Legal Theory, 5 (1999), 221–234. Printed in the United States of America

MODELING JUROR BIAS

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We consider the implications of the definition of juror bias offered in Schwartz and Schwartz[1] for optimal use of juror challenges to improve the accuracy of the jury process. For them, bias consists of a juror assinging more/less weight to the evidence for guilt than would be assigned by the median juror in a fully representative pool of jurors. When juror assessments of the evidence have a probabilistic component to them, we show that this notion of bias does not imply that we necessarily would wish to use challenges to eliminate the most biased jurors. We also explain how understanding juror verdict accuracy requires an analysis of the interaction between the threshold rule that the juror uses to determine what level of belief in the guilt of the defendant is sufficient for "guilt beyond a reasonable doubt" and the probative force of the evidence in the cases that the prosecution chooses to bring to trial. Whether we use the Schwartz and Schwartz definition or other more standard legal approaches to defining juror bias (and grounds for challenge for cause) we come away highly skeptical of the expanded voir dire and extended use of peremptories that, in a number of recent highly publicized criminal trials, have had the consequences of eliminating from the jury pool the most highly educated and the most knowledgeable jurors.

I. INTRODUCTION

To evaluate the desirability of alternative rules about the use of challenges for cause and the use of peremptory challenges in jury trials we must have both a notion of what the jury is expected to do and of what it means for a juror to be biased. After very briefly discussing the notion of "fair trial," we turn to one generally accepted component of the notion of a "fair trial": trial by a set of jurors who have no particular biases against (or for) the

Professor Grofman is indebted to Dorothy Green, Jesse Knepper and Clover Behrend for library assistance, and to Edward Schwartz and Warren Schwartz for sparking his renewed interest in jury decision making. Professor Wales is indebted to Warren Schwartz, who suggested the collaboration that led to this article.

1. Edward P. Schwartz & Warren F. Schwartz, *The Challenge of Peremptory Challenges*. Paper presented at the annual meeting of the Public Choice Society, Long Beach, California, March 24–26, 1995.

defendant. Of course, exactly how we operationalize the concept of bias is far from clear. Here, we focus on criminal trials and we pay particular attention to the definition of bias offered in Schwartz and Schwartz,[2] in which bias consists of assigning more/less weight to the evidence for guilt than would be assigned by the median juror in a fully representative pool of jurors. This notion of bias seems particularly relevant to the decisions reached by prosecution and defense attorneys in deciding how to exercise their peremptory challenges against jurors who have not already been eliminated for cause.

Then we explicate a general five-part (probabilistic) approach to juror accuracy, in which juror bias is merely one component. Here, juror accuracy in any given trial depends not just on individual characteristics of the juror but also upon the nature of the evidence and upon the decision threshold used for converting the weight of the evidence into a verdict choice. Using this approach, we consider the implications of the Schwartz and Schwartz definition of bias for the likelihood that a given juror will reach a "correct" verdict. When juror assessments of the evidence have a probabilistic component to them, we show that their notion of bias does not imply that we would always wish to use challenges to eliminate the most biased jurors in order to improve verdict accuracy. We conclude the article with a brief discussion of the issues involved in the design of a system of juror challenges that will maximize the likelihood of "correct" verdicts as well as eliminating jurors who are "biased" within the traditional legal definitions of that term.

II. JUROR BIAS

We may think of the modern notion of a "fair (criminal) trial" as having three central components: the first involves basic procedural safeguards, such as the right to confront one's accusers; the second concerns a "fair and impartial" jury in the negative sense of a "representative" jury—one that reflects the distribution of community biases accurately.[3,4] Here, even if there is bias in some fashion it is, if you will, "representative" bias. This negative concept of a fair and impartial jury involves an "inclusive jury." The third component is a fair and impartial jury in the sense of a jury whose members have been selected in such a fashion as to exclude individuals who might be biased against (or for) the accused. This positive notion of the meaning of fair and impartial jury involves an "exclusive" jury.

2. *Id.*

3. Hans Zeisel & Shari Diamond, *The Effect of Peremptory Challenges on Jury Verdicts: An Experiment in Federal District Court,* 30 STAN. L. REV. 491–531 (1978). *See also* James B. Gobert, *In Search of the Impartial Jury,* 79 J. CRIM. L. & CRIMINOLOGY 269–327 (1988).

4. A representative jury also serves another purpose. One of the functions of the jury is to protect the people against usurpations of government such as the selective enforcement of laws, and one way to effectuate this end is to allow criminal convictions only if the people—or, at least, a fairly drawn cross section thereof—agree that the evidence so warrants.

