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Tempest in a Teapot – The Role of the Decision Tree in Enhancing Juror Comprehension and Whether It Interferes with the Jury's Right to Deliberate Freely?

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Abstract

This article explores the potential of the decision tree (also referred to as a flow-chart, "Route to Verdict" or question-trail) to improve the legal comprehension of jurors in criminal trials. It examines why the decision tree has not yet been adopted as a mainstream jury aid in the United States and suggests that the hesitancy is rooted in longstanding distrust of any attempt to encroach on the freedom of the jury and the concern that a list of questions to guide jury deliberations may unduly influence and compel a verdict that the jury would not otherwise render. The findings from research from England, Canada, Australia and the United States on the effectiveness of decision trees in enhancing juror comprehension is discussed. The reliance on decision trees in medicine to facilitate patient comprehension of treatment options and in assisting physicians to navigate through complex treatment protocols is also considered as instructive for the legal system. The paper suggests that decision trees neither interfere with a defendant's constitutional right to a jury trial nor with a jury's right to deliberate freely, and that greater use of this tool should be considered given the promising indications from empirical research that decision trees can enhance jurors' recall and comprehension of legal concepts. Any concerns about the potential misuse of decision trees are overstated and can be remedied through clear instructions to the jury.

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Key words

Decision tree; jury; jury aid; decision aid; aide-memoire; flow-chart; Route to Verdict; question-trail; special verdict; juror comprehension

Resumen

En este artículo se analiza el potencial del árbol de decisiones (también conocido como diagrama de flujo, “ruta al veredicto” o camino de preguntas) para mejorar la comprensión legal de los miembros del jurado en los juicios penales. Analiza por qué en Estados Unidos aún no se ha adoptado el árbol de decisiones como una ayuda habitual al jurado y sugiere que la duda tiene sus raíces en la desconfianza antigua de cualquier intento de invadir la libertad del jurado y en la preocupación de que una lista de preguntas para guiar las deliberaciones del jurado pueden influenciar de forma indebida y forzar un veredicto que el jurado no hubiera tomado. Investigaciones en Inglaterra, Canadá, Australia y Estados Unidos analizan la eficacia de los árboles de decisiones para mejorar la comprensión de los miembros del jurado. La confianza dentro de la medicina en los árboles de decisiones para ayudar al paciente a entender las opciones de tratamiento y para ayudar a los médicos a navegar a través de protocolos de tratamientos complejos también se considera instructiva para el sistema legal. El artículo sugiere que los árboles de decisiones no interfieren con el derecho constitucional del acusado a un juicio con jurado ni con el derecho del jurado a deliberar libremente, y que se debería considerar un mayor uso de esta herramienta, teniendo en cuenta los indicios prometedores de investigaciones empíricas que apuntan a que los árboles de decisiones pueden fomentar que los miembros del jurado tengan en cuenta y comprendan conceptos jurídicos. Cualquier preocupación sobre el posible uso indebido de los árboles de decisiones es exagerada y puede remediarse a través de instrucciones claras al jurado.

Palabras clave

Árboles de decisiones; jurado; ayuda al jurado; ayuda en la decisión; memorándum; diagrama de flujo; ruta al veredicto; camino de preguntas; veredicto especial; comprensión del jurado

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1. Introduction

Jurors are called upon to perform a task with enormous consequences for the liberty of a defendant charged with a criminal offense. They must decide weighty legal issues without having had the benefit of three years of law school.[1] Generally, jurors have to wait until the end of the trial before they receive comprehensive instructions on the law from the trial judge. Given the enormous responsibility on jurors' shoulders and the compressed amount of time in which they must learn the law, it is surprising that common-law countries[2] have not done more to develop a vast array of decision aid devices to assist jurors in carrying out their civic duty.

The goal of this paper is to shine the light on one aid—the decision tree—that has not been traditionally used in criminal jury trials but which may have significant potential to assist jurors in learning complex legal concepts. The decision tree[3] (also referred to as a question-trail, "Route to Verdict" or flow-chart) uses sequential questions to lead jurors to the verdict that flows from their factual and legal determinations (Essex and Goodman-Delahunty 2014, Watt 2015, Leveson 2015). There is promising research that decision trees may enhance juror comprehension of legal concepts (Brewer *et al*. 2004, Dann *et al*. 2004, Ede and Goodman-Delahunty 2013). However, it appears that decision trees are rarely used in criminal trials in the United States although there is growing use and approval of decision trees in countries such as Canada, England, Australia, and New Zealand (Watt 2015, Leveson 2015, Ede and Goodman-Delahunty 2013, Law Commission (New Zealand) 2001).

