Bad Romance: The Uncertain Promise of Modeling Legal Standards of Proof With the Inference to the Best Explanation

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ABSTRACT

Abductive reasoning, commonly described as ‘inference to the best explanation,” has long found favor among many philosophers as a method of choosing between competing candidate explanations. Inference to the best explanation (IBE) dictates that when confronted with a set of different explanations for a given phenomenon, we should examine the explanatory virtues of each of the respective explanations—e.g., consilience, simplicity, coherence, lack of ad hocery, testability, et cetera—and defeasibly accept as true the candidate explanation which does the best job of explaining the phenomenon. Such an inference pattern is believed to be prolific in the reasoning conducted during daily life—but is at the same time equivalent to the deductive logical fallacy of “affirming the consequent.”

Recently, legal scholars have attempted to integrate the epistemic tool of IBE into legal philosophy. Specifically, scholars have tried to utilize IBE in the explication of highly nebulous legal standards of proof. The motivation for such attempts can be traced to the fact that legal standards of proof—both criminal and civil—often prove difficult to consistently and reliably apply. And it should come as no surprise that along with those optimistic about the utility of IBE in the context of legal standards of proof, there are a significant number of those who would discount the role of IBE in explicating legal standards of proof.

In this Note, the authors evaluate the arguments against IBE’s role in modeling legal standards of proof. They additionally evaluate the assertions most often offered in support of such a perspective, and provide responses to those assertions that indicate that such arguments are not highly persuasive. The authors conclude that IBE’s potential as a model for legal standards of proof is significant and, identifying the remaining problematic issues which must be addressed, delineate a path through which IBE can truly model legal standards of proof.
BAD ROMANCE: THE UNCERTAIN PROMISE OF MODELING LEGAL STANDARDS OF PROOF WITH THE INFERENCE TO THE BEST EXPLANATION

I. INTRODUCTION

Abductive reasoning, commonly described as ‘inference to the best explanation,’ has long found favor among many philosophers as a method of choosing between competing candidate explanations. Inference to the best explanation (IBE) dictates that when confronted with a set of different explanations for a given phenomenon, we should examine the explanatory virtues of each of the respective explanations—e.g., consilience, simplicity, coherence, lack of ad hocery, testability, et cetera—and defeasibly accept as true the candidate explanation which does the best job of explaining the phenomenon. Such an inference pattern is believed to be prolific in the reasoning conducted during daily life—but is at the same time equivalent to the deductive logical fallacy of “affirming the consequent.”

Recently, legal scholars have attempted to integrate the epistemic tool of IBE into legal philosophy. Specifically, scholars have tried to utilize IBE in the explication of highly nebulous legal standards of proof. The motivation for such attempts can be traced to the fact that legal standards of proof—both criminal and civil—often prove difficult to consistently and reliably

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1 We will use ‘inference to the best explanation’ or ‘IBE’ throughout this piece.


4 Id. at 7.

Among a bevy of esteemed scholars, Ron Allen & Michael Pardo,⁷ John Josephson,⁸ and Paul Thagard⁹ have all offered accounts of how IBE might be utilized to elucidate legal standards of proof. And it should come as no surprise that along with those optimistic about the utility of IBE in the context of legal standards of proof, there are a significant number of those who would discount the role of IBE in explicating legal standards of proof.¹⁰

We will evaluate the arguments against IBE’s role in modeling legal standards of proof. We will evaluate the assertions most often offered in support of such a perspective, and we will provide responses to those assertions which indicate that such arguments are not highly persuasive. That being said, we do not aim to provide an unqualified defense of the utility of IBE in modeling legal standards of proof. There is a significant body of work which must still be done before IBE may be conclusively said to model these standards. Nevertheless, we believe that IBE’s potential for such a use is significant and—identifying the remaining problematic issues which must be addressed, we delineate a path through which IBE can truly model legal standards of proof.

This Note proceeds in six further parts. In Part II, we will lay out the details of IBE. In Part III, we will briefly describe the current issues with legal standards of proof and summarize proposed solutions to those issues which utilize IBE. In Part IV, we lay out the general

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⁶ Lauden, supra note 2, at 1.

⁷ See generally Pardo & Allen, supra note 3.


¹⁰ See generally Lauden, supra note 2.
objections to the described solutions involving IBE. In Part V, we address those objections. In Part VI, we identify lingering problems for the IBE models of legal standards of proof, along with some potential responses to those issues. In Part VII, we will provide some concluding remarks.

II. INFRINGEMENT TO THE BEST EXPLANATION: A BRIEF SUMMARY

IBE begins with the idea that if we understand a given proposition as explaining a given phenomenon, then, in the absence of superior explanations, we may infer that that proposition is true.\textsuperscript{11} When there are multiple explanations of the phenomenon, we infer that the proposition which \emph{best} explains the phenomenon is true. Given that background, IBE demonstrates the following general structure:

1. \(f_1, f_2, f_3, \ldots, f_n\) are facts that require explanation.
2. \(h_1, h_2, h_3, \ldots, h_n\) are each distinct explanations of the set of facts \(\{f_1, f_2, f_3, \ldots, f_n\}\).
3. The set of explanations \(\{h_1, h_2, h_3, \ldots, h_n\}\) is the product of an earnest, good faith search and contains all discovered explanations.
4. \(h_i\) is the best explanation among \(\{h_1, h_2, h_3, \ldots, h_n\}\) for \(\{f_1, f_2, f_3, \ldots, f_n\}\).
5. Ergo, \(h_i\) is probably true.\textsuperscript{12}

As presented, this formulation of IBE is inherently comparative. It examines the many potential explanations for a set of facts and selects the best among them. However, there is a distinct formulation of IBE that is non-comparative. The non-comparative formulation of IBE demonstrates the following structure:

1. \(f_1, f_2, f_3, \ldots, f_n\) are facts that require explanation.

\textsuperscript{11} Pardo & Allen, \textit{supra} note 3, at 1.

