The Jury EXPERT

The Art and Science of Litigation Advocacy

August 2014

A publication of the American Society of Trial Consultants

ON THE APPLICATION OF GAME THEORY IN JURY SELECTION

Don't miss the consultant responses below: Roy Futterman; Edward P. Schwartz.

When we think of jury selection, we think of jury questionnaires, mock trials, demographic surveys, voir dire, psychological profiling, social media scanning and the like. Significant amounts of time and expense are invested in such activities, especially in high-value and high-profile trials, with the intent of determining the favorability of prospective jurors to a particular theory of prosecution or defense. However, we must keep in mind that rating or ranking of prospective jurors in not an end unto itself, but is undertaken in large part as preparation for the exercise of peremptory challenges. It is the exercise of peremptory challenges that is the topic of this article and we will come to some conclusions regarding challenge strategies that may surprise you.

I became interested in jury selection as a graduate student at Stanford University. While not directly related to my thesis (I was working on a degree in High Energy Astrophysics), the probabilistic and competitive nature of jury selection was within the scope of my interests. In particular, I realized that game theory – the mathematics of competition between multiple players over a common outcome – has a direct application to jury selection. In the case of jury selection, it is common to be in a situation where you must make a decision to exercise a challenge in the absence of complete information, for example, when not all jurors have been examined, when juror ratings are uncertain, when you are unsure of your opponent's preferences, or when replacement jurors are selected at random from the jury pool.

This added degree of uncertainty is probabilistic in nature. I worked out the Game Theory solutions to many common jury selection scenarios including various forms of 'Strike and Replace' and 'Struck' systems, and we have now implemented these solutions in computer software.

It is useful to think of jury selection as a two-step process: Step 1) rate jurors and the jury pool, and Step 2) determine a strategy for the exercise of peremptory challenges. Step 1 has received the bulk of attention among litigators and trial consultants. Indeed, many readers of this article will spend much of their careers applying best scientific practices to obtain meaningful and accurate juror (and jury pool) ratings. Step 1 is the 'bread and butter' of jury selection.

Step 2, when considered at all, is too often relegated to the level of 'rule of thumb', hunch, intuition, or guesswork. While there are many possible challenge strategies ranging from never challenging to flipping a coin, the most common strategy that I have encountered among litigators is what I call 'Pool Average': challenge those jurors whose ratings fall below the average of the jury pool and accept those whose ratings are above the average of the jury pool. While intuitively compelling, 'Pool Average' is not the best strategy, not even by a long shot! Why? It does not take into consideration the possible actions of the opposing party and it does not account for the loss of a challenge that could prove valuable later in the selection process.

Let's look at a concrete example. Suppose that you have one jury seat to fill, you and your opponent each have a single remaining challenge, and the pool is a uniform distribution with an average of 5 on a scale from 0 to 10. You are presented with a juror whom you have rated as a 4. Should you challenge this juror? A 'Pool Average' player would reason that 4 (the juror's rating) is less than 5 (the pool average) so it makes sense to exercise a challenge. Unfortunately, this would be the wrong choice because your opponent still has a challenge available to use should you draw a favorable member from the pool. In a sense, once you have made your challenge, your opponent has two chances – the first replacement and the second, if they do not like the first. It turns out that your best strategy in this situation would be challenge only if the juror has a rating of 3.75 or less.

Decision problems, such as those encountered in jury selection, are solved by generating a 'game tree' representing every possible decision path. Each node of the game tree represents a decision point for a particular party on a particular juror. For example, the first node might represent the choice by the plaintiff to challenge or to accept Juror 1. Each such choice generates a branch to be followed in the case that that choice is made. The leaves of the game tree represent possible final outcomes. A simple game tree for the scenario described in the previous paragraph is shown in Figure 1. This game tree has four decision points leading to three possible outcomes: One representing Juror 1, two representing the first replacement juror, and two representing the second replacement juror.