In Part 2, the paper defines what constitutes a decision tree and identifies the variety of terms used to describe a similar tool that is used in other jurisdictions, such as England, Wales, and Australia. The potential of a decision tree to reduce the cognitive load placed on jurors is examined. In Part 3, the question of why decision trees have not been adopted as a mainstream comprehension tool for jurors in criminal trials in the United States is examined. This part of the paper explores the classic resistance to special verdicts in criminal trials and how the special verdict shares some important similarities with the decision tree through its reliance on a list of questions to the jury. The paper probes the concerns expressed by the U.S. Court of Appeals for the First Circuit in the Vietnam war resistance case of *U.S. v. Spock,* most notably that a list of questions might compel a jury to render a guilty verdict when the jury would have otherwise acquitted a defendant (*United States v. Spock* 1969). The paper asks whether a list of questions to guide deliberations truly impinges upon the jury's right to deliberate freely and without the coercion of the state. The paper suggests that avoiding the use of decision trees in criminal trials is shortsighted because any concerns about misuse could be adequately addressed through detailed instructions about the intended role of the tool.

In Part 4, the paper considers what the research reveals about the decision tree and whether it should be used more widely in the United States. The paper considers the extant research in Canada, the United States, and Australia as well as the research on the use of the decision tree within medicine. Some of the challenges and methodological limitations in the research thus far will be considered—from the failure of jurors in one set of experiments to use the decision tree and the failure to separate out the decision tree from an animation film sequence in another (Ogloff 1998, Brewer *et al*. 2004). While there were signs in a

[1] The typical length of a law school education in common-law jurisdictions is three years. In some countries, such as England and Australia, law school is an undergraduate degree whereas in other countries, such as Canada and the United States, it is a course of study that requires an initial undergraduate degree in another field before entry is permitted.

[2] This article is focused on those common-law countries that have maintained the jury system.

[3] Other terms that are used to describe aids similar to the decision tree include: aide-memoire, question-trails, and flow-charts. The unifying feature of these aids is that the elements of the offense are framed as a series of questions to be answered by the jury.

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study on using decision trees to improve juror understanding of mtDNA evidence that this tool was more effective than other tools tested, the absence of a significant difference in comprehension scores when compared to the no aid control group means that the results were not definitive and further research studies are needed (Dann *et al*. 2004). The paper briefly reviews some of the contexts in which a decision tree has aided patient comprehension in medical contexts and summarizes the international effort known as the Delphi Consensus Process which has been used to develop quality standards for decision aids in medicine (Elwyn *et al*. 2006, Hsu and Sandford 2007, Joseph-Williams *et al*. 2014). In conclusion, I draw together the key observations from this paper and suggest that there is no constitutional impediment to using decision trees in criminal trials in the United States and that room ought to be made for a limited and careful use of decision trees in criminal trials. I also recommend further study of how a decision tree can best be used to enhance juror comprehension, and the need to study whether the increase in juror comprehension is greater when the complexity of the trial increases.

2. Defining the decision tree and its role in reducing cognitive load on jurors

2.1. Defining the decision tree

Before entering into a discussion about the constitutional implications of placing a decision tree before a jury, it is important to define what is meant by the term "decision tree" and how it is intended to assist the jury. In this article, when I refer to a "decision tree," I refer to a document that summarizes the elements of an offense or a defense with a step-by-step series of questions, which require a "yes" or "no" answer.

The term "decision tree" is not a monolithic one with universal use. A number of jurisdictions that employ jury trials in their criminal justice systems use a tool similar to a decision tree but use a different label to describe it. In England and Wales, the document is called a "Route to Verdict" or "Steps to Verdict." It is defined in the Crown Court Bench Book as "a logical sequence of questions, couched in words which address the essential legal issues, to be answered by the jury in order to arrive at their verdict(s)" (Judicial Studies Board 2010, p. 3). It does not replace oral legal instructions but is a supplementary tool (Judicial Studies Board 2010, p. 3). In Australia, the term most frequently used is question-trail although it has sometimes been called a flow-chart (Semmler and Brewer 2002, Ede and Goodman-Delahunty 2013). A Jury Directions Bill was passed in Victoria that amended the *Criminal Procedure Act 2009* to permit judges to provide a jury guide to jurors containing a list of questions to assist the jury in reaching its verdict (Department of Justice (Victoria) 2012, Clause 29). The Law Reform Commission of Queensland ("LRCQ") recommended that the final directions to the jury should culminate in a series of factual questions for the jury that embed the legal issues to be considered (Queensland Law Reform Commission 2009, Recommendation 9-4). The LRCQ also observed that providing the jury with a list of questions as a framework is not a new phenomenon in Australia (Queensland Law Reform Commission of Queensland 2009, p. 271). Questions were provided to the jury in the 1974 case of *Stuart v. The Queen* and the clarity of the six questions framed by the trial judge was lauded upon appeal (Queensland Law Reform Commission 2009, p. 271). While the LRCQ concluded that the use of flowcharts or sequential questions was widely considered to be a technique to assist jurors and was used by some judges, it is not a formalized procedure and remains a matter of discretion for each trial judge (Queensland Law Reform Commission 2009, p. 273).

