Utilizing "Big Data" Modeling for Evaluating Potential Jurors

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Many legal teams believe that a case is won or lost during jury selection. Although this process is a critical aspect of any trial, legal teams typically use inadequate methods for determining whom to strike peremptorily. Each juror arrives at the courtroom with life experiences, attitudes, and backgrounds that may affect his or her case evaluations. Attorneys and paralegals, however, rely on only a limited amount of information to evaluate potential jurors. This inclination is the result of individuals' limited ability to appraise a great deal of information at any one time. Consequently, paralegals, attorneys and consultants are likely to take mental shortcuts and ignore pertinent juror characteristics that predict verdict decisions. Mathematical models developed from "big data" techniques control for this tendency by evaluating each juror's information *in toto* and computing the probability that he or she will be biased.

Mathematical models are simple quantitative descriptions that are used to predict future events. This analysis is frequently employed to forecast meteorological phenomena such as where hurricanes will hit, economic trends such as stock market movements, sales projections, and employment statistics, and in other diverse fields such as agriculture and epidemiology. Mathematical models are also increasingly used to forecast human behavior. For example, after briefly viewing a marital couple in disagreement, a researcher can use models to predict with 93% accuracy whether they will divorce five years later.[1] Career achievement, marital satisfaction, and even longevity may also be prognosticated well into the future by assessing an individual's current behavior.[2]

Without the aid of quantitative models, jurors' case reactions and verdict decisions are more difficult to anticipate because of the multitude of ways that jurors differ from each other and the perceived unpredictability of group deliberations. Jurors' verdict decisions, however, are often a product of their characteristics such as pre-existing attitudes, life experiences, perceptions of the parties in a dispute, as well as demographic information.[3]

Behind The Mathematical Model

As any experienced paralegal, jury consultant or trial attorney can attest, the vast majority of potential jurors who enter the courtroom do not completely or neatly fit their profile of a pro-plaintiff or pro-defense juror. For example, in a hypothetical antitrust dispute, a consultant for a defendant may use a profile in which he or she recommends peremptorily striking jurors who are 35 years old or younger, liberal, and have negative feelings about the defendant. However, how does this consultant evaluate a juror who is 25 years-old, conservative, and has negative feelings about the defendant against a potential juror who is 45 years old, liberal, and has positive feelings toward the defendant? Often in reality, legal

teams are forced to choose between such jurors. In the above example, is a juror's age more important than whether his or her political ideology? This profile contains only three variables, whereas other profiles may contain as many as eight or more, which of course, makes evaluating jurors much more difficult.

Mathematical models are used to analyze the degree to which a prospective juror's characteristics are predictive of bias. Without a model, legal teams tend to focus on certain jury characteristics to the exclusion of others when making jury-selection decisions. Mathematical models allow for a much more comprehensive analysis of each juror by performing advanced computations of the relative importance of each juror characteristic for predicting unfavorable verdict decisions. In the above example, political ideology may be three times more predictive of jurors' verdicts than age level. In the analysis of jurors, models *weigh* the relative importance of juror characteristics accordingly. The advantage of using mathematical models rather than more rudimentary approaches to evaluate potential jurors is that the former utilizes all of a potential juror's information to determine the likelihood that he or she is predisposed to decide a case in a particular manner.

The 'How To' for Mathematical Modeling

$$\frac{P(\mathbf{x})}{1-P(\mathbf{x})} = \exp(\sum_{j=0}^{K} b_j x_j)$$

$$= \prod_{j=0}^{K} \exp(b_j x_j)$$

Jury profiling models are developed utilizing large datasets typically obtained in phone or Internet surveys or by conducting multiple focus groups. Based on the results of the pre-trial jury research, a mathematical model is then developed by using advanced statistical techniques such as a log-linear regression. Log-linear regressions are used to weigh the juror characteristics according to the extent to which jurors' demographic backgrounds, experiences and attitudes predict jurors' verdicts in pre-trial research.

During jury selection, attorneys may utilize the model to evaluate jurors by inputting their information into a spreadsheet. The spreadsheet is programmed with the mathetmatical model with which to rate jurors. The trial team then needs to provide the relevant information for each specific juror based on his or her responses during voir dire and/or from a juror questionnaire. Based on this information, each prospective juror is given an actual rating score within the spreadsheet, which indicates the likelihood that he or she will decide the case favorably or unfavorably to your client. The scores may be color-coded to indicate whether they are pro-defense, middle-of-the-road, or pro-plaintiff jurors. Attorneys may also compare the rating scores of the jury panel to determine which jurors are most unfavorable and should be the initial focus during voir dire.

It is important to note that the accuracy of the model for identifying dangerous jurors depends on quantity and quality of the juror information acquired through juror questionnaires or during voir dire. To ensure that a sufficient amount of juror information is obtained to improve the accuracy of a mathematical model, the use of juror questionnaires is highly recommended. Paralegals often play a critical role in aggregating the jury questionnaire responses. For the trial team, the model will also inform the specific questions that attorneys should ask jurors during voir dire. Each juror's model score is a starting point for determining the likelihood that he or she will view your client's case unfavorably. An assessment of a potential juror may change drastically as a result of bias revealed during voir dire or in response to open-ended questions on the juror questionnaire.

When In Doubt, Model It Out

Mathematical models help legal teams determine jurors' verdict predisposition by utilizing the information obtained during jury selection and then deriving an initial score for each individual juror. Based on these ratings, jurors on the panel may be ranked from best to worst. The models developed provide a statistically-based methodology for identifying the worst jurors, preventing the trial team from misusing peremptory strikes and thus facing a less receptive jury than could have been otherwise selected.

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[1] See Gottman & Levenson, *The timing of divorce: Predicting when a couple will divorce over a 14-year period,* 62 Journal of Marriage and the Family. 737-745 (2000). Gottman, Murray, & Swanson also presented at the 2004 annual meeting of the American Association for the Advancement of Science in Seattle a model that predicts with 94% accuracy which newlyweds will remain married four to six years later.

[2] See Harker & Keltner, *Expressions of positive emotions in women's college yearbook pictures and their relationship to personality and life outcomes across adulthood,* 80 Journal of Personality and Social Psychology. 112-124 (2001), *see also* Danner, Snowdon, & Friesen, *Positive emotions in early life and longevity: Findings from the nun study,* 80 Journal of Personality and Social Psychology. 804-813 (2001).

[3] See review of Fulero and Penrod, *The myths and realities of jury selection folklore and scientific jury selection: What works?, XVII* Ohio Northern University Law Review. 229-253 (1990).

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