

1992

# Infinite Strands, Infinitesimally Thin: Storytelling, Bayesianism, Hearsay and Other Evidence

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## Recommended Citation

Friedman, Richard D. "Infinite Strands, Infinitesimally Thin: Storytelling, Bayesianism, Hearsay and Other Evidence." *Cardozo L. Rev.* 14 (1992): 79-101.

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# INFINITE STRANDS, INFINITESIMALLY THIN: STORYTELLING, BAYESIANISM, HEARSAY AND OTHER EVIDENCE

*Richard D. Friedman\**

## INTRODUCTION

David Schum has long been one of our keenest commentators on questions of inference and proof. He has been particularly interested in, and illuminating on, the subject of “cascaded,” or multi-step, inference.<sup>1</sup> This is a subject of importance to lawyers, because most evidence at trial can be analyzed in terms of cascaded inference. Usually, the proposition that the fact finder<sup>2</sup> might immediately infer from the evidence is not itself an element of a crime, claim, or defense. Most often, an extra inference would be required to jump from that proposition to a proposition that the law deems material.

Thus, inference is complex even when the witness in court testifies to a proposition that the proponent of the evidence asks the fact finder to accept as truthful. Another layer of complexity is added when the in-court evidence is hearsay—that is, evidence that at a prior time some declarant asserted the proposition that the fact finder is asked to accept.<sup>3</sup> Hearsay is therefore a natural subject of inquiry for Schum, on which he now focuses what he calls his “conceptual microscope.”<sup>4</sup>

Part I of this Comment compares Schum’s breakdown of the testimonial process, which may lead to a hearsay declaration, with the

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\* Professor of Law, University of Michigan. Many thanks to Ron Allen, Rick Lempert, Eleanor Swift, and Peter Tillers.

<sup>1</sup> Note, for example, Ward Edwards et al., *Murder and (of?) the Likelihood Principle: A Trialogue*, 3 J. BEHAVIORAL DECISION MAKING 75 (1990), which discusses a highly significant point developed by Schum—that in cases of cascaded inference, many of the inputs to Bayesian arithmetic must be expressed as complex conditional probabilities, rather than as likelihood ratios. Note also Schum’s interesting work on redundant evidence, in David A. Schum, *Hearsay from a Layperson*, 14 CARDOZO L. REV. 1, & works cited at 67 n.107 (1992).

<sup>2</sup> I generally refer in this essay to fact finders, but in some contexts a narrower reference to a jury is appropriate.

<sup>3</sup> Naturally, the complexity is greater yet in the case of multi-stage hearsay, in which there is not one but a series of declarants, each one after the first reporting what the previous one declared. Schum wisely concentrates on single-declarant hearsay. To a large extent, the same considerations apply to single-declarant and multi-declarant hearsay; in the latter context, they apply repeatedly.

<sup>4</sup> Schum, *supra* note 1, at 14.

breakdown traditionally offered by evidence scholars.<sup>5</sup> Part II examines Schum's model of fact-finding as a backward-looking chain of inferences, and offers a simplified version of another model that integrates forward-looking story lines with Bayesian logic, in a way that might be useful for dealing with evidentiary questions. Part III adds some complexities to this model and examines its workings in the context of a hearsay declaration. Part IV discusses the broader applicability of the model in other evidentiary contexts. Part V is a brief conclusion suggesting directions for further research related to hearsay.

## I.

Schum's metaphor of the conceptual microscope is, I believe, particularly apt.<sup>6</sup> What appears to the naked eye as a simple bit of tissue may, under an ordinary microscope, reveal itself to be a far more complex structure of cells; under a microscope of higher resolving power, the yet more complex structure of the individual cells may become apparent. Similarly, the inference from hearsay evidence to a material proposition may be viewed from a distance, as a monolith; viewed more closely, it may be seen as a series of inferences—from the in-court testimony to the out-of-court declaration, from the declaration to the proposition asserted by it, and from that proposition to another, material proposition. And, as Schum recognizes, the resolving power of the conceptual microscope may be turned much higher, "decomposing" an inference into a series of smaller inferences.<sup>7</sup>

Let us focus, as Schum properly does, on the possible inference from the fact that the hearsay declaration was made to the truth of the proposition the declaration asserts. This is the key aspect of hearsay. The proponent of the evidence asks the fact finder to infer that the declarant, in asserting the proposition, was telling the truth. According to traditional doctrine, hearsay is presumptively excluded because this inference is presumably more difficult to make with respect to an out-of-court declaration than with respect to in-court testimony; in the former setting, the fact finder lacks the opportunity to observe the declarant at the time she made the declaration, under oath, and subject to prompt cross-examination.<sup>8</sup>

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<sup>5</sup> See, e.g., Laurence H. Tribe, *Triangulating Hearsay*, 87 HARV. L. REV. 957, 959 (1974).

<sup>6</sup> See Schum, *supra* note 1, at 14.

<sup>7</sup> *Id.* at 12.

<sup>8</sup> See Advisory Committee's Note to Federal Rules of Evidence, Art. VIII, 56 F.R.D. 183, 288-89. The value of the fact finder's ability to observe the demeanor of the declarant has recently been subjected to challenging scrutiny. Olin Guy Wellborn III, *Demeanor*, 76 CORNELL L. REV. 1075 (1991).

The nature of the inference is similar, though, in both settings—from the fact that a declaration was made to the truth of the declaration. The inference requires a close-up examination of the testimonial process, by which the declarant assertedly observed, remembered, and reported the event or condition described by the declaration.

Evidence scholars customarily break this process down into four aspects, or testimonial capacities, given names such as perception, memory, sincerity, and expression.<sup>9</sup> The declarant whose capacities operated perfectly accurately perceived the event or condition described by her statement, accurately remembered what she perceived, sincerely intended to communicate accurately what she remembered, and accurately communicated what she intended. Looked at another way, if the fact finder concludes that all four of these capacities operated perfectly, then from the fact that the declaration was made, the fact finder can infer the truth of the declaration. The fact finder might infer that the declaration is truthful even if two or more of the capacities operated in a substantially flawed manner—but only if the inaccuracies introduced in this way essentially canceled each other out. This fortuity is interesting, and I shall return to it later;<sup>10</sup> it is usually highly unlikely, though, and for now I shall put it aside.

Schum's breakdown of the declarant's testimonial process differs somewhat from that traditionally used by evidence scholars. For one thing, he treats the possibility of ambiguity in communication as a matter separate from that process; he appears to regard such ambiguity as a difficulty in the process by which the declarant's statement is related to or perceived by the fact finder.<sup>11</sup> This perspective, it seems to me, does not encompass the whole picture.

Suppose, for example, that a declarant intends to express proposition *X*—that Tina is a spiritually appealing person—and chooses the words, "Tina is beautiful." Suppose further that a listener perceives that the declarant intended to express proposition *Y*—that Tina is a

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<sup>9</sup> Various taxonomies have been used. See Richard D. Friedman, *Route Analysis of Credibility and Hearsay*, 96 YALE L.J. 667, 685 n.46 (1987); Roger C. Park, "I Didn't Tell Them Anything About You": *Implied Assertions as Hearsay Under the Federal Rules of Evidence*, 74 MINN. L. REV. 783 (1990). The taxonomy used here differs from others in its use of "expression." This may seem too narrow, but I mean to use it in a broad sense to include any manner of conveying a proposition, whether implicit or explicit, verbal or nonverbal. For present purposes I prefer "expression" to a broader term, "communication," because I wish to draw a sharp distinction between the capacities of the declarant and of those of her listeners; "communication" is most naturally understood to refer to the persons on both sides of the message.