In Canada, one of the primary sources of jury instructions, *Watt's Manual of Criminal Jury Instructions,* includes a sample decision tree after the pattern instruction for each offense (Comiskey 2010, p. 632, Watt 2015). In the other

leading source for jury instructions in Canada, *CRIMJI,* there are no sample decision trees and no views expressed on their utility (Ferguson *et al*. 2005). A description of the Watt decision tree for first-degree murder in Canada will help illustrate how decision trees aim to simplify complex jury instructions and present them visually in a one to two page document (Watt 2015, p. 693). The first question in the decision tree centers on causation: "Did the defendant cause the victim's death?" The decision tree in a trial is intended to be modified to use the names of the parties involved. If the answer is no, then the arrow leads to a box that identifies the final verdict as "Not Guilty." A yes answer leads the juror to the next question, "Did the defendant cause the victim's death unlawfully?" In Canada, the defendant must have committed an unlawful act (such as assault) in causing death for the conduct to be criminally culpable. The next question focuses on the mental element and asks "Did the defendant have the state of mind required for murder?" The tree does not tell the juror what that state of mind must be but serves as a reminder that this is an issue to be considered by the juror. If the answer is no, the juror is advised via an arrow on the decision tree that the final verdict is "Not guilty of first degree murder but guilty of manslaughter." If the answer is yes, the juror is then directed to consider whether the murder was both planned and deliberate, which is required to establish first-degree murder in Canada. If the answer is yes, then the final verdict is "Guilty of first-degree murder." If the answer is no, then the final verdict is "Not guilty of first degree murder but guilty of second degree murder." Decision trees can also be amended to incorporate defenses at the relevant stage. For example, if provocation were a defense in a murder trial then it would need to be inserted into the decision tree right after the state of mind question but before the planning and deliberation question.

While juries in New Zealand are not generally given copies of the judge's directions or instructions in writing, the Court of Appeal permits charts such as the issues tables or flow-charts where the complexity of the case warrants it (Cameron *et al.* 1999, p. 135). Juries are also permitted to ask for a direction to be repeated orally or to be explained in more detail while they are deliberating (Cameron *et al.* 1999, p. 135). In New Zealand, the Law Commission recommended in its report on *Juries in Criminal Trials* that the use of flow-charts and sequential questions should be encouraged, particularly in complex cases (Law Commission (New Zealand) 2001, p. 121).[4] The *New Zealand Bench Book* recommends that an "Issues Table" be provided to jurors that contains a list of questions in table form with a comments column (New South Wales Law Reform Commission 2008, p. 234 citing New Zealand Institute of Judicial Studies 2006, Appendix 6). The jury may be told, for example, that the issue is a straightforward factual determination or that the prosecutor's case is largely circumstantial (New South Wales Law Reform Commission 2008, p. 245-Appendix C). The issues tables are also complemented by the format of the judicial instructions which use sequential or step instructions to direct the jury on how to approach the issues in their case (New South Wales Law Reform Commission 2008, p. 234).

2.2. Cognitive load challenges for jurors

While first-year law students are given a semester to learn the rudiments of criminal law, jurors are expected to become conversant with the essential elements of the criminal law over the space of a few hours while listening to a judge's instructions. The cognitive load placed on jurors is steep[5] particularly when you consider how little time jurors have to grasp the criminal law that they are expected

[4] An example of a flow-chart to assist a New Zealand jury in working through a charge of possessing cannabis for the purpose of supply or sale is included within the Law Commission's report (Law Commission (New Zealand) 2001, p. 122).

[5] Ede and Goodman-Delahunty (2013, p. 114) discuss in their paper how cognitive load theory suggests that a high intrinsic cognitive load is predicted when the evidence in a trial is lengthy, the legal rules are complicated, or there are multiple charges involved.

to learn and apply. The level of responsibility on jurors' shoulders is enormous—the verdict rendered by the jury can result in years of lost liberty when the defendant is convicted and it can result in the loss of life when the defendant is convicted and sentenced to death in a capital murder case. Jurors strive to get it right and render a true and fair verdict according to the law. However, modern science has established that the working memory of the average adult human is limited to retaining at most seven items at a time, and the number can frequently be as low as four (Cowan 2000, p. 87). Without some sort of aid such as a decision tree to simplify and distill the complex principles of criminal law into a page or two, our expectations of jurors are unrealistic. How can they remember all of the elements of an offence (or multiple offenses) and any applicable defense(s) if all they receive is a lengthy oral summation of the law? This paper takes the position that it is critical for the efficacy of a tool such as the decision tree to be comprehensively studied and made available to jurors. It is acknowledged that there other tools that have been made available to jurors such as notes and written instructions, but the focus of this paper is on the decision tree, which remains underused. The decision tree is a modestly priced tool (the cost of the paper to print it) which is within the skill set of judges and lawyers and has the potential to enhance and improve the comprehension of jurors. Countries that use juries in criminal cases ought to consider providing the decision tree as part of a toolkit to assist jurors in completing this important civic duty.