Obviously, we can expect conflicts between the second and third desiderata on our list, for it seems impossible to simultaneously satisfy inclusive as well as exclusive notions of what it means for a jury to be impartial, but we shall not deal with issues of jury representativeness here. Instead, our sole focus will be on the notion of juror bias. However, we should note that Schwartz and Schwartz[5] have suggested that, in part at least, we can reconcile representativeness and the absence of bias by thinking of a jury as representative if the median voter on the jury is the same as the median voter in the population (*cf.* Feld and Grofman).[6] As long as we are symmetric in the nature of the exclusion process, we can preserve the median voter while still excluding some jurors (presumably "extreme" ones).[7]

A. Traditional Legal Approaches to the Concept of Juror Bias

The principal mechanism for dealing with juror bias has been the attempt to exclude "outliers" from the jury. This is done through a combination of statutory exclusions (e.g., attorneys barred from jury duty in some states), excusals for cause (with continuing controversies about what constitutes cause, e.g., the debate about exclusion of so-called non-death-qualified jurors), and use of peremptory challenges. It seems to us that fear of juror bias and jury error has been growing. Fear of juror bias is expressed in the jury selection phase of the trial in terms of expanded voir dire, an increase in the number of peremptory challenges, a greater concern for the potential of bias in cases involving extensive pretrial publicity that has led to a loosening of the interpretation of what constitutes a challenge for cause,[8] and a far greater concern for the racial and ethnic composition of juries, one that more frequently than in the past spills over into disputes over change of venue.[9]

Yet there are major problems with the strategy of removing outliers, including (1) the competence of judges to correctly identify those who should be eliminated for cause; (2) the higher costs in jury/attorney/court time in the extensive voir dire that screening for bias is now seen to require, and, perhaps most importantly from our perspective; and (3) the tendency to dumb down the jury both via venire selection and via challenges (especially peremptory challenges) at trial—for example, to have persons with specialized knowledge that may be relevant to understanding case issues

5. Schwartz & Schwartz, *supra* note 1.

6. *See also* Scott L. Feld & Bernard Grofman, *On the Possibility of Faithfully Representative Committees,* 80 AM. POL. SCI. REV. 863–79 (1986); Alan Gelfand & Herbert Solomon, *A Study of Poisson's Models for Jury Verdicts in Criminal and Civil Trials,* 68 J. AM. STAT. ASS'N 271–78 (1973).

7. In so doing, we also presumably reduce the likelihood of hung juries.

8. Jeffrey Abramson, WE, THE JURY: THE JURY SYSTEM AND THE IDEAL OF DEMOCRACY (1994).

9. H.W. Wales, *Legal Rules to Effect an Impartial Jury: Something More Than Barstool Justice.* Paper presented at the Conference on the Role of the Jury in Democratic Society, Georgetown University Law Center, October 28, 1995.

more likely to be struck than persons without, and to allow students and other middle-class jurors to avoid service.[10]

The notion of screening for juror "bias" to assure an impartial jury remains one of the murkiest (and most controversial) aspects of the jury selection process.[11] Nonetheless, to model jury decision making, it would seem we need come to grips with how to define the concept of bias.[12] We begin our discussion with three traditional legal approaches to the concept of juror bias.

1. A Personal Interest in the Outcome

Clearly, jurors for whom a verdict may have consequences that would directly affect them should not serve, as their impartiality would be suspect even if they claimed to be unbiased. The principle of juror exclusion here is no different from that governing judicial recusal.

10. In this context it is useful to comment briefly on alternative mechanisms for dealing with juror bias: (1) One such alternative mechanism has been evidentiary rules to control what the jury hears (e.g., excluding evidence that might be prejudicial). However, social science evidence is that jurors are not much affected by instructions informing them to disregard what they have heard or to assign it only limited probative weight, and that even exclusion of evidence risks jurors simply guessing at the nature of what was missing. (We are extremely skeptical of the current exclusionary rules. To us they seem based on outdated notions of human psychology and information processing and paternalistic notions about the competence of jurors to evaluate evidence, but that topic is beyond the scope of this paper.) (2) Manipulating the verdict decision rule (or the size) of the jury might also be a potential means to reduce bias. If the verdict rule is reduced from unanimity to some lesser requirement, then the jury system may be better able to cope with the presence of "outliers" who might otherwise hang a jury. *See* Schwartz & Schwartz, *supra* note 1. Similarly, if we treat outliers as a purely statistical phenomenon, then the impact of the presence of an "outlier" may be mitigated if there are more jurors to "dilute" their effects on jury deliberations and verdict decision making.