\textsuperscript{12} Laudan, \textit{supra} note 2, at 4–5.
(2) \( h_j \) is an explanation of the set of facts \( \{f_1, f_2, f_3, \ldots, f_n\} \).

(3) \( h_j \) is the product of an earnest search and is the only explanation that was discovered.

(4) \( h_j \) meets the criteria of being a *good* explanation.

(5) Ergo, \( h_j \) is probably true.\(^{13}\)

As noted, this formulation of IBE is used when only one explanation seems to exist.

The general structure of these two formulations will leave the thoughtful reader unsatisfied. The questions remains: What qualifies an explanation as good, better, or best?”\(^{14}\) Predictably, there is some controversy regarding the answer to that question. Some have suggested that the “goodness” of an explanation is dependent on its simplicity, plausibility, and the absence of ad hocery.\(^{14}\) Others have suggested that goodness is linked to coherence with background beliefs, consilience, testability, and simplicity.\(^{15}\) Still others have suggested that goodness is an expression of predictive power and internal consistency.\(^{16}\) One ardent exponent of IBE, Peter Lipton, has even suggested that goodness is a function of “loveliness.”\(^{17}\)

Any attempt to define “good,” “better,” or “best” would be hotly contested\(^{18}\) and beyond the scope of this Note. We need not advocate for any particular meaning of those terms in critiquing the arguments contrary to using IBE as a model for legal standards of proof. It is enough that we cabin these issues and assume that we can fix a set of agreed-to criteria that will

\(^{13}\) *Id.* at 4–5.

\(^{14}\) *Id.* at 5 (stating that these were the virtues considered important by Gil Harman).

\(^{15}\) Thagard, *supra* note 7, at 363; *William Lycan, Judgment and Justification* 130 (1988).

\(^{16}\) Josephson, *supra* note 8, at 1626.

\(^{17}\) *Peter Lipton, Inference to the Best Explanation* ch. 4 (2d ed. 2004). “Loveliness” is a technical term, but roughly it means the quality of aiding in our understanding of the phenomenon. *Id.*

\(^{18}\) *See supra* notes 14–17 and accompanying text.
permit us to determine what is the best explanation among competing explanations. This assumption facilitates the discussion herein, and is appropriate given that the general objections to IBE are posited under this same assumption.\(^\text{19}\) That said, in addressing the further problems for IBE, we will examine potential explanatory virtues and whether these virtues covary with the probability that the explanations are true.\(^\text{20}\)

There are some important features of the IBE apparatus which should be emphasized. First, even in the previously articulated comparative version of IBE, theorists agree that some threshold explanatory goodness must exist in order to derive the conclusion.\(^\text{21}\) If all candidate explanations after utterly ad hoc, or possess little predictive power, et cetera, then it cannot be licensed that even the best of a set of bad explanations is probably true.\(^\text{22}\) There must be propositions in the set of candidate explanations which satisfy a certain level of threshold goodness. For example, the ad hocery or lack of predictive power of at least some among the set of candidate explanations must not exceed some threshold level.\(^\text{23}\) Thus, in the background of the comparative version of IBE is a threshold goodness test that must be satisfied in order to conclude that a best explanation is probably true.\(^\text{24}\)

\(^{19}\) Laudan, note 2, at 5; see generally Pardo & Allen, supra note 3 (laying out the general objections to IBE without discussing the differing potential explanatory virtues).

\(^{20}\) See infra Part VI.

\(^{21}\) Laudan, supra note 2, at 6.

\(^{22}\) Id.

\(^{23}\) This level of threshold goodness may be vague and therefore it may be difficult to determine whether a theory near the threshold is above or below. For a discussion of vague predicates, see Roy Sorensen, Vagueness, in STANFORD ENCYCLOPEDIA OF PHILOSOPHY (2006), http://plato.stanford.edu/entries/vagueness/.

\(^{24}\) Laudan, supra note 2, at 5–6. Of course this threshold test also applies in the non-comparative version of IBE; it is in the forefront of the non-comparative version of IBE. Indeed, in our own legal system, the “sufficiency of the evidence” test may be approximating this threshold goodness.
Second, it seems that IBE theorists often assume that whatever features are utilized to define good, better, and best, the greater the presence of those features in an explanation, the more probable it is that the explanation is true. This assumption is highly controversial—in part because, as previously articulated, the features of goodness are themselves controversial.\textsuperscript{25} Notwithstanding, this is an assumption that underlies attempts to model legal standards of proof using IBE, and it will remain a consideration throughout our analysis.\textsuperscript{26}

III. PROBLEMS WITH LEGAL STANDARDS OF PROOF AND POTENTIAL IBE REMEDIES

A. Problems Identified

The most difficult aspect of legal standards of proof is one of clarity. This is especially true when engaging the “beyond a reasonable doubt” standard (BARD), the standard used in American criminal prosecutions. Many commentators have expressed deep frustrations with the BARD standard. Larry Laudan calls it “obscure, incoherent, and muddled.”\textsuperscript{27} James Whitman, while acknowledging BARD is fundamental and familiar, describes the standard as “vexingly difficult to interpret and apply.”\textsuperscript{28} Not surprisingly, jurors, whose understandings of the standard are perhaps most important, are not immune to BARD’s complexities either. Oftentimes jurors have “only the haziest notion”\textsuperscript{29} of what BARD truly means and are “understandably baffled”\textsuperscript{30} when applying it. Compounding the problem, judicial instruction on BARD is typically less than

\textsuperscript{25} The epistemologist and philosopher Larry Laudan does not think that this assumption is warranted. Laudan, supra note 2, at 13.

\textsuperscript{26} We address this issue in greater detail infra at Part VI.

\textsuperscript{27} LARRY LAUDAN, TRUTH, ERROR, AND CRIMINAL LAW 30 (2006).


\textsuperscript{29} LAUDAN, supra note 27, at 31.

\textsuperscript{30} WHITMAN, supra note 28, at 1.
helpful, and often introduces conceptual errors and various other errors into the equation.\textsuperscript{31} The same holds true, albeit to a much lesser extent, with the civil standard “by a preponderance of the evidence” (POE). Simply put, it is often impossible to clarify what makes any given party’s explanation better or more likely true than any other that so either of these standards may be satisfied.