3. Does the use of a decision tree violate the right to a jury trial in criminal cases?

3.1. The constitutional right to a jury trial

The unique development of the right to a criminal jury trial in the United States and its connection to the movement to independence may explain the reluctance of courts to use decision trees. Part of the impetus for the United States' decision to break free from England[6] was due to laws passed that limited the availability of jury trials. In the pre-revolutionary period in the United States, juries actively refused to enforce British colonial law. For example, in 1735, jurors refused to convict a New York publisher, John Peter Zenger, of seditious libel for publishing newspaper accounts that were critical of a colonial governor (Moglen 1994, p. 1519, Hoffmeister 2008, p. 1173). Acquittals of this type led England to pass laws restricting the right to a jury trial, particularly in customs cases, through the passage of the controversial *Navigation Acts,* which required goods to and from the colonies to be carried on British ships (Piche 1978, p. 350).

The colonists' anger at England's attempt to narrow the availability of jury trials is reflected in the accusations made against King George III in the Declaration of Independence (1776). One of the accusations made was that England had unfairly denied colonists their right to a jury trial.[7] Justice Hugo Black has explained that the denial of the right to jury led to the war for America's independence from England and eventually to the Bill of Rights (*Cohen v. Hurley* 1961). It is not surprising then that the right to a jury trial was enshrined in Article III of the United States Constitution and provided that "The trial of all Crimes, except in cases of Impeachment, shall be by Jury" (United States Constitution 1787, art. III). The right was also protected in the Sixth Amendment, which states that the accused shall enjoy the right to "an impartial jury of the State and district wherein the crime shall have been committed" (United States Constitution 1787, amend. VI).[8] Given that the right to a jury trial was closely aligned to the reasons for asserting

[6] England is now part of the United Kingdom of Great Britain which includes England, Scotland, Wales and Northern Ireland.

[7] The actual text states: "For depriving us in many cases, of the benefit of Trial by Jury" (Declaration of Independence 1776).

[8] The civil jury trial right is rooted in the 7th Amendment.

independence, it would be logical to expect that there would be long-lasting distrust of any attempt to encroach on the freedom of the jury.

The United States' concern about the appropriateness of using decision trees in criminal cases also has its origins in historic disapproval of the use of special verdicts in criminal trials (*United States v. Munz* 1976, *United States v. Jackson* 1976, Murphy 1996, p. 973). In contrast to a general verdict, special verdicts require juries to answer a series of questions as an integral part of their verdict (Olander 1985, p. 1089, Sunderland 1920, pp. 264-265).[9] The questions can frequently address the factual underpinnings of the verdict, and in some cases, the answers to the questions may reveal that the jury came to the wrong final verdict when the legal implications of the factual findings are assessed. This opens up the final verdict to reversal by the trial judge even before an appeal.

Special verdicts have been traditionally viewed as a dangerous intrusion into the power of the jury in criminal trials as they diminish the right of the jury to make a final decision of guilt or innocence without outside influence. Historically, in the United States, special verdicts were seen as a threat to the liberty of the jury. In the nineteenth century case, *Hutchinson v. Commonwealth* 82 Pa. St. 487*,* the court stated: "[u]nder our special system of criminal jurisprudence, they [special verdicts] are essentially inconsistent, if not incompatible, with the right of trial by jury." More recently, the U.S. Supreme Court in *United States v. Gaudin* confirmed the historical right of a criminal jury to deliver a general verdict of guilty or not guilty and the right not to be restricted to mere factual findings (*United States v. Gaudin* 1995). A special verdict typically requires the jury to reveal the factual underpinning of its verdict either through "yes" or "no" answers to questions or by requiring written responses to specific factual questions to reveal the facts leading the jury to its verdict. Most civil juries are still asked to deliver a general verdict in addition to a special verdict or answering special interrogatories. (Marder 1999, p. 914).[10] This process arguably endangers the liberty of the jury by opening up the jury's verdict to interference or reversal by the trial judge or the appellate court upon review. A second concern expressed in *Hutchinson* was that special verdicts lead to increased conviction rates as they usurp the power of the jury to refuse to convict regardless of the jury's factual findings and create a situation in which the trial judge may impose a guilty verdict despite the fact that the jury would not have come to that decision.