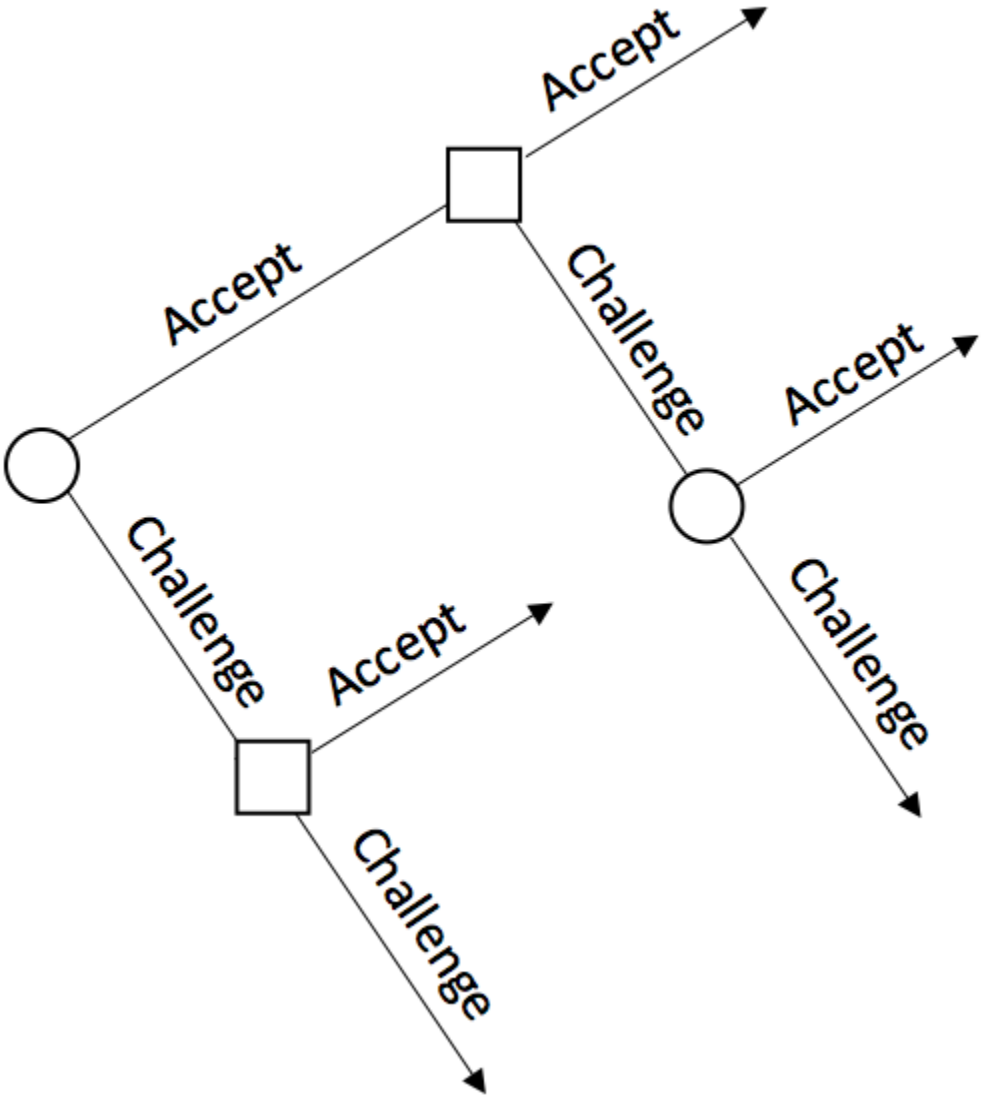

Figure 1. A simple game tree representing the situation where one juror is to be chosen and each side has one available peremptory challenge. Circles represent plaintiff decision points and squares represent defendant decision points. The arrows represent final outcomes. Game trees for larger juries and greater numbers of available challenges are geometrically more complex and require computer software to evaluate.

Game trees become geometrically complex as the number of choices increases. A real-world sequential jury selection game tree with 12 jury seats and each litigant having four peremptory challenges contains over 30 million potential decision points – quite a surprising result. There is no escaping the fact that computer software is required to apply game theory to the exercise of peremptory challenges. Without software, Pool Average or some modification thereof is probably the best that can be done, given the limitations of time and other resources in the courtroom. Using software to identify the best strikes can help you make the best decisions possible at a time when your cognitive resources may be at a low point.