<sup>10</sup> See *infra* notes 36-37 and accompanying text.

<sup>11</sup> This, if I understood him correctly, is what Schum said on this point at the oral presentation of his paper, at the meeting of the Association of American Law Schools in San Antonio, Texas, on January 7, 1992.

physically attractive person—and later testifies in court that the declarant expressed that proposition. (Alternatively, we might examine the case in which the listener repeats the declarant's statement verbatim—so that there is no communicative difficulty in the linkage between declarant and listener—but that the fact finder perceives the statement to have been of proposition *Y*. In that case, the fact finder essentially steps into the shoes of the listener for purposes of the following analysis.) There is no a priori reason to treat either the declarant or the listener as the source of the difficulty. We might take a purely relativistic point of view and say that the declaration, though asserting proposition *X* in the idiolect of the declarant, asserted proposition *Y* in the idiolect of the listener. Or we might try to introduce objectivity into this interface, saying that in standard linguistic use the declaration was of a proposition *Z*, which might be the same as either *X* or *Y*, or somewhere between the two, or not. The miscommunication might then be characterized as a result of failure of the declarant's expressive ability (if *Z* is not substantially identical to *X*), of the listener's perceptive ability (if *Z* is not substantially identical to *Y*), or of both.

I tend to prefer this latter approach, even if the pretense to objectivity in linguistic usage is unavailing. This approach preserves a certain symmetry, much like a child's link toy, in which each component has hooks in front and back so that it can be attached to adjacent components. Here, the same testimonial capacities, including the front hook of perception and the back hook of expression, might be examined for every participant—the out-of-court declarants and the in-court witness—in a hearsay chain.<sup>12</sup> But whatever view one prefers, one cannot assume away from the start the possibility that the peculiarities of the declarant's attempt to express herself might account, at least in part, for how she might have been understood to have asserted a proposition notwithstanding the falsity of the proposition.

Schum's breakdown of the testimonial process differs from the traditional one in another respect, which I find quite interesting. Whereas evidentiary scholars traditionally speak of memory, Schum speaks of objectivity.<sup>13</sup> Schum is not speaking here of sincerity; as in the traditional model, he treats that capacity separately. Rather, Schum is addressing the entire mental process of information process-

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<sup>12</sup> See, e.g., Michael H. Graham, "Stickperson Hearsay": *A Simplified Approach to Understanding the Rule Against Hearsay*, 1982 U. ILL. L. REV. 887, 895-96 (presenting diagrams of "stickperson hearsay").

<sup>13</sup> Schum, *supra* note 1, at 29.

ing that begins after the declarant's senses perceive the underlying event or condition (assuming she does in fact perceive it), continues with the coding and storage of the information, and ends when the declarant retrieves the information from memory to make her statement. This viewpoint lends the useful insight that various failures might over time lead a person to a state of belief about an event or condition at variance with the information she originally perceived. She might suffer passive decay in memory from the passage of time, but that is only one possible explanation. Once her sensors received the information, she might have distorted it in a material way in encoding it—that is, in putting it into a form that she could later use; other information, learned either before or after she perceived the event or condition in question, might have interfered with her ability to retain the material information; by “constructive processing” she may have come to believe more information than she was given; or it may be that, under the circumstances, she is unable to retrieve the information from her memory.<sup>14</sup>

As used in modern cognitive theory, however, the term “memory” embraces the whole continuous process of encoding, storage, and recall.<sup>15</sup> It thus seems to do the work that Schum imposes on the term objectivity; I think, therefore, that evidence analysts can continue to speak of memory without fear that they are overlooking an aspect of the testimonial process.

Whatever terminology one uses, though, an analyst must take care not to overlook the encoding process, by which the brain analyzes, digests, and records the signals that it receives from the senses. I suspect evidence analysts traditionally would tend to consider encoding, if they paid attention to it at all, as part of perception rather than of memory. Similarly, in Schum's taxonomy, the encoding process might be treated as a part of observational sensitivity.<sup>16</sup> Cognitive theory, however, treats encoding as part of memory.<sup>17</sup>

Note, however, that this latter question of taxonomy concerns merely the location of the dividing point between two steps in the testimonial process. If one wished, one could treat the encoding pro-

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<sup>14</sup> See ROBERTA L. KLATZKY, *HUMAN MEMORY: STRUCTURES AND PROCESSES* at 4, 108, 124-25, 141-42, 150, 274-75, 296-97 (2d ed. 1980); Schum, *supra* note 1, at 30; Friedman, *supra*, note 9, at 721 n.103 (discussing possibility of intervening change of taste).

<sup>15</sup> See KLATZKY, *supra* note 14, at 4.

<sup>16</sup> See Schum, *supra* note 1, at 29-31.

<sup>17</sup> See KLATZKY, *supra* note 14, at 4. In doing so, however, cognitive theory takes a very broad view that makes perception part of, or inseparable from, memory. *Id.* Treating information processing as integral does not, of course, preclude cognitive theory from analyzing the individual components of the entire process.

cess as a separate step between perception and memory, rather than simply allotting it to one of those two steps. But there is no particular reason to stop there: If one chose to increase further the resolving power of the conceptual microscope, one could break the entire testimonial process into an infinite number of infinitesimally small links.<sup>18</sup> At every nanosecond between the time the event or condition assertedly occurred and the time the declarant made the statement, inaccuracy might have entered that process, tending to lead towards an inaccurate statement; every nanosecond, therefore, might be deemed a separate aspect of the process.<sup>19</sup>

## II.

That the possibility of decomposition is boundless suggests that viewing inference as a "chain of reasoning"—to use another metaphor of Schum's<sup>20</sup>—is neither descriptively accurate nor prescriptively useful. But Schum does not make either of these claims. Instead, he is interested in the heuristic value of such chains. In many contexts, including juridical contexts, I believe it is useful to think of chains of reasoning. Sometimes, however, I believe that the metaphor might tend to obscure some complexity that ought instead to be highlighted.

Part I of this Comment focused primarily on the testimonial process by which the declarant came to make a statement. Now let us shift gears by focusing primarily on the inferential process by which the fact finder determines whether the statement made by the declarant is true. Consider the basic links that, according to Schum's decomposition, cover the inference from proposition *A*—that the declarant made a statement asserting proposition *D*—to the truth of proposition *D*: From proposition *A*, infer proposition *B*, that at the time the declarant made the statement she believed in the truth of proposition *D*; from propositions *A* and *B*, infer proposition *C*, that the declarant believed proposition *D* at the time of the underlying event or condition; and from propositions *A*, *B*, and *C*, infer the truth of proposition *D*. This chain of reasoning—of the type illustrated in

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<sup>18</sup> Alternatively, one might for some purposes move in the other direction, treating all of perception and memory as part of one integral link. But the need for finer analysis would still require examination of particular components of the process. See *supra* note 17.

<sup>19</sup> For example, in certain circumstances, recall of information diminishes rapidly within seconds after the perception of the information. KLATZKY, *supra* note 14, at 124-41. Furthermore, to the extent that loss of memory, over either the short or long term, is attributable to interference by information perceived after the information in question, that interference may occur at any time. See *id.* at 131, 279.

<sup>20</sup> Schum, *supra* note 1, at 31.

Schum's Figures 1-B, 2, 4, 6, and 7<sup>21</sup>—moves chronologically backwards.

This retrospective view has some appeal. Typically, much of the evidence presented to the fact finder arose after, and in some sense may have been caused by, the event or condition that the proponent is trying to prove. A description of the event or condition, whether presented in hearsay form or by live testimony, is an example of such after-created evidence. A fact finder trying to evaluate such evidence is engaged in an act of reconstruction, and that appears to be backward-looking. The problem is essentially the same in any evidentiary context.