However, special verdicts were not completely unknown in criminal cases in the nineteenth century in the U.S. In *Commonwealth v. Eichelberger* (1888)*,* the Pennsylvania Superior Court upheld the use of a special verdict in a larceny case. Sitting as an appeals court, Justice Paxson acknowledged that while special verdicts are not frequently employed in criminal cases, they are permitted in the appropriate circumstances and that the trial judge had acted wisely in this larceny case by requiring a special verdict because "the case itself lies upon the border" of whether the facts supported a larceny charge (*Commonwealth v. Eichelberger* 1888, p. 565). The defendant Eichelberger was indebted to a bank for $1600. When Eichelberger made an interest payment to enable him to carry the debt for another ninety days, he exchanged the original $1600 note with a replacement note for only $16 but the bank cashier believed that new note was for $1600. Eichelberger was charged with larceny for deliberately intending to defraud the bank. The jury set out those facts but with the following qualification: "if the facts stated, and the acts of the defendant above set forth, are sufficient, in the opinion of the court, to warrant a conviction of the defendant of the crime of larcency, then the jury do say that he (the defendant) is guilty of larceny in manner and form as he stand

[9] In some cases, the jury does not render the final verdict, but the trial judge renders the verdict based upon the jury's answers to the questions posed (Stinson 1942, p. 142).

[10] The general verdict has been caustically described as a "great procedural opiate, which draws the curtain upon human errors" (Sunderland 1920, p. 262).

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indicted. If not sufficient, then the jury find the defendant not guilty" (*Commonwealth v. Eichelberger* 1888, p. 566).

In the *Eichelberger* case, the jury came to factual conclusions but was unclear about the verdict which flowed from those facts and whether the facts supported a conviction for larceny. This suggests that the jury was confused about the judge's instructions on the law and had not fully understood them. Rather than asking a question, the jury qualified its verdict in this way. The decision of the trial judge to convict following this special verdict was upheld on appeal. Although Mr. Justice Paxson of the Pennsylvania Supreme Court did not endorse widespread use of the special verdict format by juries, he was willing to approve their occasional use in instances such as this, where the jury was unsure about the legal implications of their factual findings and these conclusions were not obvious in law.

The decision of the United States Court of Appeals for the First Circuit in *United States v. Spock* has been cited for the proposition that special verdicts violate the defendant's right to a jury trial in criminal cases (*United States v. Spock* 1969, Conrad 2013, p. 52). In *Spock*, the First Circuit considered an appeal by a group of defendants, known as the "Boston Five," for various anti-Vietnam protest actions under the *Military Selective Service Act of 1967*. The charges included conspiracy to counsel citizens to evade the draft and failing or refusing to have mandatory draft cards on their person. One of the five, Marcus Raskin, was not convicted as he had only advocated an inquiry into whether the Vietnam war was legally authorized (Lang 1968, p. 38). The most famous of the defendants was Dr. Benjamin Spock, a pediatrician who wrote influential child-rearing books for almost sixty years. At the time of his death in 1998, the classic text, *Dr. Spock's Baby and Child Care,* had over 50 million copies in print (Pace 1998).

Dr. Spock and a group of other defendants had authored a document encouraging resistance and urging men to turn in their draft cards to protest the United States' policies toward Vietnam. Four of the five defendants were convicted and sentenced to two years in prison. While the First Amendment's rights of free speech and free association were at the core of the case, the case also raised issues about the freedom of jurors to deliberate without undue interference from the judge or other outside forces. In this case, the trial judge, Judge Francis J.W. Ford, submitted ten questions for the jury to answer. Jessica Mitford, who wrote a book about the trial, has stated that defense counsel vociferously objected to the "special verdict" format given to the jury and that "[t]he very phrasing of the questions would suggest guilt to the jury …" (Mitford 1970, p. 197). The judge disagreed that the jury was being asked to deliver a special verdict and claimed that the final verdict would be guilty or not guilty on the conspiracy count (Mitford 1970, p. 198).

While the essence of each of the questions in the trial was whether the defendants had violated s.12 of the *Military Selective Service Act of 1967*, there was a slight variation of language in each question. For example, the text of Question 1 was as follows: "Does the jury find beyond a reasonable doubt that defendants unlawfully, knowingly and wilfully conspired to counsel Selective Service registrants to knowingly and wilfully refuse and evade service in the armed forces of the United States in violation of section 12 of the *Military Selective Service Act of 1967*?" (*United States v. Spock* 1969, para 42.) The subsequent questions varied the wording slightly by replacing, for example, the term counselled with aided (question 2), and then with abetted (question 3) (*United States v. Spock* 1969, para 42). The questions were submitted to the jury over the objections of the defendants. No opportunity was given to allow the parties to makes submissions about the propriety of submitting special questions to the jury rather than asking the jury to return a general verdict. The First Circuit drew a distinction between submitting questions to a jury in a civil case, which it described as a "normal occurrence," versus submitting questions in a criminal trial, which historically had only been done in narrow circumstances (*United States v. Spock* 1969*,* para 43.) The First

Circuit also pointed to the absence of any federal rule of criminal procedure permitting the practice of special questions and the existence of Rule 49 of the *Federal Rules of Civil Procedure*, which specifically authorized the practice.