11. The rules for challenge for cause in the state of California are "fairly typical." (*See* Donald E. Vinson, JURY TRIALS: THE PSYCHOLOGY OF WINNING STRATEGY 72 [1986].) They provide that "challenges for cause will be entertained if:

1. The juror is related to a party in the litigation.
2. The juror has a unique interest in the subject matter.
3. The juror has served on a related case, or the grand jury which indicted the accused.
4. The juror has a state of mind that will prevent her or him from acting with entire impartiality and without prejudice to the rights of either party."

Item 4 is the critical one. According to Vinson (*see id.* at 72–73), in practice, "Judges have wide latitude in granting challenges for cause. Their practice can be very uneven and subjective. There is much room for discretion and little hard and fast law."

For peremptories, the law is murkier still, with attempts to limit discretion when suspect classifications are implicated (*see* Wales, *supra* note 9).

12. We would, however, emphasize that the statistical model below is not the only way that bias might reasonably be approached in a theoretical fashion. In particular, we might want to draw on the Bennett and Feldman [*see* W. Lance Bennett & Martha S. Feldman, RECONSTRUCTING REALITY IN THE COURTROOM (1984)] "storytelling" model, or the various schema-oriented models to develop a more holistic approach to how jurors fit pieces of evidence into a "convincing" story that contains the critical elements of actor, object, instrument, place and time, and motive. *See* Steven Penrod & Reid Hastie, *Model of Jury Decision-Making: A Critical Review,* 86 PSYCHOL. REV. 462–92 (1979).

2. Absence of Prejudgment

Clearly, too, jurors who had their minds firmly made up in advance of hearing the evidence at trial should be disqualified. But what does it mean to have one's mind firmly made up in advance?

Abramson[13] reviews early attempts to come to grips with the concept of juror "prejudgment." In the federal trial of Aaron Burr at which Chief Justice John Marshall presided as a circuit judge, Marshall took the view that a person who had expressed a decisive opinion on any "essential" element of the crime could be disqualified as jurors. But Marshall drew a distinction between "light impressions which may fairly be supposed to yield to the testimony that may be offered" and "those strong and deep impressions which will close the mind against testimony."[14]

3. Absence of Exposure to Indelibly Etched Prejudicial Information

As Abramson[15] summarizes Marshall's view on the exposure of jurors to prejudicial information in absence of a trial: "The gist of Marshall's reasoning is that having pretrial information does not disqualify a juror, but a predisposition against considering the facts undermines impartiality." However, Abramson[16] observes that modern law, especially since the 1960s, has moved considerably beyond Marshall's opinion in *Burr,* in adding the "concept of inherent, or presumed, bias, as a way of disqualifying potential jurors."

> Media coverage occasionally reaches such levels of revelations and inflammation that bias may simply be presumed in anyone exposed to it; there is no need to uncover particular evidence of prejudice through voir dire questions. Rather, as the Supreme Court put it, "adverse pretrial publicity can create such a presumption of prejudice in a community that the jurors' claims that they can be impartial should not be believed."[17]

B. The Schwartz and Schwartz Concept of Juror Bias

Immediately above we have very briefly reviewed the "traditional" legal notions of bias. Recently, however, much weaker notions of juror bias have been proposed. Self-interest, unwillingness to consider the evidence, and fatal exposure to prejudicial information are not the only things that may interfere with impartiality. Jurors may have no foreknowledge of the case facts and be quite willing to consider the evidence, but may still bring into the jury room "biases" that will incline them more to one side of the case than the other or that will cause them to evaluate evidence in what may be seen as a

13. Abramson, *supra* note 8, at 38–44.
14. *Id.* at 43.
15. *Id.* at 43.
16. *Id.* at 47.
17. *Id.* at 47, with internal cite to Patton v. Yount, 366 U.S. 1025, at 1031, referring to Irwin v. Dowd, 366 U.S. 717, 725. See further discussion of this point below.

prejudicial way.[18] Under such definitions virtually all jurors would be biased, at least to some extent. One recent approach along these lines is that of Schwartz and Schwartz,[19] who define juror bias in terms of a divergence between the probability that a given juror confronted with the evidence in the case will convict and the probability of a vote for conviction from the (hypothetical) "median" juror drawn from a fully representative jury pool.

Although we do not believe that this definition of bias is the one that should be used for explicating the notion of the right to a fair and impartial jury,[20] because the Schwartz and Schwartz[21] approach to the idea of juror bias very well captures how defense and prosecution attorneys seek to determine the jurors whom they most wish to see excused from the jury and on whom they are most likely to use peremptory challenges,[22] it is important to see how bias as so defined is related to juror verdict accuracy. To answer this question we need to develop a general model of juror accuracy.