To maintain our focus on hearsay, though, suppose that the parties stipulate to proposition *A*—that the declarant made an out-of-court statement of proposition *D*, describing an event. Suppose further, to keep matters relatively simple for now, that, while the proponent contends that the declarant spoke truthfully, the opponent contends simply that the declaration should not be believed because the declarant was lying.<sup>22</sup> The fact finder must ask, in effect, "Given this evidence, how probable is the hypothesis of truthful narration, which the proponent would have us believe, as compared to the hypothesis of dishonest statement, which the opponent would have us believe?"<sup>23</sup>

Phrased in this backward-looking way, the question may appear intractable; it cannot be answered by a direct assessment of what is likely to happen given a particular state of affairs, but rather demands an exercise of logic.<sup>24</sup> The question may be made more tractable by

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<sup>21</sup> *Id.* at 5, 9, 21, 29, 33.

<sup>22</sup> This is a simplification because the opponent need not present a particular, affirmative hypothesis as to how the declarant came to make the statement. The opponent may simply contend that the statement is false, without specifying the testimonial failure that led to the inaccuracy. See *infra* note 35 and accompanying text.

<sup>23</sup> For examinations of what I call a retrospective style of reasoning, see Richard D. Friedman, *A Diagrammatic Approach to Evidence*, 66 B.U. L. REV. 571, 586-91, 593-96 (1986) [hereinafter, Friedman, *Diagrammatic Approach*]; RICHARD D. FRIEDMAN, *THE ELEMENTS OF EVIDENCE* 65-68 (1991) [hereinafter FRIEDMAN, *ELEMENTS*].

<sup>24</sup> The following discussion assumes, in effect, that the elemental data that a fact finder will tend to use in analyzing a situation look forward chronologically, and that if the fact finder is asked to determine a backward-looking problem it will generally have to transform the question into one that can be resolved in terms of forward-looking probabilities. A forward-looking probability, as I am using the term, is one that assesses the likelihood, given a state of affairs, that a particular event will follow. A backward-looking probability, then, is one that assesses how probable it is that a given state of evidence arose from a particular earlier state of affairs. To speak of a probability as backward-looking is necessarily an over-simplification, because part of the evidence, at least background evidence, must have arisen before the time in question.

Standard Bayesian analysis does not draw any distinction between the two types of



recasting it in this way: "How probable is it that this evidence arose by a course of events consistent with the proponent's hypothesis, as compared with a course of events consistent with the opponent's hypothesis?"

This phrasing invites the fact finder to examine, and assess the relative probability of, forward-looking stories, which differ at one or more points but end in the same way—with the known evidence. The proponent's story is that the event occurred, that the declarant accurately perceived and remembered it, and that she sincerely intended to express a description of it, thus yielding the stipulated declaration. The opponent's story might be that the event did not occur, that the declarant did not perceive or remember it, but that she insincerely intended to express that it occurred, and so made the stipulated declaration. Note that the movement of these stories, chronologically forward, is in the same direction as the testimonial process; indeed, each story incorporates an accounting of how that process might have led to the making of the particular declaration.

The fact finder might assess the relative probability of these two stories by comparing them whole. Or it might use the evidence in question incrementally. To do that, the fact finder would need to assess the prior probabilities—how likely, absent the evidence in question, the alternative hypotheses (that the event occurred or that it did not occur) appeared to be. The other part of the fact finder's task would then be to answer this explicitly forward-looking pair of questions: "How probable is it, given the hypothesis that the event occurred, or alternatively, given that it did not, that this evidence would arise?" Probability assignments need not actually be numerical, and given human limitations usually cannot be. For most purposes, "fuzzy" assessments, such as "highly probable" or "extremely improbable," will do.

Thus, the backward-looking, bottom-line inquiry—as to the probability of the alternative hypotheses given the evidence in question—is transformed. The fact finder is asked to assess the relative probability of two forward-looking stories, one consistent with one

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probability that I refer to here. See, e.g., Ward Edwards, *Comment*, 66 B.U. L. REV. 623, 624 (1986); Laurence H. Tribe, *Trial by Mathematics: Precision and Ritual in the Legal Process*, 84 HARV. L. REV. 1329, 1346 (1971). But neither does anything in standard Bayesian analysis contradict the idea that people will tend first to assess forward-looking probabilities, which track a natural chronological progression from one state of affairs to another, and derive other probabilities from them. Indeed, Schum's analysis follows just this pattern, using forward-looking probabilities as the given data. Schum, *supra* note 1, at 73-77. Given that an observer assigns subjective Bayesian probabilities based at least in part on the observer's experience of the world, and that the world moves chronologically forward, it seems natural to expect that elemental probabilities will most often be forward-looking.

hypothesis and one consistent with the other. This transformation, using a forward-looking comparison to answer a backward-looking inquiry, is the essence of Bayesian logic.

Note that this analysis refers to both story construction and Bayesian logic in a favorable light. Though some recent scholarship appears to treat these as contrasting approaches,<sup>25</sup> there is nothing inconsistent about them at all.<sup>26</sup> The fact finder, in attempting to account for the evidence, will likely attempt to construct alternative stories that square with one material hypothesis or another. And in choosing between alternative stories, the ideal fact finder should make a selection consistent with Bayesian logic. In the context being considered here, that logic does not require sophisticated mental gymnastics; it means essentially that in evaluating the probability of one hypothesis as compared to another, given a body of evidence, one must take into account—or act consistently with the way one would by taking into account—both the prior probabilities and the relative probabilities that the evidence would arise given one hypothesis or given the other. Suppose, for example, that before a particular item of evidence was offered a given hypothesis appeared somewhat less probable than its negation, but the evidence was far more likely to arise given the hypothesis than given the negation. In light of the evidence, the hypothesis probably appears more likely than the negation.

Two aspects of this analysis are not captured by a representation of a backward-looking chain of inference. First, such a representation does not convey the sense that assessment of the probability of a hypothesis in light of evidence consists of the comparison of alternative stories that might account for the evidence; this sense would be conveyed by a diagram that included two chains, one connecting the evidence with the hypothesis and one connecting the evidence with the negation of the hypothesis. Schum does present other diagrams, such

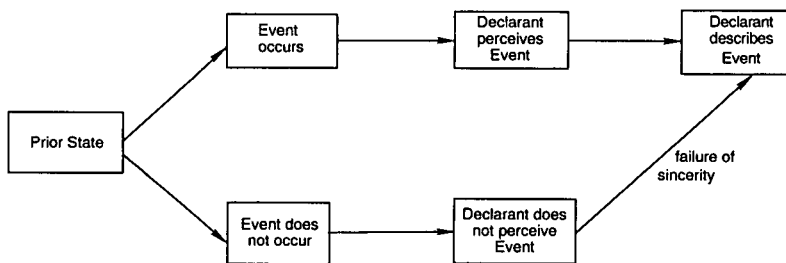
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<sup>25</sup> See, e.g., John Leubsdorf, *Stories and Numbers*, 13 *CARDOZO L. REV.* 455, 455-56 (1991). The "Story Model" has been extensively described and analyzed in the work of Nancy Pennington and Reid Hastie. See, e.g., Nancy Pennington & Reid Hastie, *A Cognitive Theory of Juror Decision Making: The Story Model*, 13 *CARDOZO L. REV.* 519 (1991). For a significant and interesting piece of legal scholarship that complements the work of Pennington and Hastie, see Ronald J. Allen, *The Nature of Juridical Proof*, 13 *CARDOZO L. REV.* 373 (1991).