One of the primary concerns voiced by the court in considering the practice of using special verdicts in criminal cases was that it removes the power of rendering a general verdict whereas the power of the jury to render the verdict is sacrosanct in criminal law even when the evidence is overwhelming. It is a fundamental principle of criminal law that a court may not require a jury to return a verdict of guilty regardless of the weight of the evidence against a defendant (*United States v. Spock* 1969*,* para 44). *Bushell's Case* is well known in jury literature as a seminal moment for the jury asserting its independence from the trial judge and lawyers (*Bushell's Case* 1670, Crosby 2012). At the time of *Bushell's Case*, jurors were subject to pressure to return the verdict favored by the trial judge and the failure to do so could result in imprisonment and fines. The case involved a charge of unlawful assembly by two Quakers, William Penn and William Mead. At that time in England, the law made it illegal for religious assemblies, other than the Church of England, to gather in groups of five or more. When the jury found Penn and Mead guilty only of speaking on Gracechurch Street, and refused to return the verdict of an unlawful assembly sought by the judge, they were initially locked up without food and water. After some pressure, the jury changed the verdict to guilty of speaking to an assembly in Gracechurch Street but this was still unacceptable to the judge as the jury had not described the assembly as unlawful. When the jury changed its verdict to not guilty, the jury was fined and imprisoned. Edward Bushell, who was a member of the jury, refused to pay the fine. Bushell's writ for habeas corpus was successful on the basis that the jury could not be penalized for its verdict. The case has become synonymous with the independence of the jury and symbolizes the bravery of the jury acting independently and refusing to bow to the power of the state to impose a verdict contrary to its conscience (Stern 2002).

In my view, caution should be used in relying on the *Spock* decision as a judicial prohibition against providing a decision tree to jurors in criminal trials. There are two significant distinctions between the special verdict method used in the *Spock* case and how decision trees can be used to summarize jury instructions. First, the questions provided to the jury in the *Spock* case did not summarize the jury instructions. There was no parsing of the elements of the offense and no attempt to describe a reasoning process, which if followed, would lead to a verdict of guilty or not guilty. Instead, the questions identified ten ways in which the defendants could be found liable of the criminal conduct alleged—for example, if their conduct could be characterized as aiding, counseling, or abetting. In the context of the political environment of the case, the ten questions could be viewed as a desperate attempt to ensure that the jury would render a guilty verdict and a failure of the trial judge to require the prosecution to particularize and communicate its theory of the case. The second distinction is that a decision tree, unlike a special verdict, does not require the jury to provide the court with the answers to any of the questions. The laying out of the questions in a tree-like format is intended to act as an aide-memoire for the jury. While the special verdict compels disclosure of the reasoning process of the jury, the decision tree ensures that the jury's deliberations remain secret and protects the verdict from the prying eyes of the trial judge or appellate courts.

The concern identified in *Spock* that cannot be so easily dismissed is whether the jury could be led to convict through a series of step-by-step questions when, if they had been left to deliberate freely, they may have acquitted. This same concern has been expressed several times in other judicial decisions (*United States v. Frezzo Brothers* 1979, *United States v. Palmeri* 1980, *United States v. McCracken* 1974). The court expressed concern that a series of questions may place pressure, whether subtle or overt, on the jury's final verdict by leading a juror who wishes to

acquit to a decision to convict through the inexorable path created by step-by-step questions. Chief Judge Aldrich expressed this concern in the following way:

> We are less concerned by the jury's possible fear of subsequent criticism with respect to special findings than we are with the subtle, and perhaps open, direct effect that answering special questions may have upon the jury's ultimate conclusion. There is no easier way to reach, and perhaps force, a verdict of guilty than to approach it step by step. A juror, wishing to acquit, may be formally catechized. By a progression of questions each of which seems to require an answer unfavorable to the defendant, a reluctant juror may be led to vote for a conviction which, in the large, he would have resisted. The result may be accomplished by a majority of the jury, but the course has been initiated by the judge, and directed by him through the frame of the questions (*United States v. Spock* 1969, para 51).