As a result, both standards of proof are often pegged to subjective probabilities.\textsuperscript{32} Laudan notes that courts often characterize the standards in terms of the mental states of the jurors tasked with evaluating presented evidence against those standards.\textsuperscript{33} Courts may ask jurors whether they believe that a party is guilty/liable to the requisite degree.\textsuperscript{34} This is curious because in other endeavors where truth is at issue—such as mathematics or the sciences—we do not inquire as to the subjective confidence in an answer of the mathematician or scientist—we want proof. The obvious problem is this: The question posed by a trial should be whether the evidence presented supports a verdict. In practice, however, a trial may be more concerned with jurors’ subjective confidence in a verdict.\textsuperscript{35} Hopefully, the subjective confidence of the jurors is not unrelated to whether the evidence supports a verdict. But in any case, framing the standards of proof in terms of subjective confidence does little to explicate any standard of proof or its appropriate application.

\textsuperscript{31} LAUDAN, supra note 27, at 31.

\textsuperscript{32} Subjective probability” understands probability as an individual’s “degree of belief.” Efforts to explain this notion have generated much literature. The basic point is that subjective probability standards focus on an individual’s subjective belief about the relevant events. Alan Hájek, \textit{Interpretations of Probability}, STANFORD ENCYCLOPEDIA OF PHILOSOPHY (2009), http://plato.stanford.edu/entries/probability-interpret/#SubPro/.

\textsuperscript{33} Id. at 51-62.

\textsuperscript{34} Id.

\textsuperscript{35} Id.
B. Proposed Remedies for the Identified Problems

Some commentators assert that IBE can be used to cure the lack of clarity regarding legal standards of proof. Ron Allen & Michael Pardo offer an account of how IBE can specifically explicate the BARD and POE standards. Allen & Pardo assert that the premises of IBE already generally mirror trial structure. They deconstruct IBE into two distinct phases: The first phase includes the generation of candidate explanations. The second phase includes the evaluation of those explanations. Such a construction roughly relates to the two stages of a trial: First, the presentation of evidence by involved parties. Second, the evaluation of the evidentiary presentations by judge or jury. The identification of facts to be explained, the search for explanations, and the generation of a set of candidate explanations are all accomplished when the involved parties present their respective cases. The identification of the candidate explanation which provides the best explanation and selecting that explanation as the winning explanation is accomplished during the judge or jury’s evaluation of the competing cases presented.

At this point, such an argument demonstrates an attractive parallel between IBE and the trial structure. But such an argument also typically includes and an attempt to characterize the legal standards of proof in terms familiar to IBE. It is most productive to first examine such a characterization of POE before proceeding to a corresponding characterization of BARD.

36 See generally Pardo & Allen, supra note 3.
37 Id. at 11–12.
38 Id.
39 Id.
40 This identification of explanations may also happen during jury deliberations, because jurors can identify possible explanations. That being said, this is still a conceptually different activity than the evaluation of explanations.
41 Id. at 13–14.
1. **Modeling POE.**—The explication of POE in terms familiar to IBE is relatively straightforward. When jurors are deliberating, they are evaluating the different candidate explanations proffered by the parties (and perhaps jurors as well). The jurors then collectively decide which explanation is the best—based on their chosen criteria—and find for the party whose case more substantially conforms to the best explanation. The best explanation is that which is supported by more—that is, a *preponderance*—of the evidence. It has been empirically demonstrated that when evaluating competing explanations and identifying the best, jurors often rely on factors such as completeness, coherence, et cetera. Given this information, it appears as though the POE standard is a simple application of IBE.

2. **Modeling BARD.**—We will consider two alternative methods for the utilization of IBE to model BARD. First, we will examine the “No Sufficiently Plausible Alternative” model. Second, we will examine the “High Degree of Virtue” model.

i. **No Sufficiently Plausible Alternative**

It has been suggested that when working with the BARD standard, jurors are not actually choosing a best explanation from among the set of candidate explanations. Instead, jurors are searching for a “sufficiently plausible” explanation of the facts that is consistent with a defendant’s innocence. If such an explanation is found, then the defendant is acquitted. If no such explanation is found, a defendant is determined to be guilty. Regarding these outcomes, Josephson writes:

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42 See *supra* notes 3, 8.

43 See *supra* note 9.


45 *Id.*
Guilt has been established beyond a reasonable doubt when there is no plausible alternative explanation for the data that does not imply the guilt of the defendant. An explanation is plausible if it is internally consistent, consistent with the known facts, not highly implausible, and it must represent a “real possibility” rather than a mere logical possibility. A real possibility does not suppose the violation of any known law of nature, nor does it suppose any behavior that is completely unique and unprecedented, nor any extremely improbable chain of coincidences. In determining whether an explanation is highly implausible, the following principles of plausibility apply:

- A hypothesis is more plausible the more similar it is to a proposition taken to be actual. That is, what has happened once may be happening again.
- A hypothesis is less plausible as its predictions fail, and more plausible as it passes this test.  
- A hypothesis is more plausible as its preconditions obtain and less plausible if they do not.

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46 Josephson’s definition here may have fallen into the trap of circularity, as he has proffered, as an element of “plausibility,” that the explanation “not [be] highly implausible.” Certainly, if we knew how to identify this element, we would not have to go much further. We think we should proceed being as charitable to Josephson as we can. To this end, we can treat being “not highly implausible” as a placeholder for the following bulleted list of conditions. We can also ignore it as a sloppy mistake, and define plausibility using just the other conditions.

47 Here too Josephson’s account is unclear and possibly incorrect. Josephson does not define “precondition”; by “precondition” we take him to mean a condition that must be true in order for the hypothesis to stand a chance of being true—a necessary condition. But if the preconditions of a hypothesis fail, the hypothesis has been refuted—it is not merely less plausible.