<sup>26</sup> See Paul Thagard, *Probabilistic Networks and Explanatory Coherence* (Dec. 3, 1991) (unpublished manuscript presented at International Seminar on Evidence in Litigation, Benjamin N. Cardozo School of Law, Jan. 30, 1992, on file with *Cardozo Law Review*). Thagard says that "[a]t the most general level, this paper can be understood as offering a reconciliation of explanationism and probabilism." *Id.* at 11. He claims that the "theory of explanatory coherence" that lies at the center of his work "has a probabilistic interpretation, albeit a computationally expensive one." *Id.* at 12. He appears to recognize, though, that if "explanationist" models do not take prior probabilities into account they may lead to unrealistic results. *Id.* at 10-11.

as his Figures 9 through 11, that represent alternative hypotheses.<sup>27</sup> But these more complex diagrams share the second limitation of his simpler chains of reasoning—they do not suggest the forward-moving nature of story reconstruction.<sup>28</sup> The chains of reasoning show backward-moving arrows, and the later diagrams lack any arrows. I believe his later diagrams could be improved quite easily by including forward-moving arrows, indicating that the evidence in question, here a declaration, could have arisen under the alternative hypotheses that the event in question occurred and that it did not. Figure 1, using a somewhat different format, shows what I mean.<sup>29</sup>

Figure 1



I am not, of course, disagreeing with Schum about the validity of his Bayesian analysis; he is one of the most sophisticated users of the Bayesian model, and he does not make mistakes in applying it.<sup>30</sup> At the same time, I am offering more than a quibble about presentation or diagrammatic technique. Under the view I am presenting here, the fact finder need not draw a series of inferences, each digging a little deeper into the past. Rather, the fact finder need only compare alternative stories, and decide which, taken as a whole, seems a more probable explanation of the evidence. Put another way, the fact finder need not create and analyze a complicated logical tree, with many diverging branches and sub-branches. Rather, the fact finder's far

<sup>27</sup> Schum, *supra* note 1, at 44-59.

<sup>28</sup> As noted, *supra* note 24, standard Bayesian analysis does not distinguish between forward-looking and backward-looking probabilities, but the former may be more elemental, and are used as data by Schum.

<sup>29</sup> Figure 1 assumes that the declaration was made. Accordingly, there is no node indicating the possibility that the declarant does not describe the event. The discussion also assumes that the declaration has been accurately transmitted to the fact finder; if the focus were on the transmittal process, the diagram could be extended to show that process.

<sup>30</sup> Schum is catholic in his receptivity to alternative systems of probability, but his mathematical analysis is traditional Bayesian.

simpler job is to construct essentially one-dimensional story lines, which move from one event to another, and then to compare the plausibility of such stories.<sup>31</sup>

I should emphasize that this model is not meant to describe how fact finders actually think. Nor is it even meant to prescribe how fact finders subject to ordinary human limitations should think. But it may be that this model, with some modifications about to be dis-

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<sup>31</sup> *Essentially* is meant to be a hedge word. Given multiple pieces of evidence, it will often be difficult to think of a story in a single chronological line. Suppose, to take a simple case, that the prosecution in a murder case offers just three pieces of evidence: (i) the testimony of Alice that the defendant Donald said on March 1, "I hate Victor and would like to see him dead"; (ii) the testimony of Barbara that on March 2 Victor was found, *very* recently killed by a gunshot wound, with a smoking pistol by his side; and (iii) the testimony of Cora that fingerprints on the pistol match those of Donald. The jury will probably find it awkward to construct a single story line that moves chronologically forward. But it might well construct a story out of substories that do move forward chronologically. Consider as an example one possible story line, accepting the prosecution's view of the case, that might be thought to comprise four substories.

According to the first substory, Donald felt hatred for Victor and a desire to see Victor dead, and then stated his feelings to Alice, who subsequently testified truthfully in court as to Donald's statement.

According to the second substory, Donald shot Victor on March 2 with a pistol and then accidentally dropped the pistol and immediately left the scene. Barbara immediately appeared on the scene and viewed it, and subsequently testified truthfully as to what she saw.

According to a third substory, Donald handled a pistol on March 2 and so left his fingerprints on it, then dropped the pistol. The pistol subsequently came into the possession of Cora, who took fingerprints from the pistol and compared them to a sample of Donald's, and the two samples matched. Cora subsequently testified truthfully as to the match.

Notice that each of these three substories ends with the presentation of evidence to the jury, and that in the aggregate they include all of the evidence presented to the jury. One or more points from each of these three sub-stories will fit what may be considered the principal substory: Donald felt hatred for Victor and a desire to see Victor dead, took hold of a pistol, transmitting his fingerprints to the pistol, shot Victor, accidentally dropped the pistol by Victor's side and fled.

This story line may therefore be thought of as a main trunk—the principal substory summarized immediately above—intersecting with smaller branches that lead to the in-court evidence. This tree is nevertheless far simpler than the intricate one that is yielded by viewing the fact finder's job as a series of probabilistic inferences involving many intermediate propositions and their negations. The real complexity in the model presented here arises from the infinite multiplicity of story lines. See *infra* notes 35-43 and accompanying text. I believe the sub-story model presented here bears a significant resemblance to the structure of stories in the Story Model presented by Pennington and Hastie, see Pennington & Hastie, *supra* note 25, at 526-27 ("The highest level episode characterizes the most important features of 'what happened.' Components of the highest level episode are elaborated in terms of more detailed event sequences in which causal and intentional relations among subordinate story events are represented."), and to the structure of "inferential streams" presented by Albert J. Moore in *Inferential Streams: The Articulation and Illustration of the Trial Advocate's Evidentiary Intuitions*, 34 UCLA L. REV. 611 (1987). Moore would probably be horrified, though, to think that anything he did could be consistent with Bayesian analysis. See Paul Bergman & Al Moore, *Mistrial by Likelihood Ratio: Bayesian Analysis Meets the F-Word*, 13 CARDOZO L. REV. 589 (1991).

cussed, provides a fair approximation of how a good fact finder will reason, and does so in a way that can be of use to legal analysts.

### III.

Under the model presented here, if the fact finder is required to determine whether or not it believes a given fact to be true, there is no need for the fact finder to make any intermediate factual conclusions.<sup>32</sup> Faced with proof of a hearsay declaration, for example, the fact finder does not have to ask separately whether it believes that the declarant was sincere when she made the declaration, or whether her perceptive senses and memory operated accurately. Rather, the fact finder must consider stories that are consistent with the evidence and that are alternatively consistent with and inconsistent with the disputed element, and decide which is more persuasive.

Looking at the fact-finding process in this way does not mean that the process must be oversimplified. Forward-moving stories, no less than backward-looking inferences, may be put under the microscope; a story may be broken down as finely as necessary. Thus, the testimonial process leading from an event to a declaration describing it might be viewed whole or in segments—for example, from the event to the declarant's perception, then by operation of memory to belief at a later time, then to a sincere intent to express the truth, and then to an accurate expression. Similarly, a story consistent with the fact that the declaration was made but inconsistent with the occurrence of the event might be broken down into segments such as the following: The event did not occur, the declarant did not perceive it, nor remember it, but insincerely desired to express that it did, and made that expression.