III. MODELING JUROR VERDICT ACCURACY: A FIVE-COMPONENT MODEL

We define juror competence in Condorcetian terms[23] as a probability of reaching a "correct" judgment on a dichotomous choice (conviction or acquittal),[24] not in terms of overall accuracy of probability assessments per se. Our model of juror competence has five components: (1) juror accuracy in evaluating the evidence, (2) juror threshold rule (for determining whether the evidence rises to the level of guilt beyond a reasonable doubt), (3) juror bias, (4) the nature of the pool of cases/defendants brought to trial, and (5) juror verdict variance.[25]

18. There is also a practical issue of how we detect biases. This issue has come up in a variety of contexts—for example, *re* the question of possible verdict differences between so-called death-qualified and not-death-qualified jurors. [*See* Edward P. Schwartz & Warren F. Schwartz, *Deciding Who Decides Who Dies: Capital Punishment as a Social Choice Problem,* 1 LEGAL THEORY 113–48 (1993).] This empirical issue is beyond the scope of this paper.

19. Schwartz & Schwartz, *supra* note 1.

20. We believe that failure to screen out jurors with attitudinal differences from the median juror (*e.g.,* in the a priori credibility attached to police testimony) ought not to give rise to a per se presumption that the right to an impartial jury has been denied. In our view, only when attitudes are "writ in stone" and not amenable to reasoned argument does the right to an impartial jury become implicated. (*See* Wales, *supra* note 9.)

21. Schwartz & Schwartz, *supra* note 1.

22. Vinson, *supra* note 11.

23. Nicolas Caritat Condorcet, *Essai sur l'Application de l'Analyse à la Probabilite des Decisions Rendues à la Pluralite des Voix* (1785). *See also* Bernard Grofman & Scott L. Feld, *Rousseau's General Will: A Condorcetian Perspective,* 82 AM. POL. SCI. REV. 567–76 (1988).

24. The meaning we attach to "correct" choices will be explicated below.

25. The approach we take is adapted from Grofman. *See* Bernard Grofman, *Mathematical Models of Juror and Jury Decision Making: The State of the Art, in* PERSPECTIVES IN LAW AND PSYCHOLOGY, VOL. II: THE TRIAL PROCESSES 305–51 (Bruce D. Sales ed., 1981). *See also* Gelfand & Solomon, *supra* note 6; Alan Gelfand & Herbert Solomon, *Modeling Jury Verdicts in the American Legal System,* 69 J. AM. STAT. ASS'N 32–37 (1974); Alan Gelfand & Herbert Solomon, *Analyzing the Decision-Making Process of the American Jury,* 70 J. AM. STAT. ASS'N 3035–3310 (1975); Stuart S. Nagel & Marian Neef, *Deductive Modeling to Determine an Optimum Jury Size and Fraction Required*

A. Juror Accuracy in Evaluation of the Evidence

The probability we assign that a juror will reach a correct verdict must depend in some fashion on the *nature of the evidence,* E (where we may take E to range from 0 to 1, with 0 irrefutable evidence of innocence and 1 being irrefutable evidence of guilt). Using probabilistic terms, we will model the relationship between evidence and the force assigned to it by a juror. We posit that any given body of trial evidence, E_g, generates a density function of the probability assigned by some given juror to the defendant's guilt. We may assume nonperversity (i.e., we take the mean of this density function to be monotonic in E). In other words, the stronger the evidence the higher the mean value assigned by the juror to the probability of guilt. The greater the ability of the juror to distinguish between evidence pointing toward guilt and evidence not pointing toward guilt, the greater the juror's accuracy in evaluating the evidence.

However, the juror's ability to evaluate the evidence is not the only component of what we shall call juror "competence." We must examine how jurors convert a probability assessment as to the likelihood of a defendant being guilty into a judgment about what verdict to choose, as *it is the accuracy of the verdict choice, and not the accuracy of the assignment of evidentiary weight, that is our ultimate concern* (i.e., our defining "bottom line" of whether or not a juror is performing satisfactorily).

B. Juror Threshold Rules

Clearly, juror competence will not depend only upon the juror's ability to evaluate evidence and the nature of the evidence available to the juror; it must also depend upon the *threshold rule* (e.g., preponderance of the evidence, guilt beyond a reasonable doubt, etc.) used by the juror to determine whether or not the probability that the juror assigns to the defendant being guilty should result in a decision to vote to convict. That rule will in turn be presumably affected by the way that jurors are instructed (e.g., as to how high a probability of guilt is needed before guilt can be determined "beyond a reasonable doubt"). The threshold used by any given juror, however, may not be that which the law had in mind.