48 Josephson, supra note 8, at 1642.
Josephson’s account of plausibility demonstrates one possible way to use IBE to model BARD. It is by no means, however, the only way to use IBE to model BARD.

ii. High Degree of Virtue

Another way of adapting IBE to model BARD is by requiring a more significant presence of the explanatory criteria that mark an explanation as the best. That is, the explanation presented by the prosecution need not simply be the best—it must be the best by a wide margin. Thagard writes, “From the perspective of the theory of explanatory coherence, reasonable doubt might be viewed as an additional constraint on the maximization of coherence, requiring that hypotheses concerning guilt must be substantially more plausible than ones concerning innocence.” More precisely, this requires both absolutely and relatively high degrees of explanatory virtue. If there was only one candidate explanation, and this requirement is understood as merely a relative requirement, then such a requirement does not impose any further requirement beyond IBE. This seems intuitively wrong, because even when there is only one explanation, the standard remains higher.

3. Are These Proposals Solutions?—These proposals should be evaluated for their utility in remedying the identified problems. Objections will remain, but it is worthwhile to summarize the dialectic thus far. In the interest of brevity, we will address the various solutions collectively, while leaving a more specific analysis for later.

Recall that the most significant problems with legal standards of proof concerned a lack

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49 Note that we could alternatively cash out “sufficiently plausible” in terms of the threshold goodness IBE inquiry, appealing to a particular set of explanatory virtues.

50 See generally Thagard, supra note 9.

51 Thagard, supra note 9, at 366–67.
of clarity. The standards are difficult to consistently and reliably apply because their respective meanings are difficult to ascertain with any specificity. Secondarily, subjective mental states are often tied to legal standards of proof in attempts to provide clarity to those standards. The linkage of the standards to subjective mental states belies the very purpose of the standards. The standards should focus on whether the presented evidence supports the verdict—not whether the jurors have confidence in the verdict.

At the outset, we note that the proposed IBE solutions rectify the second problem. With IBE’s focus on explanatory virtues like simplicity, coherence with background beliefs, consilience, et cetera, the focus on subjective mental states is eliminated. The focus is returned to the question of whether the evidence supports the verdict through the explanatory virtues of the explanation.

With regard to clarity, modeling legal standards of proof through IBE takes a fast leap forward. At present, it is often unclear why one party’s offered explanation is preferable to another party’s explanation in the eyes of jurors. IBE can fill this lacuna by dictating to jurors the explanatory virtues that indicate goodness, probability, and ultimately a winner. This provides legal standards of proof with a much greater degree of clarity. If such an IBE solution were to be implemented in a trial setting, and jurors were confused as to what criteria should be considered when evaluating competing explanations, a judge could instruct the jury to consider the explanatory virtues of the competing cases. This, in turn, would inform the jury’s assessment of whether an explanation is good enough to satisfy the relevant standard of proof. This is a marked improvement over the current typical circumstances where juror confusion is fed by judicial silence (or mistake).

52 See supra section III.A.
IV. **ISSUES WITH THE PROPOSED SOLUTIONS**

A. **Problems with the IBE Model of POE**

IBE appears to present an appropriate apparatus by which POE can be modeled. However, there is one very significant potential issue. Suppose there are only two bad candidate explanations of a fact.\(^53\) Given these two poor explanations, \(h_1\) and \(h_2\), IBE may still not license either argument, even if one is better.\(^54\) This is because of the IBE requirement that a candidate explanation satisfy a threshold goodness—it cannot merely be the best of a bad bunch.\(^55\) This exposes a potential disanalogy between IBE and the civil standard.\(^56\) It seems that in a civil trial, if an adversary’s case is better than the other’s, but fails to satisfy threshold goodness, the jury must still find for that party.\(^57\) This is contrary to what IBE would license, so scholars argue. Therefore, IBE cannot model the POE civil standard of proof.\(^58\)

B. **Problems with the IBE Model of BARD**

Two distinct problems have been suggested with the traditional IBE model of BARD. Imagine a trial with two competing stories—the prosecutor’s story and the defendant’s story. Suppose both stories offer poor explanations. Even if the prosecutor’s story were to enjoy some slim advantage in goodness, if we were to permit conviction in this case we would likely undertake too great a risk of convicting an innocent defendant. Such a risk is strongly disfavored.


\(^{54}\) *Id.*

\(^{55}\) *Id.*

\(^{56}\) *Id.*

\(^{57}\) *Id.*

\(^{58}\) *Id.*
by societal values.\textsuperscript{59} However, it seems that traditional IBE licenses this counterintuitive and counterproductive result.\textsuperscript{60} Given the opposite, if both competing stories are quite good, should the prosecutor’s story be better, traditional IBE would require conviction.\textsuperscript{61} However, the defendant’s good explanation should allow for acquittal because, as even a plausible story, it should suffice to establish reasonable doubt.\textsuperscript{62}

There are remedies to the issues raised by the use of traditional IBE in the BARD context. First, we could require that in order for the prosecutor’s explanation to satisfy the BARD standard, it must possess a higher degree of explanatory virtue, particularly in comparison to any other competing explanation. It must not simply be the best—it must be the best by a wide margin.\textsuperscript{63} Second, we could require that in order for the prosecutor to satisfy the BARD standard, there must not be any “sufficiently plausible” explanation consistent with innocence. And, in judging sufficient plausibility, we look to the explanatory virtues of the explanation.\textsuperscript{64} Both suggestions require further consideration.

1. \textit{High Degree of Virtue}.—One concern with the IBE model of High Degree of Virtue is whether such a model eliminates the nebulous nature of the BARD standard. The chief ambition of using the IBE model in the BARD context is to provide clarity to the standard. However, the High Degree of Virtue model requires that we define the gap between the

\begin{itemize}
  \item \textsuperscript{59} \textit{Id.} at 7-8.
  \item \textsuperscript{60} \textit{Id.}
  \item \textsuperscript{61} \textit{Id.}
  \item \textsuperscript{62} \textit{Id.}
  \item \textsuperscript{63} \textit{See supra} subsection III.B.2.
  \item \textsuperscript{64} \textit{See supra} subsection III.B.2.
\end{itemize}
plausibility of the prosecutor’s story and the plausibility of the defendant’s story. Such a gap is itself highly nebulous. Laudan asserts that jurors would be equally baffled in applying this model of BARD, so no jurors need bother with this apparatus. That is, jurors would struggle mightily with concepts such as simplicity, coherence with background beliefs, plausibility, and the like.