How much difference do game theory strategies make in the final jury selection outcome? Is it really worth optimizing Step 2 or are simple rules of thumb good enough? These are good questions and we set out to answer them.

Following standard procedures for testing game theory strategies, my colleagues and I set up computer programs to represent the actions of the plaintiff and the defendant in various jury selection scenarios. The computer programs played against each other with the defendant always using 'Game Theory' and the plaintiff variously using 'Game Theory', 'Pool Average', 'Coin Toss', and 'Always Accept'. The results of our simulations are summarized in Figure 2.

Coin Toss – randomly deciding whom to challenge – and Always Accept are tantamount to not rating jurors at all, since no rating information is ever used when making challenges. As expected, our simulations show that such strategies fare poorly against an opponent using Game Theory.

Playing Pool Average gives better results since it makes some use of the juror and jury pool ratings. However, it still only performs about half as well as Game Theory in real-world selection scenarios. Put another way, using Pool Average against Game Theory returns about 50 cents for each dollar invested by the client in obtaining meaningful juror ratings. Moving from Pool Average to Game Theory almost doubles the expected jury value in real-world jury selection scenarios.

Our results show that rating jurors (Step 1) and optimizing peremptory challenge strategies (Step 2) are of equal importance to the outcome of the empanelled jury in real-world scenarios. This is so despite the fact that presently, litigants and their consultants can expend the bulk of their efforts on juror ratings and little or none on optimizing challenges.