When the trial evidence, E_g, would elicit a probability of conviction at or

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to Convict, 97 WASH. U. L. QUARTERLY. 933–78 (1975); Bernard Grofman, *A Preliminary Model of Jury Decision Making, in* 3 FRONTIERS OF ECONOMICS, 98–110 (Gordon Tullock ed., 1980); Guillermo Owen, Bernard Grofman & Scott L. Feld, *Proving a Distribution-Free Generalization of the Condorcet Jury Theorem,* 17 MATH. SOC. SCI. 1–6 (1989); David Estlund, Jeremy Waldron, Bernard Grofman & Scott Feld, *Democratic Theory and the Public Interest: Condorcet and Rousseau Revisited,* 83 AM. POL. SCI. REV. 1328–40 (1989); and, of course, Condorcet, *supra* note 23, and Simeon-Davis Poisson, RECHERCHES SUR LA PROBABILITE DES JUGEMENT EN MATIERE CRIMINAL ET EN MATIERE CIVILE: PRECEDEES DES REGLES GENERALES DU CALCUL DES PROBABILITES (1837). An historical exposition of the Condorcetian approach is found in Duncan Black, THE THEORY OF COMMITTEES AND ELECTIONS (1958; reprinted in 1992).

above the specified threshold level in an ideal observer (if we take the Platonic view of guilt/innocence) or in the majority of the population were the whole population exposed to the evidence (if we take a "sampling bias elimination" view à la Schwartz and Schwartz),[26] we shall say that the evidence "supports a verdict of guilty." Otherwise we shall say that the evidence "supports a verdict of not guilty."[27]

In a given trial (i.e., for a given E_g) we may take the proportion of the juror's probability density function that exceeds the value of E required by the threshold rule as the probability that the juror will convict.[28] We shall say that a juror is "correctly doing his or her job," if, when the actual trial evidence, E_g, supports a verdict of guilt, the juror votes to convict, and when the evidence does not support a verdict of guilty, the juror votes to acquit.[29] It is very important to recognize that "correct" verdicts as we have now defined them are not the same thing as convicting the "guilty" and freeing the "innocent." Instead, we evaluate the juror's task in terms of whether the juror votes to convict those *for whom the evidence supports a verdict of guilt* and acquits those for whom this is not true.[30]

C. Juror Bias

The *mean* probative weight assigned by the juror to the evidence need not be the "true" weight of that evidence. There are five ways a juror can, in general, go wrong.

26. Schwartz & Schwartz, *supra* note 1.

27. Note that in the sampling bias elimination view we take the "true" weight of the evidence to be whatever the majority of the community would have found it to be. This "privileges" the majority view. What most would see as bias or incompetence in evaluating the probative weight of evidence may be taken by others, instead, as proof of superior insight. For example, in a posttrial press conference, a black woman juror in the Simpson case stated that the fact that O.J. Simpson engaged in repeated wife-beating was irrelevant to her in judging the credibility of the scenario that involved him killing his ex-wife in anger. Was this a reflection of the cultural insight she had into the lack of relationship between wife-beating and killing rages among black men, or was she merely being obtuse? That same juror took the fact that the socks found on the scene had lots of blood but there were no blood spots in the area leading to the socks, as evidence that the socks had been "planted." Was she simply making a mistake about the viscosity of blood, or had her experiences with the Los Angeles criminal justice system imbued her with a more realistic view of the possibility that there might have been a conspiracy to frame O.J. than that of more naive whites? In the Bayesian approach, the weight of the evidence cannot be separated from the (prior) probabilities attached to certain types of events.

28. We have treated the juror information evaluation process as *probabilistic* in nature in order to be consistent with our earlier treatment of juror competence as a probability value (*see* Grofman, *supra* note 25; and Grofman & Feld, *supra* note 23) while we have treated the probative weight of evidence in *deterministic* terms. At the cost of further mathematical complexity, we could have treated the probative weight of evidence as probabilistically related to the "true" likelihood of guilt.

29. In this respect the model here is different from that given in Grofman, *supra* note 25.

30. The focus on the preferences of a hypothetical representative median juror (or on a hypothetical fully representative group majority verdict preference, as in Grofman, *id.*) avoids the need to assert what constitutes the "correct" verdict from a Platonic standpoint. Schwartz and Schwartz (*see supra,* note 1) take the view that, in general, chasing such a Platonic essence is