While not specifically mentioned, the underlying concern of the court appeared to be that the questions put to the jury diminished the ability of the jury to nullify and deliver the verdict based on the jurors' conscience. It has been reported that, after the verdict, one of the jurors told Dr. Spock that the jury considered him to be a national hero. When asked why the jury convicted, the reputed answer was, "We had no choice. He did what the government said he did." (Freedman 2014, p. 1126). This reveals that the jurors were unaware of their ability to render a verdict according to their conscience even if contrary to the facts of the case. Although the defense lawyers in the case had applied to the trial judge for permission to advise the jury of the right to nullify, the application was refused along with a warning that to do so would result in a finding of contempt of court. Rather than deal with the thorny issue whether the jury is entitled to be informed of its right to nullify, the appeal court may have deliberately sidestepped this issue by deciding the case on a more settled principle of criminal law—that juries are only required to deliver a general verdict in criminal trials and that the list of ten questions contravened this longstanding precept.

The concern that a list of sequential questions (such as those used in a decision tree) creates an environment that restricts the freedom of the jury is unfounded and is arguably an alarmist view without empirical evidence to back up the concern. The decision tree is intended to be a summary of the elements of the offense and a tool to assist the jury in comprehending the oral instructions on the law delivered by the trial judge. Could not any concerns be alleviated by specific jury instructions advising the jury that a decision tree does not require the jury to approach its deliberations in any specific order or with any specific list of questions? If the jury is advised that it has no obligation to follow the order of the questions in the decision tree but is provided with the tool as an aid that it may choose to use or not use, then the danger of impermissible pressure to convict evaporates.

As will be discussed in more detail later in the paper, one of the difficulties encountered by at least one researcher studying whether a decision tree can enhance juror comprehension was that the decision tree provided was not used by the jurors in the experimental research and its usefulness could not be assessed (Ogloff 1998, p. 29).[11] Also, in a 1978 study where the trial judge provided a step-by-step list of questions, the jurors reported that they did not feel directed to provide a particular answer, were more confident in their verdict and viewed the pathway of questions in the instructions as a superior type of instruction method (Strawn *et al*., 1977, p. 389). Thus, the empirical research conducted does not support the concern by the First Circuit in *United States* v. *Spock* that a list of step-

[11] The reasons for the failure to use the decision tree are not known as Ogloff (1998, p. 29) observed that this was a methodological shortcoming that he had not anticipated. Some potential reasons are that the decision tree was not well designed for the facts of the case or that the offense was not well suited to a decision tree. It may also be the case that the decision tree helped clarify the issues for the jurors to resolve simply by glancing at the one-page summary before entering deliberations and the failure to debate or refer to the decision tree did not necessarily mean that it had no impact on juror comprehension levels.

by-step questions may force a doubting juror to vote to convict. Instead, this research supports the view of the jury as a powerful entity that operates independently from the lawyers and trial judge.

If there is a chance that a decision tree could act as a straitjacket on a criminal jury's ability to deliberate freely, then this danger could be remedied through clear judicial instructions advising the jury that the decision tree is merely an aid and in no way prescribes how deliberations are to occur or the order in which legal issues are to be addressed. If the role of the decision tree as an aide-memoire and helpful summary of the legal instructions is emphasized in closing instructions then the dangers of its misuse can be substantially reduced. However, we ought to be careful before ascribing to the decision tree tool powers that it does not inherently have. In *United States v. Spock,* the court spoke of the importance of juries in criminal trials being able to use more than logic to determine their verdicts—this applies equally whether or not a list of questions (either through a decision tree or special verdict form) is provided to jurors. If it is important that juries be aware that their task requires more than the application of brute logic, a judicial instruction is the means through which this could be addressed rather than the prohibition on a tool that can assist jurors in understanding complex judicial instructions. Nancy Marder suggests that language from the following instruction suggested by John Adams could be borrowed to craft a modern-day instruction for jurors: "It is not only [a juror's right], but his [or her duty] … to find the verdict according to his [or her] own best understanding, judgment and conscience …." (Marder 1999, p. 957). Marder suggests this instruction would give jurors some idea that nullification is a possibility; however, no federal court has been inclined to move in this direction thus far. As will be seen in the next section, the limited use of special verdicts in discrete areas of the criminal law, such as RICO prosecutions, demonstrates that there is sufficient flexibility in criminal law to allow the use of decision trees and there is no need for an absolutist approach prohibiting its use with juries.