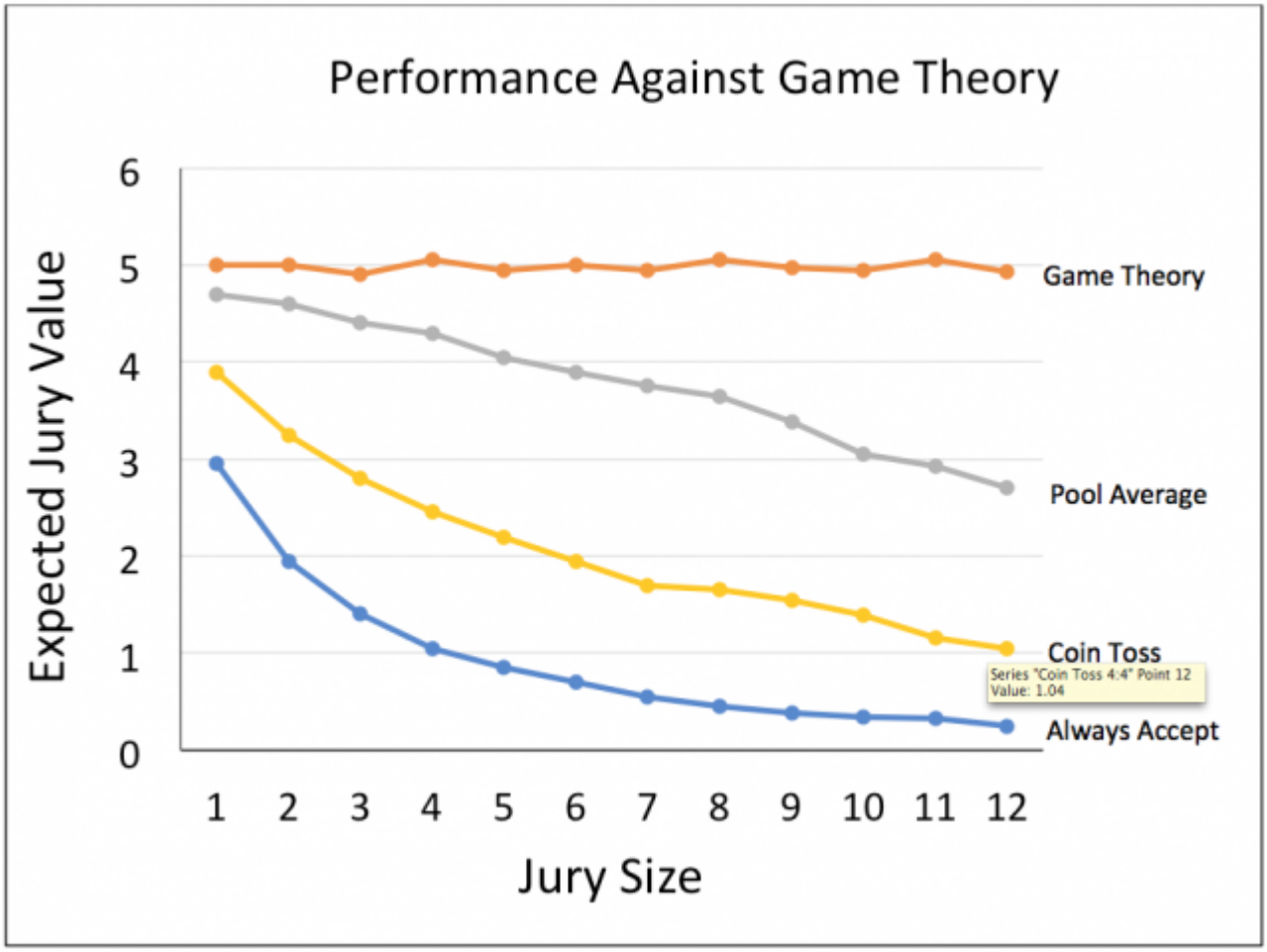

Figure 2. Simulation results for jury selection where defendant uses Game Theory and plaintiff uses either Game Theory, Pool Average, Coin Toss or Always Accept. Jury value is rated on a scale from 0 to 10 with individual jurors selected at random from a uniform pool. The total jury rating is the product of individual juror ratings. Each side has four available peremptory challenges. As expected, Game Theory played against Game Theory gives jury values of 5 indicating that neither side has an advantage. In real-world situations with a jury of 12 seats, Pool Average does only about half as well as Game Theory in obtaining a favorable jury.

Rating jurors is a skill borne of years of study, observation, experience and practice. High value cases call for competent litigators and trial consultants to assist in profiling and rating jurors. However, obtaining accurate and meaningful juror ratings is only half of the story. We have shown that once ratings have been determined, the optimal use of a limited number of peremptory challenges is mathematically calculable using game theory. In many real-world cases, the strategic use of peremptory challenges can make significant differences in the outcome of the selection process and can thereby significantly increase the return on the investment made in rating jurors.

Indeed, the outcome of the trial as a whole could depend on the difference between a single juror and their replacement had they been challenged. We would serve our clients well by considering game theory-based strategies for exercising peremptory challenges. While the details of such strategies vary depending on the particulars of the selection system used in any given jurisdiction, adopting a sound, mathematically rigorous challenge strategy is arguably as important as obtaining accurate juror ratings. Rating jurors may be an art, but exercising challenges is now a science.

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COMMENT ON DAVID CADITZ'S "*ON THE APPLICATION OF GAME THEORY IN JURY SELECTION*"

In his article "*On The Application of Game Theory in Jury Selection*," David Caditz brings the lens of game theory to jury selection. This merger is long overdue (see, for instance, Futterman, R. (2011). Playing the Other Side's Hand: Strategic Voir Dire Technique. *The Jury Expert*), and Caditz' work is as thought-provoking as was expected. From its beginnings, game theory has focused on calculating the optimal strategies for dealing within scenarios in which there is incomplete information available to the game players (such as poker in which the other players' cards are hidden) and those in which there is complete information available to all opponents (such as chess where all pieces are in full view throughout). Jury selection, in which the attorneys make strikes based on incomplete information about the lives of the jurors, appears to be a fruitful area for game theorists to explore.

Although this is a laudable first step in that endeavor, Caditz has provided a model for jury selection that is not yet fully developed. The issue is that Caditz compares the ability of his game theory computer simulation against what he considers to be the norm of jury selectors– which is someone who does not take into account the other side's countermoves and available strikes, but rather, just considers whether the current potential juror is better or worse than the average potential juror in the venire, the so-called "pool average". This unfortunately creates a straw man/woman of a strikingly blithe and inept practitioner. His other comparisons are to even more inept decision-makers, the "coin toss" and the "always accept" decision-makers.