The first is to have a mapping that consistently understates the mean probability of guilt relative to the evidence for guilt. The second is to have a mapping that consistently overstates the mean probability of guilt relative to the evidence for guilt. The third and fourth types of error involve misapplying the legal threshold rule. The third type of error is to consistently use too low a threshold rule. The fourth type of error is to consistently use too high a threshold rule. The fifth source of potential error is for a juror to have a very high variance in his or her probability density function. Here, even a juror who, on average, always perfectly assesses the probative weight of the evidence, and uses the correct threshold rule, may still be wrong—in those situations where a portion of the juror's probability density function leads him or her to erroneous judgments.[31]

The five generic types of error identified above are, of course, simplifications. For example, we might imagine that some jurors underestimated the probative force of the evidence for conviction when it was weak, but overestimated its probative force when it was strong, or conversely. Or, to add even more complexity, we can also consider each type of bias/flaw in juror information processing skills in the context of the evidence in any given trial. For example, we might imagine that the probable direction of juror error might be a function of the nature of the crime, and/or of the race/gender of the defendant, and/or of the race/gender of the victim, etc.

Note also that the expected consequences for juror competence (i.e., verdict accuracy) of the fourth and fifth types of error are dependent in part on the extent to which biases of either the first or second type occur. If a juror consistently underestimates the evidence of guilt, the juror's verdict accuracy (competence) might actually be improved if he or she uses a threshold rule for one's own conversion from "probability of guilt" to "vote to convict" that is lower than the law requires. Similarly, if a juror consistently overestimates the evidence of guilt, the juror's verdict accuracy (competence) might actually be improved if the juror uses a threshold rule for his or her own conversion from probability assigned to guilt to the decision to vote for conviction that is higher than the law requires. In other words, errors of the first type might in part be compensated for by errors of the third type, whereas errors of the second type might in part be compensated for by errors of the fourth type, and conversely.

Still, in general, we may think of jurors who fall prey to errors of the first or fourth types as biased in favor of the defense, and jurors who fall prey to errors of the second or third types as generally biased in favor of the prosecution. Indeed, biases may be reinforcing. That is, individuals who

misguided. As noted earlier, we shall call their approach (and a similar approach in Grofman, *id.*) a "sampling error reduction" notion of individual judgmental accuracy.

31. We will illustrate this point below. For a related discussion of competence, see Grofman, *supra* note 25; Grofman & Feld, *supra* note 23; and Bernard Grofman, *Public Choice, Civic Republicanism, and American Politics: Perspectives of a "Reasonable Choice" Modeler,* 71 TEXAS L. REV. 1541–87 (1993).

over-credit believe police witnesses, think black males brought to trial are almost certainly guilty, believe defense lawyers are shysters, think a defendant who chooses not to take the stand is probably guilty, and so forth, may also be persons (e.g., perhaps "authoritarian personalities") who make use of a low threshold of proof for guilt.

D. The Expected Probative Weight of the Evidence in the Types of Cases That Actually Come to Trial

Evidence will vary in different trials; and the expected strength of the evidence in the trials that juries actually hear will depend upon prosecutorial decisions (as well as plea-bargaining choices made by defendants). It is important to recognize that, even in the absence of compensating biases, if the magnitude of juror bias of any of the first four types is slight, its consequences for juror competence may not be that severe when the evidence is clear-cut and/or the decision threshold rule sets a high hurdle. For example, if the evidence points overwhelmingly to guilt, even if jurors slightly underestimate or overestimate the probative weight of that evidence they are still likely to conclude (correctly, in our terms) that the defendant was guilty. Similarly, if the evidence for conviction is weak, and especially if the threshold for a guilty conviction is also high, even jurors who substantially overestimate the probative weight of the evidence are unlikely to reach an erroneous verdict. Thus, the choices made by litigants (and *especially, the choice made by the prosecution as to which cases to bring to jury trial*) will have a major impact on the likely accuracy of juror (and ultimately jury) judgments. The weight of the social science evidence is that jury verdicts are heavily evidence driven.[32]

E. Juror "Verdict Variance" (a Measure of the Juror's Consistency in Matching Evidence to Verdict)

Schwartz and Schwartz[33] suggest that we can improve jury accuracy by obtaining jurors whose verdict judgment mimics as closely as possible the preference of the median representative juror. This can be done by eliminating "extremist" jurors—that is, ones who are, on average, either much more likely to convict (given the evidence) or much less likely to convict (given the evidence) than the hypothetical median juror. However, in our more general probabilistic framework, once we take into account error variance, we shall show that jurors who attach the same *mean* probative

32. *See, e.g.,* Michael Saks, *What Do Jury Experiments Tell Us About How Juries (Should) Make Decisions?* Paper presented at the Conference on the Role of the Jury in Democratic Society, Georgetown University Law Center, October 28, 1995.