So far, I have spoken as if there are only two possible stories consistent with the evidence, one consistent with the hypothesis and one inconsistent. Usually, though, that is an oversimplification. Figure 2 shows what I mean.<sup>33</sup> This diagram indicates five stories consistent with the fact that the declaration was made. One of these stories is consistent with the occurrence of the event in question. The other four are not. In one of these stories, the event did not occur, but the declarant perceived that it did. In another account, the event did not occur and the declarant did not perceive that it did, but a failure of memory led her to believe that it did. In yet another story, the declar-

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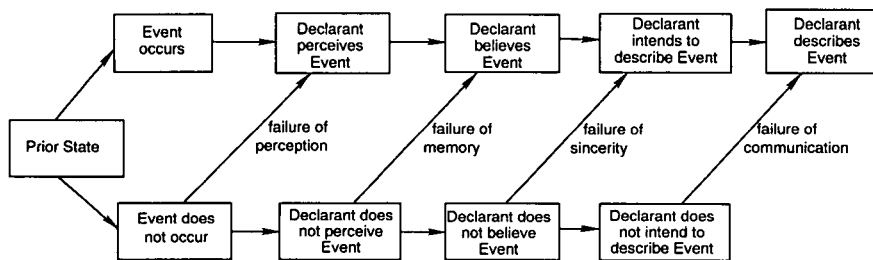
<sup>32</sup> This point is made well in Dale A. Nance, *Conditional Relevance Reinterpreted*, 70 B.U. L. REV. 447, 451 (1990).

<sup>33</sup> I have given rather detailed explanations of diagrams like Figure 2 in Friedman, *supra* note 9, at 685-88, and in FRIEDMAN, *ELEMENTS*, *supra* note 23, at 134-36.

ant perceived and remembers accurately that the event did not occur, but insincerely intends to express that it did. In the final account, the declarant did not even intend to convey the message that the event occurred, but she did so because of a failure of expression.<sup>34</sup>

Thus, the comparison the fact finder must make is not simply of one story against another. Even if the fact finder perceives only one story line consistent with both the occurrence of the event and the making of the declaration, it must consider numerous ways, each somewhat different from the others, by which the declaration might have been made even though the event did not occur. At least the possibility of a false declaration should not be thought of as a single strand, or story line, but rather as a thread composed of multiple related, yet different, strands.<sup>35</sup>

Figure 2



Even the model suggested by Figure 2 is a simplification in several ways. Some of the paths by which the evidence might have arisen are not represented at all, and many others are represented without differentiation at all.

First, Figure 2 does not represent any story lines in which the failures of more than one testimonial capacity cancel each other out. For example, the diagram does not show the possibility that the event occurred, the declarant failed to perceive it, but her memory played tricks on her and so at the time of her statement she believes that she did perceive it. Such story lines are usually rather flimsy possibilities,<sup>36</sup> if that is so, a fact finder is likely to disregard them, and doing

<sup>34</sup> This diagram does not indicate separately what Schum calls "testimonial bias," the inclination or disinclination to provide a statement at all. Schum, *supra* note 1, at 37. This factor could be indicated by complicating the diagram slightly, adding a pair of nodes to the left of the "Intends to describe" and "Does not intend to describe" nodes, indicating that the declarant did, or alternatively did not, decide to make a statement.

<sup>35</sup> In my view, this multiplicity of strands creates a difficulty for any model of juridical proof that requires a party to present a specific story. See *infra* note 40.

<sup>36</sup> Not always, though. For example, a declarant might perceive an event but then forget

so would not create any serious inaccuracies. Thus, Figure 2 shows no segments leading from the upper tier of nodes to the lower tier, because a story line including such a segment, each representing a failure of a testimonial capacity, would then need an upward-pointing segment, representing another failure, to reach the node representing the making of the declaration. Interestingly, Schum's mathematical analysis does not eliminate possible accounts simply because they include such self-nullifying testimonial failures. Schum's approach has the advantages of symmetry and completeness, and it leads to quite elegant mathematical results.<sup>37</sup> I think, however, that the approach presented in Figure 2 has the advantage of simplicity, and perhaps, if I am right that the fact finder will tend to disregard such coincidental multiple failures, of additional realism as well.

Second, and more importantly, at each stage Figure 2 represents only two possibilities—the event either occurred or it did not, the declarant either perceived the event or did not, and so forth. This is not an inaccuracy, but rather a simplified categorization. At times, though, it may obscure significant complexities. Suppose, for example, that the hypothetical event in question is that it rained an inch on Tuesday. One possibility is that it did indeed rain an inch on Tuesday, and all other possibilities might be lumped together under the proposition that it did not rain an inch on Tuesday. But obviously that lump comprises an infinite number of other possibilities: It might not have rained at all on Tuesday, or it might have rained any amount other than an inch; moreover, even if it did not rain on Tuesday, it might have snowed an inch, it might have rained an inch on Wednesday, and so forth. And at each subsequent stage of the testimonial process before the making of the declaration, there is a similarly infinite range of possibilities, each infinitesimally narrow. Viewed in this way, the thread of possibilities is composed not of several but of an infinite number of strands, each infinitesimally thin, and each, taken alone, with an infinitesimal probability.<sup>38</sup>

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it, and then, finding it to her advantage to claim that the event did occur, make a statement to that effect. In such a case, the failures of memory and sincerity would cancel each other out.

<sup>37</sup> The equations yielded by Schum's mathematical analysis are presented in the Appendix to Schum, *supra* note 1, at 73, 76. Schum does not actually show the derivations of these equations, but they are easily enough derived by Bayesian algebra.

<sup>38</sup> Some of those strands might involve more than one error in testamentary capacity. For example, if it rained an eighth of an inch, the declarant might have perceived that it rained a quarter of an inch, remembered that it rained half an inch, intended to communicate that it rained nearly an inch, but inarticulately communicated that it rained an inch. See generally Friedman, *supra* note 9, at 681-84, 689, 736-739 (discussing the multiple possibilities of falsehood). Figure 2 does not reveal such possibilities of multiple error. Given the simplified categorization of that diagram, the only multiple errors that it could show would be ones that

This complexity concerns not only the possibility of testimonial error but also that of truth. Suppose, to take a simple example, that the declarant said that a certain event occurred "at about 2 p.m." There plainly is an infinite number of stories that are consistent with this statement. The event could have occurred at 2 p.m. sharp, at one nanosecond past 2 p.m., at two nanoseconds past, and so forth.<sup>39</sup> Thus, even the thread that might lead from an event to a truthful description of it is composed of an infinite number of infinitesimally thin strands.<sup>40</sup>

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would cancel each other out. As discussed above, the probability of such compensating errors is usually quite small.

<sup>39</sup> I do not mean that a fact finder will consciously, or even subconsciously, distinguish among all these different stories; rather, I believe the fact finder will group large batches of stories together. See *infra* text accompanying notes 42-43. But those who analyze the inferential process must be aware that in reality the fact finder is simplifying the situation by engaging in this batching process.

<sup>40</sup> As this analysis indicates, it does not suffice to think of the inferential process as comparing the most likely story consistent with the hypothesis to the most likely story inconsistent with it. Cf. Ronald J. Allen, *A Reconceptualization of Civil Trials*, 66 B.U. L. REV. 401, 426 (1986) (proposing reconceptualization in which each party must make specific allegations and the fact finder decides which seems more plausible); Allen, *supra* note 25, at 381 (Both parties in civil litigation should be required "to propose equally well specified cases" and the fact finder should be instructed "to render judgment for the more likely of the two competing versions of reality offered by the parties.") The probability of any single given story, exactly defined, is near zero.

A theorist drawn to Allen's view might attempt to avoid this problem by saying that a party's story need not be so extremely specific; the "one nanosecond past 2 p.m." and the "two nanoseconds past two" stories should be considered as part of the same. See Allen, *supra*, at 428 ("The proposal made here is coherent so long as the parties are required to be fairly specific, although I cannot say what 'fairly' means with any specificity."). I do agree that parties group stories together in presenting them and that fact finders group stories together in considering them. But there does not appear to be any readily ascertainable standard as to how specific a story must be—that is, as to how broad a group of stories may be treated as one—for the story to be weighed against the other party's story.

