Is a High Probability of Guilt Enough to Convict?

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What is proof beyond a reasonable doubt? ... Proof beyond a reasonable doubt does not mean proof beyond all possible doubt, for everything in the lives of human beings is open to some possible or imaginary doubt.

A charge is proved beyond a reasonable doubt if, after you have compared and considered all of the evidence, you have in your minds an abiding conviction, to a moral certainty, that the charge is true.”

–Commonwealth v. Webster, 5 Cush. 295, 320 (1850)
Can we do better than offering paraphrases?
Legal Probabilism

Meeting a suitably high guilt probability threshold is enough, in and of itself, to justify a conviction

**Rationale**

The defendant’s guilt can hardly be established with absolute certainty

At best, the defendant’s guilt can be established with a high probability
Jakob Bernoulli

“It would be useful, accordingly, if definite limits for moral certainty were established by the authority of the magistracy. For instance, it might be determined whether $\frac{99}{100}$ of probability suffices or whether $\frac{999}{1000}$ is required”

The Art of Conjecture, 1713, pt. IV
The Prison Yard Scenario

- 99 of 100 prisoners present kill the guards on duty
- After the fact, one prisoner is picked at random and tried
- He is 99% likely to be one of the killers
- Is that enough to convict him?
The Gambling Worry

Criminal trials are not about gambling with people’s lives.

If the jury convicted the prisoner on trial and the prisoner was in fact guilty, the jury would be right only as a matter of *fortuitous accident*.
A Dilemma

Given the *inevitable fallibility of the trial system*, the defendant’s guilt can hardly be established with absolute certainty.

As suggested by the *prison yard scenario*, we feel uneasy in convicting the prisoner despite the high probability of his guilt.

A probability of 99% should be enough to convict.

A probability of 99% does not seem enough to convict.
Cesare Beccaria

“The moral certainty needed to convict is nothing but a probability, though a probability of such a sort as to be called a certainty”

Of Crimes and Punishments, 1764, chapter 14
Probability or Certainty?
Taking a Step Back
(SOME OF THE) OBJECTIVES OF A “GOOD” TRIAL SYSTEM

As many verdicts as possible should be factually correct

The inevitable errors should be distributed in a desirable way

WORKING HYPOTHESIS

A theory of the standard of proof should explain how the standard can

1. reduce errors
2. distribute errors
## Frequencies, Rates and Risks of Error

<table>
<thead>
<tr>
<th>Error frequencies</th>
<th>describe how many innocent defendants are convicted and how many guilty defendants are acquitted</th>
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<tbody>
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<td>$P(IC) \times n$</td>
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What a Threshold Does

A higher/lower threshold directly affects the distribution of error risks:

\[ P(C \mid I) \quad \text{and} \quad P(A \mid G) \]

A higher/lower threshold indirectly affects error rates and frequencies:

\[ P(IC) = P(I) \times P(C \mid I) \]
\[ P(GA) = P(G) \times P(A \mid G) \]

\[ P(IC) \times n \quad \text{and} \quad P(GA) \times n \]
What a Higher Threshold *Does*  

A higher probability threshold, compared to a lower threshold, *diminishes the risk of convicting innocent defendants* even at the cost of increasing the risk of acquitting guilty defendants.

**NB:** This is true regardless of the shape of two curves.
What a Higher Threshold *Doesn’t* Do

A lower threshold, e.g. >0.7, as a requirement for a conviction, may even reduce the overall risk of error.

\[ P(C|I) \] and \[ P(A|G) \]

NB: Whether a lower threshold reduces the overall risk of error depends on the shape of the curves.
Error Distribution, Not Error Reduction

acceptable error distribution

>0.9 probability threshold

acceptable error reduction

>0.5 probability threshold

**Upshot:** If we want to ensure that the criminal standard of proof reduces errors and distributes them in an acceptable manner, we cannot identify the criminal standard of proof with a probability threshold.
Schema of a Theory of the Standard of Proof

- acceptable error distribution

- acceptable error reduction

- high threshold probability

+ ?
More on *Error Reduction*
Diagnostic Power and Error Reduction

Long-run factual correctness (of the trial system overall)

Two errors:
1. convicting an innocent
2. acquitting a guilty

Error minimization

Increase in the diagnostic power of the trial system

REDUCTION OF THE OVERALL RISK OF ERROR
How to Increase Diagnostic Power?

“evidential completeness”

The evidence, coming from both parties, should be as complete as possible

Intuitively, the more evidence, the sharper the separation between the two curves, so the higher the diagnostic power

“dialectical scrutiny”

The prosecutor’s case should be challenged thoroughly and the challenges rebutted

Similarly....
More Evidence Increases Diagnostic Power

A trial system in which more evidence is presented during each trial will have, in the long run, higher guilt probabilities for guilty defendants and lower guilt probabilities for innocent defendants.

- **E is evidence for G**
  - iff
  - \( P(E | G) > P(E | I) \)
  - iff
  - \( P(G | E) > P(G) \)
- **E is evidence for I**
  - iff
  - \( P(E | I) > P(E | G) \)
  - iff
  - \( P(I | E) > P(I) \)

Intuitively, the more evidence, the sharper the separation between the two curves, so the higher the diagnostic power.
What Is Enough?

How do we decide when the evidence is sufficiently complete?

How do we decide when the dialectical scrutiny is sufficiently thorough?

The threshold should be defined relative to practical needs and fairness considerations, such as:

- reasonable time for the trial
- equal allocation of resources to both parties in the trial
A Theory That Meets Both Objectives

acceptable error distribution

acceptable error reduction

high probability threshold

thresholds for evidential completeness and dialectical scrutiny
The Dilemma Clarified

Given the inevitable fallibility of the trial system, the defendant’s guilt can hardly be established with absolute certainty.

A probability of 99% should be enough to convict.

As suggested by the prison yard scenario, we feel uneasy in convicting the prisoner despite the high probability of his guilt.

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Probability

High probability threshold

Moral certainty

Threshold for evidential completeness and dialectical scrutiny
Probability and Certainty
Thank you!