2. No Sufficiently Plausible Alternative.—One potential issue with the No Sufficiently Plausible Alternative IBE model is that it contravenes the essential meaning of an “inference to the best explanation.” Such a model asks whether a particular explanation is the only plausible explanation. However, the purpose of IBE is to answer the question of what to do in the event of multiple plausible explanations. The No Sufficiently Plausible Alternative model is operational only when there is one plausible explanation. This seemingly rejects the preconditions for IBE to apply. Accordingly, it does not seem to be a useful IBE model.65

V. RESPONSES TO THE IDENTIFIED ISSUES

A. Utilizing IBE in the POE Context

IBE advocates can offer a strong response to the objection raised against its utility in modeling POE. In articulating this response, it is important to consider the respective burdens of proof and persuasion. If a particular party is saddled with the burden of persuasion, then that party is obliged to convince the trier of fact to decide the dispute in that party’s favor.66

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65 Laudan, supra note 2, at 13–14. Laudan further notes that any maneuvering that changes the definition of “best” will not help the situation. Id. If we change “best” to mean “lack of any plausible rival,” we will break the crucial link in IBE between something being the best explanation and being probably true. Furthermore, this would lead to the unintuitive result that “the same hypothesis [will be] credible in situation a [but] not worthy of belief in situation b, even though the evidence and background beliefs in the two situations are indistinguishable.” Id. Yet Laudan thinks this is not good, for “[g]iven the same evidence and same background beliefs, it cannot be reasonable to believe h1 is probably true and not reasonable to believe h1 is probably true.” Id.

66 See, e.g., El v. SEPTA, 479 F.3d 232, 238 n.6 (3d Cir. 2007) (“The burden of persuasion . . . is the obligation to convince the factfinder at trial that a litigant’s necessary propositions of fact are indeed true.”).
Consider a case in which only two poor explanations exist—$h_1$ for the plaintiff and $h_2$ for the defendant. Both explanations are “poor” in that neither $h_1$ nor $h_2$ meet the threshold explanatory goodness—a minimum threshold of plausibility—required for license by IBE. The objection here is predicated on the assumption that traditional IBE model requires that the jurors must decide for the plaintiff in the event $h_1$ demonstrates any superior quality of goodness to $h_2$. But this seems incorrect.

Imagine that a plaintiff proffers poor explanation $h_1$, but the defendant is silent, and offers no competing explanation. If the explanation advanced by the plaintiff does not satisfy the standard of threshold goodness, it cannot satisfy the minimum threshold of plausibility. In such a case, the plaintiff has not satisfied his burden of persuasion. The law dictates that the jury must find for the defendant. Even if the defendant offers an equally poor explanation—or a worse explanation—the outcome is not seemingly changed.\textsuperscript{67} Whether the defendant responds to the plaintiff’s argument with silence or poor explanation $h_2$, the plaintiff has not satisfied its burden of persuasion and the jury must find for the defendant.\textsuperscript{68} If the jurors have no minimally plausible explanations, the jurors are prevented from reaching any conclusion. As a default rule, when jurors are unable to reach a conclusion, the defendant prevails.

IBE demands that, given the existence of multiple hypotheses all falling short of threshold goodness, no hypotheses be licensed as probable. Consequently, it appears that IBE is aligned with POE on this concern.

B. Utilizing IBE in the BARD Context

\textsuperscript{67} This assumes that the defendant’s poor explanation does not make him seem \textit{more} liable—for example, by making him look less credible and thereby making the plaintiff’s explanation more credible.

\textsuperscript{68} See Pardo & Allen, \textit{supra} note 3, at 15 (stating that when two poor explanations are proffered, the defendant wins due to the burden of persuasion).
1. **High Degree of Virtue.**—Recall that the primary objection to the utilization of the High Degree of Virtue model is that it fails to provide any greater degree of clarity. This IBE proposal requires that, in order to gain a conviction, a prosecutor must offer an explanation which is substantially more plausible than all others. This plausibility gap is similar to the notion of reasonable doubt in terms of clarity—both are nebulous and not likely to facilitate juror comprehension of the relevant standards.

However, such pointed criticism seems overreaching. Some residual lack of clarity is inherent to the High Degree of Virtue model of IBE. However, such a lack of clarity is not necessarily fatal to the model’s utility. It could be the case that the High Degree of Virtue model still serves a meaningful purpose by filling comprehension gaps and guiding jurors in the application of legal standards.

Recall that the typical effect of the BARD standard is to inspire utter confusion in those tasked with its application. Typical jurors lack any basis on which to make determinations regarding reasonable doubt. This has led to the characterization of BARD in terms of subjective states of mind. That is, instead of focusing on whether the evidence supports a verdict, jurors instead focus on their own subjective confidence in a verdict.

In response, IBE’s modeling of BARD supplies a basis for how to evaluate whether a particular verdict has been proven beyond a reasonable doubt. Consider a hypothetical exchange between judge and jury: The judge instructs the jury as to the BARD standard, indicating that the jury must convict if and only if it is convinced beyond a reasonable doubt that the defendant is guilty. Baffled by the judge’s initial explication of the standard, the jurors ask for clarification as to the standard’s meaning. In the absence of the IBE model, the judge is likely to either remain
silent or reference subjective mental states in an attempt to elucidate the standard. Using the IBE model, the judge is enabled to respond more fruitfully. The judge is empowered to say, “Consider the competing explanations, and ask yourselves if each of the explanations demonstrate a high degree of simplicity, coherence with background beliefs, consilience, etc. If the degree to which these explanatory virtues are present is substantially higher than any other explanation consistent with the defendant’s innocence, then you must convict.” The possibility exists that the jurors may be unsure as to how to define “substantially higher,” and the Higher Degree of Virtue model may not provide a thoroughly satisfying response to this point. However, it is likely that employing the Higher Degree of Virtue model results in less juror confusion and a greater reliability in the application of the BARD standard than would exist in its absence.