Even if a satisfactory standard is ascertainable, another problem awaits. Suppose the plaintiff presents one sufficiently specific story group and the defendant presents several such groups. Suppose further that the fact finder regards the plaintiff's single story group as more probable than the most probable sufficiently specific story group presented by the defendant, but less probable than the aggregate of all the story groups presented by the defendant. If the defendant is not given the benefit of the aggregation, the result would be unattractive; the fact finder might easily find for the plaintiff, even while regarding it as far more likely than not that the defendant is not liable. If, on the other hand, the defendant is given the benefit of the aggregation, then the defendant is not really required to be specific at all. Indeed, if the defendant also gets the benefit of the usual, and probably unavoidable, doctrine that the fact finder is not limited to the evidence formally proffered at trial but may also rely on its "understanding, knowledge, judgment, and experience," Allen, *supra*, at 433 n.71, then Allen's view actually seems quite close in operation to the conventional understanding of civil trials. That is, the fact finder, even without relying on evidence presented by the defendant, can give the defendant the benefit of any stories that are both inconsistent with the plaintiff's hypothesis and reasonable given all the evidence that is presented at trial.

Allen's work appears to reflect this dilemma. In Allen, *supra*, at 432-33, he appears to



Finally, Figure 2 simplifies in another dimension by representing the testimonial process as a limited number of discrete stages. But, as we have seen, that process is really a continuous one, during any point of which a failure ultimately leading to a false declaration might have occurred. For example, as discussed earlier,<sup>41</sup> failure might have occurred between the actual sensory perception and storage of the perception in memory, during the process by which the perception is transmitted to the brain and encoded. Or a failure of memory might have occurred at any point between the time the declarant perceived whatever she did and the time she decided to make the declaration.

We can, therefore, view the testimonial process in as many small segments as we wish. Theoretically, a fact finder could break a story line down into many small segments, evaluating the plausibility of the whole by evaluating the probability at each point that events would move to the next segment along that story line. In practice, that would be a virtually impossible, if not useless, task. A fact finder is far more likely to be able to make sense of a situation by thinking of complete story lines, or at most in a limited number of segments. But taking a complete view of the situation requires a fact finder to recognize that at innumerable points what appeared to be a single story line might dissect into separate strands, which rejoin at some later point, perhaps as late as the creation of the known evidence. Threads of story lines may have many strands indeed.

The fact finder's lot, in short, is not a simple one. The fact finder must take into consideration and evaluate an infinite number of story lines, each infinitesimally different from some others and dramatically different from still others. But this emphasis on the complexities of the process should not be taken too far. To say that a situation presents an infinite number of varying possibilities is not to say that humans are unable to deal with the situation reasonably well. To catch a thrown ball may require rapid and tolerably accurate assess-

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endorse allowing the defendant to benefit from the aggregation of distinct stories. But in his later article, Allen, *supra* note 25, he does not address the issue; his discussion of "equally well specified cases," and his view that the nature of juridical proof typically calls for ordinal rather than cardinal reasoning, suggest that he does not have aggregation in mind.

Having said all this, I do not doubt that very often a party, whether plaintiff or defendant, will most wisely present, and ask the fact finder to accept, only one, rather specific, story. But sometimes a plaintiff ought to be able to invoke *res ipsa loquitur* and say in effect, "I don't know just what happened, but the defendant must have caused my injury." And a defendant ought to be able to argue to the jury, "I don't know just how the plaintiff got injured, but clearly I wasn't responsible." See generally W. LANCE BENNETT & MARTHA S. FELDMAN, RECONSTRUCTING REALITY IN THE COURTROOM 93-115 (1981) ("case construction strategies" in criminal trials).

<sup>41</sup> See *supra* notes 16-19 and accompanying text.

ments of an infinite number of possibilities of how spin and the wind may affect the trajectory of the ball, and yet many people, given sufficient experience, are able to handle the task quite well. Heuristics no doubt help the ball catcher, and they also may help the fact finder. Individual story lines are essentially one-dimensional strands,<sup>42</sup> and a fact finder, by declining to draw exceedingly fine distinctions among them, may batch large groups of them together without significantly distorting the fact-finding process.<sup>43</sup>

If, even given such heuristics, the fact finder's job in this model seems extremely difficult, that is not because of the Bayesian aspect of the model. The fact finder must construct and group infinitesimally thin story lines, each of which is consistent with the evidence and some of which are consistent with the hypothesis at issue; eventually, the fact finder must compare the relative plausibility of the group of stories consistent with the hypothesis at issue and the group of stories inconsistent with that hypothesis. These are difficult tasks, and it is difficult for an analyst of the fact-finding process to ascertain just how the fact finder performs them. The Bayesian aspect of the model, however, simply allows the fact finder to transform its comparison of forward-looking story groups into a backward-looking inference, a determination of the probability of the hypothesis given the body of evidence. This transformation is not really very complex at all.

In short, the world is a complex place, but that is not the fault of Bayesian analysis. A fact finder may simplify it, by disregarding altogether certain types of stories that seem unlikely to have accounted for the evidence and by grouping together many other stories that seem different from each other only in small respects. If such simplifications enable the fact finder to make the complexities more manageable, so be it. This complexity, and the need for simplification, would persist if one focused only on the stories as a basis for inference, without using Bayesian logic at all. But the fact finder's analysis will be a less accurate reflection of the fact finder's beliefs if, given whatever simplifications the fact finder does make, the analysis leads to results inconsistent with that logic.

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<sup>42</sup> Again, note the weasel word. See *supra* note 31.

<sup>43</sup> For a very helpful review of the psychological literature on the cognitive theory of schematic information processing and the role that a particularly important heuristic—the representativeness heuristic—plays in determining a fact finder's probabilistic conclusions, see Albert J. Moore, *Trial by Schema: Cognitive Filters in the Courtroom*, 37 UCLA L. REV. 273, 278-303 (1989).

## IV.

Like Schum's Article, this Comment has focused largely on the use of a single piece of evidence, a hearsay declaration, in the evaluation of a single material proposition.<sup>44</sup> But I do want to emphasize that the perspective I am presenting need not be so limited.

First, much of what I have to say about hearsay could be applied equally well to other forms of after-created evidence, such as in-court testimony describing the event in question, or physical evidence that might be a trace of the event. That is, the fact finder can evaluate the probability of the disputed hypothesis in light of the evidence by constructing and comparing stories, or groups of stories, that are consistent with the evidence and alternatively consistent with or inconsistent with the hypothesis. Indeed, the same technique may be applied to evidence, such as proof of a previously-stated intent, that might have arisen before the event in question. With respect to such evidence, though, the Bayesian transformation is not necessary; all that is needed is the construction of stories by which the hypothesis might, or alternatively might not, have followed the evidence.<sup>45</sup>

Second, more broadly, nothing in the model presented here is at all inconsistent with a "holistic," rather than an "atomistic," view of evidence.<sup>46</sup> The fact finder can assess the probability of a hypothesis in light of more than one item of evidence at once. Making such an assessment is not necessarily more difficult than, and in any event is not fundamentally different from, an assessment of a single piece of evidence. The fact finder must compare stories (or groups of stories), alternatively consistent with or inconsistent with the hypothesis being tested, that are consistent with all the evidence. The fact finder must, in effect, connect all the known dots and construct alternative versions that connect the disputed dots as well. No matter how many pieces of evidence there are, two such alternative versions, one consistent with the hypothesis in question and the other not, may be identical in substantial part, diverging only near the point in dispute. Adding items of evidence need not make the fact finder's task

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<sup>44</sup> Schum, *supra* note 1, at 8.