33. Schwartz & Schwartz, *supra* note 1.

weight to the evidence as that evidence warrants (judged from the perspective of the median representative juror), and thus are "unbiased" in the Schwartz and Schwartz definition, need not be equally likely to reach the "correct" verdict.[34] Indeed, it is easy to show that there are circumstances where a biased but low-variance juror may be more likely to reach a correct verdict than an unbiased juror with higher variance—a result well known in the statistical literature and one that considers the trade-offs between bias and consistency in terms of the properties of statistical estimators.[35]

Consider Figure 1. The decision threshold, *t,* is assumed the same for both jurors. A perception of values of E to the right of the threshold will result in a vote to convict. Juror I has a symmetric probability distribution centered on E (i.e., Juror II exhibits no bias in evaluating the evidence). Juror I's mean assessment of E is too high, but his variance is low.

Because E is to the left of *t,* a vote to convict is an "incorrect" verdict under our assumptions. Yet the "unbiased" juror, Juror II, is more likely to convict than is Juror I. Even if, as well as committing an error of the first type, we have Juror I engaged also in an error of the third kind, by using too low a threshold value for *t,* as long as he or she uses a threshold reasonably close to the true value of *t,* Juror I can still be more likely to reach a correct verdict than the unbiased but less discriminating[36] Juror II.[37]

The link between a juror's accuracy in assigning probative weight to the evidence and accuracy in reaching the "correct" verdict is very much contingent on the threshold *t.* Consider again the example in Figure 1, but now move the threshold *t* considerably to the left. Now, the unbiased juror *is* the more accurate. Another interesting and rather counterintuitive result is that it is possible for a juror to be biased everywhere except at $E = t$ and still reach the correct verdict all the time. Imagine, for example, a juror who, for all values of E other than $E = t$ always underestimates the mean probative weight of the evidence, but who correctly assesses the weight of the evidence for $E = t$. Despite errors in judging evidence almost everywhere, such a juror will still be unbiased as we have defined that term. Moreover, if we also posit that juror to have a deterministic choice rule, the juror will also always be accurate. For that juror, values of E below *t* will correctly lead to a verdict of innocence as the weight of the evidence is being *under*estimated for values of E below *t.* On the other hand, that juror's perceived values of E for E greater

34. Recall that by accuracy we do not mean convicting the "truly" guilty or freeing the "truly" innocent, even assuming that a clear meaning could be given to those ideas; rather, we mean the likelihood of a juror reaching the same verdict as would be reached, hypothetically, by a majority of the entire population, based on the evidence presented and the jury instructions given.

35. *See, e.g.,* Gary King, Robert Keohane and Sidney Verba, DESIGNING SOCIAL INQUIRY (1995).

36. The discriminability of a juror's information processing can be made more precise in the context of a signal detection model. (*See, e.g.,* Grofman, *supra* note 25, at 315–17.)

37. Of course, if Juror II sets the threshold too high, that acts to compensate for that juror's having overstated the probative weight of the evidence; thus, under the hypothesized circumstances, this type of error actually raises Juror II's competence.

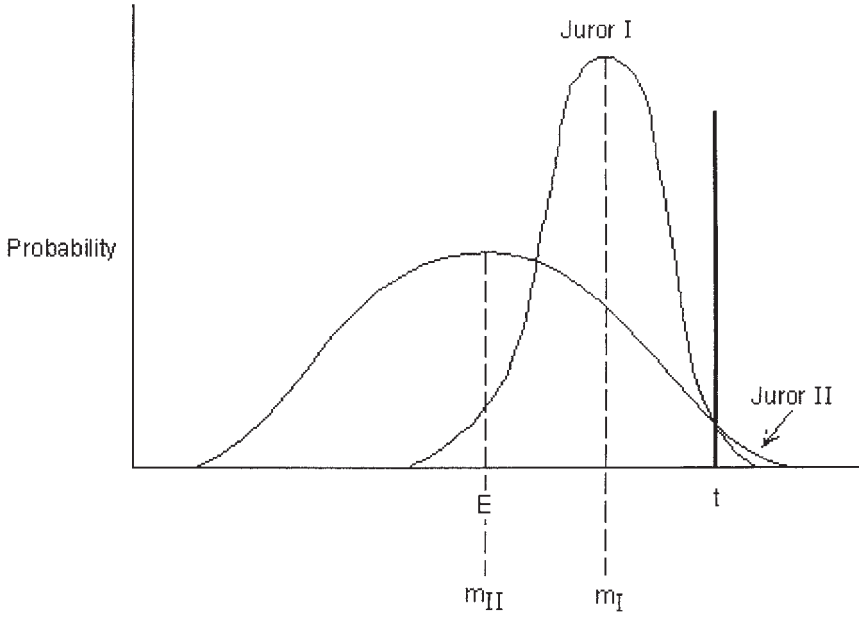

FIGURE 1.

than *t* will be above *t*, and thus the juror will correctly vote to convict (recall that we assumed monotonicity; and we assumed that the juror's evidence assessment of E at the value E = *t* was accurate).