At the very least, jurors may now conceptualize what kinds of features of an explanation make that explanation more likely to be true. The question as to whether an explanation is very good or much better than another explanation may remain a difficult question for a typical jury to answer. However, if the answer to this question is at least partly informed by providing the jury with the features of appropriate criteria for evaluating competing explanations, then such a question, while undoubtedly remaining difficult, will become significantly easier to answer. Jurors will still be required to determine whether there exists a sufficient gap between the presences of explanatory virtues in two competing explanations—and this will likely remain a difficult determination. However, such a question addresses a significantly narrower issue than

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69 See supra notes 32–35 and accompanying text. See also BARBARA E. BERGMAN & NANCY HOLLANDER, WHARTON’S CRIMINAL EVIDENCE § 2:4 (“Most of these courts have reached the conclusion that reasonable doubt need not be defined on the grounds that the term is self-explanatory, and a definition would tend only to confuse the jury.”).
the questions BARD asks absent this IBE model. And once a jury makes a determination on the component explanatory virtues, it may then compound those particular determinations to facilitate a determination on the global question.

It could be countered that such a model does not clarify the standards of proof—rather, it addresses the grounds for evaluating explanations. That is, such a model values not how strongly the evidence supports the result, but what features of an explanation demonstrate that the evidence supports the result. However accurate such an assertion may be, we nonetheless clarify legal standards of proof by identifying the important component features of candidate explanations. If jurors are aware of the appropriate basis on which to evaluate an explanation, they are more capable of determining whether that explanation is good and whether that explanation is substantially better than another.

Consider a loosely analogical hypothetical: Two men are arguing whether one is substantially more bald than the other. To resolve this debate, they appeal to a group of random strangers. All of the strangers are endowed with luscious heads of hair and have never thoughtfully reflected on the subject of baldness. Accordingly, the random strangers perceive the question presented for their determination to be a difficult one. Specifically, determining whether one man is substantially more bald than the other is difficult to gauge. This issue might be more easily resolved if the strangers were provided with some of the component features that bear on baldness: surface area of the head covered by hair (total and proportionality), hair length, hair thickness, hair volume, curly or straight qualities of hair, et cetera. This issue would be much easier to resolve if the two men demonstrated a substantial

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difference as to each of the factors, particularly if these facts may be then compounded to decide if there is a substantial global difference. In the same way, identifying the dimensions on which to evaluate a candidate explanation can help illuminate a standard of proof. Consequently, while the High Degree of Virtue model is no panacea for modeling BARD, it nonetheless helps to clarify the standard in a meaningful way.

2. **No Sufficiently Plausible Alternative.**—Recall that the complaint with the No Sufficiently Plausible Alternative model is that it seems completely disconnected from IBE. It is granted that IBE is not likely to prove a perfect model for the BARD standard. Indeed, the very conclusion of IBE offers that one hypothesis is probably true. And, as such a conclusion can be reached on the basis of goodness well short of level required for BARD, pure IBE cannot hope to effectively model such a standard. Consequently, it would seem that IBE must be modified in some way if it is to serve as a means to model BARD.

In order to analyze this objection, we must identify and distinguish the core feature of BARD: that the explanatory virtues of an explanation bear on how probable that explanation is. Reducing IBE to this characterization, it is clear that IBE can still serve to model BARD despite requiring subtle modifications to do so.

Recall that using IBE to model BARD indicates that a finding of guilt proven beyond a reasonable doubt is equivalent to a finding of the prosecutor’s story as plausible while at the same time finding no plausible story consistent with the defendant’s innocence. Such a result cashes out plausibility in terms of explanatory virtues. So, the proposed remodeling of BARD reflects the core consideration of IBE.

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71 See Pardo & Allen, *supra* note 3, at 6 (describing IBE and first and foremost talking about “explanation as a guide to inference”).
A persistent objector might argue that IBE is above all else a rule that allows us to infer the truth of a hypothesis—that it is, crucially, a rule that dictates a course of action when presented with multiple plausible explanations. Furthermore, the No Sufficiently Plausible Alternative theory operates only in the presence of, at most, a single plausible explanation—rendering IBE moot.

In response, we must first recognize that although it is not the most useful application of IBE, IBE does apply in cases where only one plausible explanation is available. In such a situation, it is simply necessary to ask whether the single available explanation satisfies threshold goodness. If the answer is affirmative, then we are able to conclude that the answer is probable. This single-answer IBE solution isolates each putative explanation, and asks whether each is plausible—a question answered by examining the presence of explanatory virtues.

Despite its differences from traditional IBE, the No Sufficiently Plausible Alternative model utilizes that most important feature of IBE to model BARD—the reliance on explanatory virtues in adjudging the likelihood of an explanation. Such an approach tracks precisely the single-explanation species of IBE.

VI. Lingerings Issues and Thoughts on Solutions

We have thus far claimed that the common objections to IBE modeling of legal standards of proof can be rebutted by the capable IBE theorist. However, several remaining points need to be addressed in order to fortify the case for IBE.

A. Lingerings Issues with BARD

At least one IBE model of BARD seems to rely on the assumption that the higher the presence of explanatory virtues, the more probable it is that the explanation is true. The Higher

72 See supra note 13 and accompanying text.
Degree of Virtue model explicitly indicates that in order to supplement IBE to model the higher criminal standard of proof, we must require a maximized presence of explanatory virtue. This oft-asserted proposition remains unsupported.\textsuperscript{73} And, this issue is a legitimate point of concern for the Higher Degree of Virtue proposal. If the principle proves untrue, then this model is clearly and fatally undercut. Accordingly, this principle deserves serious consideration.