<sup>45</sup> In reality, proof of a state of affairs arising before the event in question, and making that event more or less likely, will often be proved by evidence arising afterwards. In the hypothetical presented in note 31, *supra*, for example, the main event in question was Donald's alleged killing of Victor. If at an earlier time Donald came to hate Victor, that would make Donald's killing of Victor more likely. Proof of Donald's feelings might be offered in the form of Alice's testimony that Donald expressed such feelings. The testimony is a form of after-arising evidence.

<sup>46</sup> Cf. Mirjan Damaska, *Atomistic and Holistic Evaluation of Evidence: A Comparative View*, in *COMPARATIVE AND PRIVATE INTERNATIONAL LAW* 91 (David S. Clark ed., 1990).

unmanageable.<sup>47</sup>

Third, by comparing the relative probability of competing groups of stories, a fact finder can determine in one step whether the conjunction of the elements of a claim, crime, or defense can be decided together. Suppose a plaintiff's tort action is conceived of as having four elements: duty, breach, causation, and injury. A jury may properly be instructed that it should not find for the plaintiff unless it finds all four elements—not just each element individually, but the conjunction as well—to a preponderance of the evidence. In other words, the jury should not find for the plaintiff unless it concludes that the group of stories that include all of the elements is a more persuasive accounting for all the evidence than the group that does not.<sup>48</sup> Viewed in this way, the supposed “difficulty about conjunction” that highly-respected scholars have perceived as inherent in a Bayesian view of fact finding<sup>49</sup> simply disappears.<sup>50</sup>

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<sup>47</sup> See *supra* note 31.

<sup>48</sup> An instruction of the sort I suggest might run as follows:

To find for the plaintiff, it is not sufficient that you find that the plaintiff has proven that each individual element of the claim is more likely true than not. You should find for the plaintiff only if you find that the plaintiff has proven that it is more likely than not that all elements of the claim, taken in conjunction, are true.

I do not claim that judges usually give an instruction of this type. I do claim, however, that such an instruction would be perfectly proper. I also suspect, though the matter would require empirical proof, that juries often actually act in accordance with such an instruction. Suppose, for example, that a jury assessed the probability of each element of the claim, conditional on the truth of all prior elements, as .6. I strongly suspect that the jury, even without encouragement from a judicial instruction, would likely conclude that the plaintiff's case, taken as a whole, is too unlikely to warrant a verdict. I believe the analysis presented here is in substantial accord with the illuminating discussion of the supposed “difficulty about conjunction” presented in Dale A. Nance, *A Comment on the Supposed Paradoxes of a Mathematical Interpretation of the Logic of Trials*, 66 B.U. L. REV. 947 (1986).

By referring for convenience in this discussion to the traditional “more likely than not” standard, I do not mean to suggest that this is usually an accurate statement of the usual burden of persuasion in civil cases. In fact, I believe the matter might be a good deal more complicated. It could be, for example, that to prevail the plaintiff should have to prove that the conjunction is *substantially* more likely than not, and also that such elements as identity are more probable yet. See generally Richard D. Friedman, *Generalized Inferences, Individual Merits, and Jury Discretion*, 66 B.U. L. REV. 509, 515-17 (1986); FRIEDMAN, ELEMENTS, *supra* note 23, at 27-30.

<sup>49</sup> See L. JONATHAN COHEN, THE PROBABLE AND THE PROVABLE 58-67 (1977); Allen, *supra* note 25, at 374-75.

<sup>50</sup> Ron Allen does offer conjunctive decision making as a solution, but he does so in the context of an argument that Bayesian inference is incompatible with the conventional view of trials. See Allen, *supra*, note 40, at 405-07; Allen, *supra* note 25, at 409. Although his resolution is to adopt what he calls a reconceptualization of civil trials, see Richard Lempert, *The New Evidence Scholarship: Analyzing the Process of Proof*, 66 B.U. L. REV. 439, 468 (1986) (Allen “accepts the [Bayesian rational] models, or at least the premises of rationality built into them, as normative and argues that if trials are not rational in the same way the models are, it is the rules of trial proof that should be changed.”), his analysis appears to reflect hostility to

Instructed in the way suggested here, a jury may still consider the probability of one or more individual elements, with the thought that this might cut its task short. Thus, if the tort plaintiff failed to persuade the jury to a preponderance as to any given element, then she must have failed to persuade it to a preponderance as to the con-

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Bayesian inference. See, e.g., Ronald J. Allen, *Analyzing the Process of Proof: A Brief Rejoinder*, 66 B.U. L. REV. 479, 480 (1986) ("the disutility of yet another defense of Bayesianism").

The problem arises from Allen's perception that according to Bayesian analysis, if a conjunctive instruction is given, a plaintiff's chance of success would depend on the "fortuity" of how many elements her claim is defined to require. Allen, *supra* note 40, at 407. Of course, if the lawmaker, whether a legislature or court, adds an element to the definition of the claim's requirements with the intention of making a change in the substance of those requirements, then the claim will be more difficult for the plaintiff to prove. But that consequence is in no sense fortuitous. Allen's point, it appears, is that if two definitions are identical in substance but one is broken down into more elements than the other, the claim ought not be more difficult to prove under one definition than under the other. That is correct. It is also correct that a conjunctive instruction would require a higher average probability for each element the more elements the claim is defined to have. For example, if a given claim is defined to have two elements, then the elements must have an average probability of approximately .707 to have a conjoint probability of .5 (that is,  $.707 \times .707$ ) or greater; if the same substantive requirements are expressed in three elements, then the average probability must be approximately .794 (.794<sup>3</sup> being approximately .5) or greater; if four elements, .841 or greater, and so forth.

It is not correct, however, that the choice of one definition or the other would alter the plaintiff's chance of success before a rational Bayesian fact finder operating pursuant to a conjunctive construction. Suppose that an element of a particular claim, according to one definition, is that a given condition remained constant for a period of one year, and that according to another definition this element is replaced by 365 elements, one for each day in the year. Assuming that the condition is one as to which change on a given date is unlikely, the probability that the condition remained constant on January 1 is very high, the probability that it remained constant on January 2 is also very high, and so forth. Therefore, a rational Bayesian fact finder who assessed the probability of constancy over the course of the year to be about 50% would likely assess that the probability of constancy on any given date to be very close to 100%. Thus, dividing the problem into more slices does not alter its substance; the slices become thinner, and so less imposing to the plaintiff.

Moreover, it must be borne in mind that if elements are closely related the probabilities of each in a given case are not independent. Suppose that, for some reason, a plaintiff has to prove that a given car had four Chevrolet hubcaps. The probability that all four wheels had Chevy hubcaps is not simply the product of the probability that each wheel, taken separately, had a Chevy hubcap. A rational Bayesian fact finder would likely assess the probability that the second wheel had a Chevy hubcap, *given that* the first wheel had one, as close to one. The probabilities that the third and fourth wheels had Chevy hubcaps, given that the prior ones did as well, would probably be assessed as even closer to one. The rational Bayesian fact finder would therefore assess the probability of the following two propositions, each referring to a standard car with four wheels, as identical:

- (1) "All four wheels had Chevy hubcaps."
- (2) "The left-front wheel had a Chevy hubcap, *and*  
The right-front wheel had a Chevy hubcap, *and*  
The left-rear wheel had a Chevy hubcap, *and*  
The right-rear wheel had a Chevy hubcap."