Caditz argues that, for the most part, jury selectors pay a great deal of attention to the rating of potential jurors and little to no attention to the strategic use of strikes. Although it is certainly true that some practitioners pay too much attention to the gathering of juror information and too little to the strategy of using strikes, it is a bit of a reach to say that strategy is barely utilized. In my experience, New York State court voir dire in New York City, for instance, comes closer to a long battle of stealth, counter-punches, misdirection, and hand-to-hand combat than a lofty academic experience.

Caditz gives an example of trying to make a decision about a slightly unfavorable potential juror when the opposing side has one peremptory strike left. He argues that a game theorist would only strike if the juror's rating were particularly low, not just marginally below average, because the other side would have the advantage due to its ability to strike or accept the potential juror's replacement. Although the logic appears sound up to a point, it fails in its depth. Even a merely adequate jury selector would have to consider two potential jurors ahead to take into account the opposing side's ability to strike the potential first replacing juror and the probability that the second replacing juror would be more likely to be favorable than not.

In addition, the merely adequate jury selector would consider other variables that might have made up the original juror rating score, such as how this person would fit in with the other jurors. This may be a consideration of the male/female split of the jury, the potential juror's likelihood of influencing the other jurors (for instance, whether the person appears to be a leader, social facilitator or follower, and how the juror would interact with specific other potential

jurors in the potential jury), and the likelihood that this potential juror would respond to the other side's specific case themes or main parties.

In conclusion, in the same way that an optimal strategy for jury selection cannot ignore the opposing side's remaining strikes and counter-strategies, nor can the optimal strategy be based solely on the opposing side's ability to strike. There is no question that game theory has a lot to offer as a way to consider jury selection strategy, and Caditz has made a good first step. We should all look forward to the following steps as the optimal strategy continues to develop.

Edward P. Schwartz is a jury consultant with TrialGraphix, where he focuses on assisting litigators with trial communication strategy, mock jury research and jury selection. He shares insights about jury trials, jury behavior research and jury trial innovations at www.linkedin.com/edwardpschwartz.

FUN AND GAMES WITH JURY SELECTION: A COMMENT ON "ON THE APPLICATION OF GAME THEORY IN JURY SELECTION," BY DAVID CADITZ.

First, a biographical note is in order. I am probably the only professionally trained game theorist operating as a jury consultant today. My Ph.D. is from the Political Economics Program of the Stanford University Graduate School of Business, a doctoral program known for the application of game theory and social choice theory to decision-making within political institutions. I have written several articles exploring game theoretic models of judicial decision-making and applying strategic voting theory to the American Jury System.[1] As such, I begin from a place very sympathetic to Dr. Caditz's point of view.

The first critical lesson is that rules matter. My game theory background makes me very sensitive to the ways in which institutional structure (the rules of the game) affect the optimality of strategic choices. As such, it is critical for any jury consultant to identify the rules of procedure governing any given jury selection *in advance of formulating a voir dire and de-selection strategy.* Caditz correctly points to the distinction between sequential and struck systems as the most stark procedural element, but there are important differences in the ways in which judges operate even within those two broad camps. In my experience, most litigators do not think about these procedures nearly early enough (if at all). I usually have to prompt my clients to ask about these rules at a pretrial conference or try to get the judge's clerk on the phone to clarify the rules that will be employed.

The second critical lesson from Caditz's essay is that jury selection is a *game theoretic* problem, not a *decision theoretic* one. That is, an optimal strategy at any decision node (strike or don't strike) depends, at least in part, on what options will be available to one's opponent (opposing counsel) and how you anticipate that person will exercise his choice over those options. The simple example in the essay of a sequential strike choice (with a population of jurors uniformly distributed over a 10-point desirability scale), when the other side still has one strike left, illustrates this point nicely.

Based upon my jury selection experience with numerous other consultants and litigators, as well conversations with colleagues in the field, it is clear that most people do recognize both of these critical points. They understand that rules matter and that any decision about exercising a strike must take into account what the other side is likely to do in response. As such, the $64,000 question is to what extent using a computer program to make such strategic choices improves upon the performance of a mere human attempting to approximate an optimal strategy through instinct, experience and a "feel for the moment." This is the sort of question addressed in Malcolm Gladwell's popular book on instinct and split-second decisions, "Blink."[2] Gladwell's admittedly unscientific conclusion is that instinct is no substitute for well-informed deliberation, but combining expertise and experience can create a sort of hard-wiring that allows people to make very sound judgments in very short order. I imagine that most of us jury consultants believe we can blink pretty effectively.