Suppose a rigorous search for candidate explanations is undertaken, and a set of candidate explanations \{h_1, h_2, h_3, \ldots, h_n\} is revealed that putatively explains some set of facts. These explanations all exhibit threshold goodness, and the best—h_i—is selected as the winning explanation. Utilizing IBE, h_i is probably true. However, suppose a new explanation is discovered: h_j. When compared to h_i (and any of the other previously discarded h_x's), h_j is better. Utilizing IBE again, we should then conclude that h_j is probably true. But, perhaps we can say more. The evaluation of h_j is a better evaluation than the evaluation of h_i. It has involved a more thorough search for explanations and has resulted in a winning explanation which exemplifies features of goodness to a higher degree. Thus, it seems that it should be more probable that h_j is true.

There is a strong counter to this line of reasoning. The aforementioned argument shifts its underlying proposition from “There is a higher probability that our IBE judgment—which asserts that h_j is probable—is correct, because of the heightened degree of explanatory virtue” to “There is a higher probability that h_j is true.” This might be unjustified, because it is unclear whether a higher degree of explanatory virtue translates into a higher probability that the explanation is true. There is strong reason to think that a higher degree of explanatory virtue—or at least a high degree of certain explanatory virtues—has no bearing on the likelihood of an

\textsuperscript{73} Laudan, supra note 2, at 13.
explanation’s truth. In particular, it is entirely unclear that the hallmark explanatory virtue of simplicity bears any relationship to the likelihood of an explanation being true. The fact that an explanation is simpler than another does not seem to bear on whether that explanation is more probable. Similarly, testability does not seem to covary with the likelihood of truth. The fact that a proposition can be tested for its truth does not seem to make it more likely that such a proposition is true.\footnote{It could be that testable theories often make broader claims, and as a result are more prone to being false. In this way, testability may actually signal a lower probability of being true.} As a final example, consider internal consistency. This virtue does not seem to admit comparatives. Rather, it admits a binary answer: an explanation is either internally consistent or it is not. The fact that an explanation is internally inconsistent merely indicates that it has a zero probability. So, internal consistency does not heighten the likelihood of an explanation in a way that allows us to reach a degree of probability greater than simply “probable.”

As noted, there are many different accounts of what features are the explanatory virtues which IBE should value. That being said, the features of simplicity, testability, and internal consistency are often identified in IBE accounts as explanatory virtues. As a result, their presence in an IBE account will undercut the lynchpin proposition that a higher degree of explanatory virtue implies a higher likelihood of the explanation being true.

An IBE proponent might respond that these three virtues \textit{do} covary with probability. However, this is a difficult case to state. For the reasons previously discussed, there does not appear to be any plausible argument that internal consistency covaries with probability.\footnote{The IBE theorist could argue that internal consistency, as a binary-answer feature does not contribute to the weighing of explanations. It really only operates as a threshold question that eliminates certain candidates, and so we need not worry about it covarying with probability.} However, with regards to simplicity, an IBE proponent could endorse the ontological view that
simpler theories are more likely to be true in a manner similar to the strong ontological version of Occam’s Razor.\textsuperscript{76} Obviously, such a view would garner considerable controversy and prove difficult to establish.

With regard to testability, the IBE proponent might suggest the following: When an explanation is testable, it allows us to discern whether it is true. After that explanation is subject to and survives testing, its shows itself to be more probable. In essence, this defense of testability’s covariance with probability argues that testability—combined with coherence with background beliefs—covaries with probability. This is not a true defense of testability, however. It seems that passing test—coherence with background beliefs—is the feature which is doing the most with regard to covariance with probability. The value of testability remains unclear.

That being said, this kind of response indicates another potential IBE solution. In utilizing the IBE model, it could be possible to select only explanatory virtues which covary with probability, while requiring that an explanation demonstrate a heightened presence of these virtues in order to show itself more probable. One such explanatory virtue seems to be coherence with background beliefs. That is, if an explanation better coheres with background beliefs, that explanation is more probable. This is merely a corollary of induction. Furthermore, consilience appears to covary with probability: if an explanation is more like other successful explanations, then it will be more probable. This is an instantiation of induction.

With this in mind, IBE proposals may ultimately have to be constructed quite differently. The “High Degree of Virtue” model might become the “High Degree of Certain Kinds of

\textsuperscript{76} Occam’s Razor is generally thought to be applicable only when the theories compared have the same predictive power. But presumably the virtue of simplicity may weigh in even when there is a difference in predictive power. For more on Occam’s Razor (or Ockham’s Razor), see Alan Baker, Simplicity, STANFORD ENCYCLOPEDIA OF PHILOSOPHY (2010), http://plato.stanford.edu/entries/simplicity/.
Virtue” model. Though such a model might be susceptible to familiar objections, such a reimagining offers great promise.

It is important to note that the “No Substantially Plausible Alternative” model has a particularly curious feature. Recall that when only one plausible explanation exists, IBE licenses only that the explanation is probably true. However, the No Substantially Plausible Alternative model says this: If there is only one plausible explanation, and that explanation is consistent with guilt, convict. If IBE can only indicate that an explanation is probably true when modeling BARD, then it seems that convictions result only when guilt has been shown to be probably true. This is counterintuitive because BARD should represent a much higher standard.

There are at least two responses in defense of the No Substantially Plausible Alternative model. First, it could be said that IBE actually licenses the claim that an explanation is very likely true—not just probably true—when it is the only plausible explanation discovered after a thorough search for explanations. However, this is an ambitious claim, and it is not clear how it would be established.