In short, it is not a matter of concern that a conjunctive instruction means that the more elements a claim is construed to require the greater the average probability of each element must be for the plaintiff to prevail.

junction of the elements. In other words, while an element-by-element approach should not be deemed a sufficient method of reaching a verdict *for* a claim, crime, or defense, it might provide a helpful shortcut in reaching a verdict *against* the claim, crime, or defense. Even then, though, there is no *need* for the jury to make any finding at a level more detailed than that of the entire claim, crime, or defense.<sup>51</sup>

### CONCLUSION

In this Comment, I have dealt with hearsay, as Schum does, in a way that is applicable to much other evidence as well. Like other scholars, therefore, I agree with Schum's conclusion that probative value should be assessed in much the same way for hearsay as for other evidence,<sup>52</sup> and that often hearsay has very significant probative value.<sup>53</sup> Moreover, I believe that, notwithstanding the difficulty that the fact finder might face in evaluating the possibility that a failure of testamentary capacity accounts for the making of an out-of-court declaration, if the probative value of the declarant's live testimony would exceed its prejudicial impact, then the same is usually true for the hearsay statement.<sup>54</sup> If, in fact, jurors tend to discount hearsay evidence sufficiently in light of hearsay dangers, then the danger of prejudice is not in itself a persuasive reason to exclude hearsay. And this is true *a fortiori* if jurors tend to over-discount hearsay evidence.

Empirical research, which has recently begun in earnest, may shed some light on this matter. This research might in time yield a useful generalization, such as that juries usually are able to take hearsay dangers adequately into account. On the other hand, it might indicate that a finer-tuned analysis is necessary; perhaps jurors tend to discount adequately for hearsay in some recurrent circumstances but not in others. If so, it will be interesting to learn how closely the dividing line resembles the very craggy line marked out by the various exceptions to the hearsay rule.

Meanwhile, though, evidence scholars must think beyond these questions. We must try to determine what other considerations, not captured in the balance of probative value versus prejudicial impact, might sometimes warrant the exclusion of hearsay.

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<sup>51</sup> Moreover, as suggested above, *supra* note 48, it may be that the plaintiff should not prevail without proving that certain elements are particularly likely.

<sup>52</sup> Schum, *supra* note 1, at 71.

<sup>53</sup> See, e.g., Jack B. Weinstein, *Probative Force of Hearsay*, 46 IOWA L. REV. 331 (1961).

<sup>54</sup> I discuss this point at greater length in Richard D. Friedman, *Toward a Partial Economic, Game-Theoretic Analysis of Hearsay*, 76 MINN. L. REV. 723 (1992).

One of those considerations is the accused's Confrontation right.<sup>55</sup> In some cases admission of a hearsay statement made by a declarant whom the accused has not had an adequate opportunity to cross-examine violates the accused's right to confront the witnesses against him. But just what the bounds of this right are has been difficult to determine. The Supreme Court has shown an increasing tendency to equate these bounds with those of ordinary hearsay law.<sup>56</sup> That is, if an offered statement would be admissible under standard hearsay doctrine—as to which the Federal Rules of Evidence provide a point of reference—the Court seems unlikely to hold the statement inadmissible by reason of the Confrontation Clause.<sup>57</sup> This strikes me as an unfortunate tendency. Tying the Confrontation Clause to ordinary hearsay law inevitably creates a tension between the need for a flexible, relatively receptive hearsay law, on the one hand, and the need for satisfactory constitutional protection of criminal defendants, on the other. Resolving this tension means that one need or the other—or, more likely, both to some degree—will be unsatisfied. Thus, I believe that scholars, and eventually the Supreme Court, should attempt to develop a theory of the Confrontation right that is independent of the limits of hearsay doctrine.<sup>58</sup>

Even apart from the Confrontation context, and even assuming that a given hearsay statement (or a broad enough category of statements to be cognizable by the law) is more probative than prejudicial, other factors may warrant exclusion of the statement in some circumstances. The admissibility determination is not made in a static setting but in the context of a dynamic litigation process, in which parties react to rulings or anticipated rulings, sometimes by presenting evidence, and in which the presentation of evidence often entails

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<sup>55</sup> U.S. CONST. amend. VI.

<sup>56</sup> See *White v. Illinois*, 112 S. Ct. 736 (1992).

<sup>57</sup> See *id.*

<sup>58</sup> Among the attempts to offer such a theory are Peter Westen, *The Future of Confrontation*, 77 MICH. L. REV. 1185 (1979) (Confrontation Clause should require the prosecution to produce an available declarant on the truth of whose statement the prosecution wishes to rely, if confrontation appears likely to be useful); Michael H. Graham, *The Confrontation Clause, the Hearsay Rule, and Child Sexual Abuse Prosecutions: The State of the Relationship*, 72 MINN. L. REV. 523 (1988) (Clause should apply only to available declarants who made their statements in anticipation of use in investigating or prosecuting the crime); Randolph N. Jonakait, *Restoring the Confrontation Clause to the Sixth Amendment*, 35 UCLA L. REV. 557 (1988) (Clause should prohibit prosecution use of an out-of-court statement, whether or not the declarant is available, when there is a reasonable probability that the fact finder would incorrectly rely on the statement to the detriment of the defendant). I have expressed my own tentative approach, which is similar to Graham's but would apply the Clause irrespective of the availability of the declarant, in Richard D. Friedman, *Improving the Procedure for Resolving Hearsay Issues*, 13 CARDOZO L. REV. 883, 885 n.9 (1991).

substantial costs.<sup>59</sup> The admissibility of a given hearsay statement, therefore, should not depend simply on whether the state of the evidence is better with or without the admission of that statement. Ultimately, scholars, courts and rulemakers must try to determine what rules and procedures, after taking into account the reactions of the parties, will likely yield favorable overall outcomes, in terms of the state of the evidence, the cost, and the allocation of cost.<sup>60</sup>

We may be on the threshold of, or even in the midst of, a revolution in the law of hearsay. If so, I believe reform will be assisted by scholarship in the three areas I have just identified: empirical work, development of a sturdy conception of the Confrontation Clause not tied too closely to hearsay law, and development of an approach to hearsay that adequately takes into account its dynamic litigation setting. But underlying any reformulation of hearsay law must be a useful conception of the nature of inference. Work like David Schum's will always be helpful.

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<sup>59</sup> Among the works that have considered hearsay from this dynamic perspective are Dale A. Nance, *The Best Evidence Principle*, 73 IOWA L. REV. 227, 282-83 (1988), and Eleanor Swift, *A Foundation Fact Approach to Hearsay*, 75 CAL. L. REV. 1339 (1987).

Swift's emphasis on the "foundation facts," *id. passim*, resonates with Schum's assertion that "the probative force of hearsay depends on the completeness with which our evidence covers matters relevant to the veracity, objectivity, and observational sensitivity of all sources in a hearsay chain." Schum, *supra* note 1, at 62; *see also id.* at 49 ("One of the characteristics of a Bayes lens is that we must have at least some ancillary evidence to support the assessment of probabilities required at each stage of reasoning."). As Schum points out, though, Bayesian analysis can rely, in the default of other evidence, on a covering generalization, which might be dramatically overwhelmed by more particularized evidence. *Id.* at 51-52. What is more, adjudicative fact finders are allowed to rely on such generalizations—even such broad generalizations as "People with no apparent motive to lie usually do not lie." A generalized proposition that is usable evidence in the analytic sense need not be formally admitted into evidence; fact finders are not expected to come into court as blank slates. *See, e.g.*, John H. Mansfield, *Jury Notice*, 74 GEO. L.J. 395 (1985).

<sup>60</sup> I offer an attempt at such an analysis in Friedman, *supra* note 54.