Caditz actually identifies several reasons in the introduction to his essay why human judgment in real-world jury selection might be superior to a computer model. He mentions several forms of incomplete, imperfect or asymmetric information. What does the distribution of juror attitudes in the general population really look like? How representative is the draw in any given case? What are the preferences of your opponent? How precisely can you identify a given juror's desirability based upon available information? (Judge-conducted voir dire in state court anyone?) Finding closed-form analytical solutions for optimal strategies with these kinds of uncertainty requires some pretty heavy duty calculus of variations, along with many, many simplifying assumptions. Game theory is an exercise of abstraction and it remains an open question for any model as to how closely the abstraction tracks the "real world." Good game theory models provide general lessons but rarely precise instructions as to how to make any given real life decision.

I would add to Caditz's list of complications a few others of particular note for us practitioners. We pay close attention to how influential a juror is likely to be in deliberations. If we have difficulty predicting how a given juror is likely to react to a case, we are more likely to strike that juror if we believe she will be vocal and influential. That is, the uncertainty surrounding this juror carries greater weight than that surrounding a relatively passive juror who we would expect to be a follower. In addition, we understand the potential for "cascading" in the jury room, where a failure of understanding or a normative judgment can gain momentum as it passes from one juror to the next. In game theory terms, we can think of the Condorcet Jury Theorem, extended by scholars like Krish Lada to accommodate the possibility of correlated evaluations by jurors and disproportionate influence for some jury members.[3]

Again, I want to emphasize that I am not raising these concerns to dismiss the value of game theory for exploring rational strategies for jury selection. Quite the opposite is true. I would encourage scholars and practitioners alike to devote more attention to studying this critical strategic scenario. The better is understood the factors that determine optimal strategies for exercising peremptory strikes, the better we will all be able to do our jobs. In addition, such scholarship is critical to informing a sensible debate about reforms to the jury system.[4] Rather, I am highlighting the difficulty faced by Caditz's company – and anyone attempting to put game theoretic solutions into practice – in helping consultants use his software effectively on a case-by-case basis. I believe that a seasoned consultant, armed with an understanding of what the software does and does not take into account in producing recommended strategies, could make very good use of this sophisticated new tool.

Footnotes

[1] The reader is invited to explore any of the following articles if interested in the application of game theory and social choice theory to the American Jury System: E.P. Schwartz and W.F. Schwartz, "And So Say Some of Us: What to do When Jurors Disagree," 9(2) University of Southern California Interdisciplinary Law Journal 429-463 (2000); E.P. Schwartz, "Double Jeopardy and Lesser Included Offenses: Complements, Substitutes, or Neither?" presented at the Annual Meetings of the Public Choice Society, Charleston, SC (2000); E.P. Schwartz and W.F. Schwartz, "The Challenge of Peremptory Challenges," 12(2) Journal of Law, Economics, and Organizations 375-394 (1996); E.P. Schwartz and W.F. Schwartz, "Deciding Who Decides Who Dies: Capital Punishment as a Social Choice Problem," 1(2) Legal Theory 113-147 (1995); E.P. Schwartz and W.F. Schwartz, "Decisionmaking by Juries Under Unanimity and Supermajority Voting Rules," 80 Georgetown Law Journal 775-807 (1992)

[2] Gladwell, Malcolm. Blink: The Power Of Thinking Without Thinking. New York : Little, Brown And Co., 2005.

[3] Krishna K. Ladha. "The Condorcet Jury Theorem, Free Speech, and Correlated Votes," American Journal of Political Science, Vol. 36, No. 3 (Aug., 1992), pp. 617-634.

[4] From my own research on the topic, I have reached what is seen as a very revolutionary conclusion that the shared democratic ideals underlying the criminal jury system would be best served by eliminating all peremptory challenges

and moving to a simple majority rule for all jury verdicts. See E.P. Schwartz and W.F. Schwartz, "And So Say Some of Us: What to do When Jurors Disagree," 9(2) University of Southern California Interdisciplinary Law Journal 429-463 (2000);