A better response would argue that a prosecutor’s explanation must not be merely plausible, but must exhibit a greater degree of virtue. This idea is borrowed from the Higher Degree of Virtue Proposal. In this event, the No Substantially Plausible Alternative model could

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77 For a familiar objection, one might argue that once we utilize certain kinds of explanatory virtues and abandon other virtues, we may reasonably ask whether this bears significant relation to IBE anymore. Since we are picking out the virtues that covary with probability, it seems that the focus on explanatory virtue has been substituted for a focus on probabilistic virtue. This is not bad, but it is not IBE. Of course, the IBE theorist could also claim that the explanatory virtues—the features that make explanations good—happen to covary with probability. This is a distinct solution from separating out explanatory virtues that covary with probability, because here the IBE theorist would be arguing that all of the explanatory virtues happen to covary with probability. The IBE theorist could accomplish this by arguing, as seen above, that simplicity, testability, and internal consistency covary with probability; but the IBE theorist could also abandon these features, claiming they are not explanatory virtues. The latter seems to be the best way for the IBE theorist to proceed, although it may be difficult to create a workable IBE model that did not involve simplicity, testability, or internal consistency. An IBE model that does not involve these traits may not be tracking explanatory virtue properly, and in that sense the objection arises again that this is not related to IBE.
license the conclusion that the explanation is not just probable—it is highly probable. However, concluding thusly would depend on the aforementioned principle that the higher the presence of the explanatory virtue, the more probable it is that the explanation is true. This may be problematic for the reasons previously discussed, but, as we have seen, there is promise to this solution.

B. Lingering Issues with POE

The model of IBE as POE may provide some counterintuitive result in situations with multiple plausible theories. Imagine a situation in which there is one plausible explanation supporting the plaintiff and two plausible explanations supporting the defendant. Suppose that the plaintiff’s explanation is 40% likely. Suppose that each of the defendant’s explanations is 30% likely. Suppose that the disjunction of the defendant’s explanations is >50%. Now assume that the plaintiff’s explanation was superior in virtue to either of the defendant’s explanations. In such a case, the IBE model of POE would direct the jurors to find for the plaintiff. The plaintiff’s story is the winner, and the verdict will be rendered for the plaintiff. However, it is more likely that the law is on the defendant’s side. In these situations, IBE as a model for POE seems to contradict the “more likely than not” POE standard. This is potentially problematic even where alternative pleading is not permitted because jurors might conjure explanations on the defendant’s behalf. Furthermore, appeals to threshold plausibility will not suffice as all explanations are plausible.

As an initial matter, it may be asked whether IBE contradicts the result dictated by POE.

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78 It should usually be the case that the plaintiff’s explanation is superior in virtue. If the plaintiff’s explanation is not usually superior in virtue despite being more probable, IBE has a problem in that explanatory virtue seemingly does not covary with probability.

79 Pardo & Allen, supra note 3, at 15.
It may be true that POE does license the verdict for the plaintiff. One could argue that the POE standard simply compares the best candidate plaintiff explanation against the best candidate defendant story. This result would belie the characterization of POE as “the more likely than not” standard. Indeed, the view that “if the jury believes two mutually incompatible stories favor a party, the party gets the benefit of the disjunction of their probabilities” is prominent in the literature.\(^\text{80}\) Thus, the IBE proponent could proceed by characterizing the POE standard differently, though this approach should be generally disfavored.

One promising way to respond to objections to the IBE model of POE is to assert that the distinct arguments offered by the defendant should actually be combined in disjunction. If this approach is used, and the explanatory virtue of the plaintiff’s explanation is inferior to the disjunctive explanation, a precisely correct result would be achieved.\(^\text{81}\) This seems to be the best way of proceeding, though it does require a substantial amount of work by the IBE proponent. Specifically, IBE accounts may have more to say about how to judge the explanatory virtues of disjunctions—they might prove to score very poorly in the simplicity and non ad hoc categories. As a result, it is unclear that a defendant’s disjunctive explanation, though it is itself more probable than not, would be the best explanation according to IBE. Again, this would expose a disanalogy between IBE and POE.

\textbf{VII. \hspace{1em} Conclusion}

We have argued that the proponents of IBE as a model for legal standards of proof can respond to the common objections against it. Significant issues remain for the use of such a

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\(^{80}\) \textit{Id.} at 26–27 (suggesting that Richard Friedman and Dale Nance argue for this principle of aggregating party’s stories).

\(^{81}\) If the explanatory virtue of the plaintiff’s explanation was superior to the disjunctive explanation, this would simply expose a mistake by IBE. This is permissible since IBE is defeasible.
Among other problems, IBE proposals seem to rely on the assumption that the higher the presence of explanatory virtue, the more probable it is that the explanation is true. Though crucial to IBE proposal, this principal is yet to find convincing support in its favor. Indeed, there are strong reasons to think it false, because some explanatory virtues—such as simplicity, testability, and internal coherence—do not seem to covary with probability. To address this worry, IBE proposals could be suitably altered to incorporate only explanatory virtues that do covary with probability. This solution has potential, but it also may undercut a separate but equally crucial aspect of IBE—a focus on explanatory virtue.

With regard to POE, IBE models seem to lead to counterintuitive results when there are multiple plausible explanations in favor of a defendant that aggregate to satisfy the “more than likely” threshold. When each definition for the defendant is inferior to the plaintiff’s, the IBE model of POE would direct a verdict for the plaintiff. However, if the defendant’s inferior explanations aggregate to greater than 50% likelihood, a verdict should be rendered for the defendant. In such a scenario, IBE seems to diverge from POE. The IBE proponent could respond that the defendant’s explanations may be combined in disjunction, ensuring that IBE and POE ultimately align. This approach shows promise, but it must be explained how to gauge the explanatory virtue of disjunctions. Disjunctive explanation may not be simple or non ad hoc, and so IBE may not prefer such explanations. If this is the case, then IBE will again diverge from POE.

In light of the preceding, there is reason for optimism with regard to IBE’s utility in modeling legal standards of proof. However, the suggestions on responses to IBE counterarguments offered in this Note are incomplete, and demonstrate that there is a significant body of work yet to be done before IBE can truly be said to model legal standards of proof.
Much of this may be accomplished by the careful crafting of the explanatory virtues to be considered in IBE proposals modeling legal standards of proof. As noted earlier, this is a source of significant controversy, with many distinct solutions offered. As such, resolving this tension is both difficult and imperative to the utility of IBE. One thing is clear: the limited comprehension of legal standards of proof is less than satisfactory and deserves our attention and honest effort. IBE has shown great promise as an aid in remedying this shortcoming, and it behooves us to fully explore its potential.