IV. DISCUSSION

We first considered the implications of the definition of bias used in a recent model of peremptory challenges[38]—a definition couched in terms of the likelihood that some particular body of evidence will give rise to a given juror's probability that the defendant is guilty that is either too high or too low, given that evidence in comparison to the probative weight (probability of guilt) attached to that evidence by a hypothetical median member of a fully representative jury pool.[39] We then expanded this approach in terms of a model with a probabilistic component to it, and then we related bias to juror accuracy/competence. We showed that juror bias is not necessarily the most important element of a juror's verdict determination calculus. More specifically, we show how juror verdict accuracy depends not only upon juror competence, and the biases of the juror, but also on what we may call the juror's "verdict variance" (a measure of the juror's

38. Schwartz & Schwartz, *supra* note 1.

39. Note that his definition of juror bias is quite different from the legal definition of types of prejudices that are appropriately screened out via challenges for cause. *See* Wales, *supra* note 9.

https://doi.org/10.1017/S1352325299052052 Published online by Cambridge University Press

consistency in matching evidence to verdict), as well as depending upon the interaction between the threshold rule that jurors are instructed to use as to how high a probability of guilt is needed before guilt can be determined "beyond a reasonable doubt," and the expected probative weight of the evidence in the types of cases that actually come to trial.

In particular, we showed (a) that unbiased jurors need not always be more accurate than biased ones when we take into account the variance component of juror verdict preference that is related to jurors' ability to discriminate the probative value of evidence, and (b) that juror verdict accuracy may be determined more by the location of the cutoff used for determining when the evidence amounts to guilt beyond a reasonable doubt and/or the probative weight of the evidence in the cases that are actually brought for jury trial than by the nature and level of juror bias per se. Indeed, we provided an example to show that even a juror who almost always either underestimates or overestimates the probative weight of the evidence can be correct in his verdict judgment all (or just about all) of the time.

We have shown that juror verdict accuracy is determined in large part by the interaction between the threshold rule that the juror uses to determine what level of belief in the guilt of the defendant is sufficient for "guilt beyond a reasonable doubt" and the probative force of the evidence in the cases that the prosecution chooses to bring to trial. We have argued that juror bias, in the sense of disagreement between the mean probative weight to be attached to the trial evidence by a given juror and that attached by a hypothetical "ideal" juror (in the Platonic view) or with the weight attached by a hypothetical "median juror from a fully representative jury pool" (in the sampling error reduction view), may not be as important a factor in affecting the accuracy of jury verdicts as juror variance in probability assessment.

One way in which the jury process tries to permit the screening out of attitudinal biases too subtle to result in appropriate challenges for cause is via the mechanism of peremptory challenges. There has been much criticism of peremptories lately, and the results above suggest reasons to be highly skeptical about the use of peremptories as a mechanism to improve jury accuracy. Our results suggest that, instead, we should be more concerned about obtaining "competent" jurors, in the sense of those who can reliably assess the evidence (i.e., with low variance) and be less concerned about eliminating jurors with attitudinal biases that may lead them to overestimate or underestimate certain evidentiary factors when the price is obtaining jurors with a high verdict variance.

Moreover, because we all differ in our life experiences and values, by seeking to eliminate jurors who differ from the hypothetical median juror we embark on a quest that would justify the elimination of virtually all jurors. We believe that the only jurors whose biases are such that they *must*

40. *See* Wales, *supra* note 9.

https://doi.org/10.1017/S1352325299052052 Published online by Cambridge University Press

be eliminated from a jury if we are to have a fair and impartial jury are those who either have a personal interest in the case or those who have their mind made up in advance and will be unwilling to listen to the evidence.[40] Thus, like Abramson,[41] we are highly skeptical of the expanded voir dire and extended use of peremptories that, in a number of recent highly publicized criminal trials, have had the consequences of eliminating from the jury venire the most highly educated and the most knowledgeable jurors.

Given likely trade-offs between bias and competency, the United States needs to consider a strategy more like English jury practices, where the effort is to create a good random sampling with only minimal strikes/excusals (e.g., close relatives, persons truly unable or unwilling to participate). Not only may the English jury actually produce more accurate results, but it may also create a greater appearance of fairness in that the system is not seen as being as open to manipulation by lawyers (the best of whom are being hired by the rich).

41. Abramson, *supra* note 8.

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