3.2. Use of special verdicts in discrete areas within criminal law

While there is a general presumption against the use of special verdicts in criminal law in the United States, the jury is sometimes asked to provide additional information akin to a special verdict. Some of the examples given by Kate Nepveu in her comprehensive article on special verdicts include: when a defendant is designated as guilty but mentally ill; forfeiture verdicts which are frequently sought in controlled drugs and white collar prosecutions; and verdict forms that include lesser-included offenses or ask special interrogatories about the facts (Nepveu 2003, p. 264). The rules relating to forfeiture specifically use the language of "special verdict." Rule 31(e) of the *Federal Rules of Criminal Procedure* provides: "If the indictment or the information alleges that an interest or property is subject to criminal forfeiture, a special verdict shall be returned as to the extent of the interest or property subject to forfeiture, if any." Rule 32 (5)(b) requires the government to prepare a special verdict form listing each property for which forfeiture is sought and asking the jury to assess whether "the requisite nexus between the property and the offense committed by the defendant" was established. In *United States v. Kravitz,* the defendant dentist was alleged to have bribed the President and Secretary of the Philadelphia Fraternal Order of Police (PFOP) with cash payments totalling $8,000 in order to obtain a renewal of a dental services contract (*United States v. Kravitz* 1984). The indictment alleged that he used his ownership shareholder position in American Health Programs, Inc. ("AHP") to engage in a pattern of racketeering activity. He was sentenced to four years imprisonment and a $25,000 fine. On the question of forfeiture of his shares, a special verdict containing three questions was submitted to the jury. First, did the defendant own shares in AHP?; second, did he hold a position of influence in the company?; and third, should his shares be forfeited? The jury answered yes to the

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ownership and influence questions, but gave a no on the final question as to whether the shares should be forfeited. What was controversial on appeal was not the use of a special verdict form but the third and final question which gave discretion over forfeiture to the jury when the language in section 1963 of 18 *United States Code* is mandatory: "[w]hoever violates any provision of section 1962 ... shall forfeit to the United States" the illegally acquired interest, security, property or contractual right (*United States v. Kravitz* 1984, para. 13). The district court found that the mandatory language of the statute in effect took away the jury's ability to deliver a general verdict contrary to its factual findings and refused to follow the jury's recommendation against forfeiture. The U.S. Court of Appeals for the Third Circuit upheld this ruling.

4. What the research says - are decision trees worth fighting for?

In this section, the extant research on whether decision trees have the potential to enhance juror comprehension is considered. There have only been a handful of studies in England, the United States, Australia and Canada. While the results from these studies are not definitive and point to the need for further research, there is promising evidence that juror comprehension can be enhanced through decision trees. However, greater research is required to determine more accurately how decision trees impact comprehension and whether decision trees work more effectively in complex trials where the cognitive load on jurors is higher than in ordinary trials.

4.1. Canada

In Canada, one study that looked at the role of a decision tree in enhancing juror comprehension was unable to find any significant relationship between those jurors who received the decision tree aid and their score on the comprehension test administered after listening to the judge's closing instructions in the experiment (Ogloff 1998). The experiment included 545 jury-eligible adults in British Columbia who watched a film reenacting a trial in which the two charges were attempted murder and aggravated assault. Professor Ogloff concluded that the failure of the decision tree to enhance comprehension was not related to the weakness of the aid but was in fact caused by a failure of the jurors to use the decision tree during the deliberations. The failure to use the decision tree was discovered when the videotaped deliberations were reviewed. In his report to the Law Foundation of British Columbia, Ogloff frankly admitted that he did not anticipate this methodological shortcoming and recommended further studies to probe more accurately the potential of this tool to improve comprehension (Ogloff 1998, p. 29).[12]

4.2. United States

While the worldwide literature on decision trees and juries is generally sparse, there are three studies from the United States that provide some encouraging signs that this tool might enhance juror comprehension. The first study did not test a decision tree aid; rather it looked at the effect of explaining legal concepts with a step-by-step list of questions (which is similar to the approach taken in a decision tree) and found positive effects in terms of jury confidence and satisfaction with the instruction process (Strawn *et al.* 1977). The next study focused on the discrete area of mtDNA evidence and whether a decision tree might help juries better understand the science behind mtDNA evidence (Dann *et al*. 2004). The third study looked at death penalty instructions from Missouri and how a decision tree might

[12] One of the aims of my doctoral project at the University of Michigan was to assess the comprehensibility of three different types of instructions as well as the efficacy of a decision tree and written instructions in enhancing juror comprehension. I anticipate that those results will be published later in 2016 or early 2017 and will add to the empirical literature on decision trees.

assist jurors in absorbing the concepts that are critical when a death-qualified jury must deliberate over whether it will recommend the death penalty (Wiener *et al.* 2004).

In the late 1970s, Strawn *et al*. tested the impact of "process" instructions, which provide a step-by-step explanation of the legal concepts through a list of questions. Their rationale for this approach was the literature on small-group behavior and the belief that "it is essential that the group process the available information in a rational manner and avoid, as much as possible, the strong human tendencies that tend to short-circuit our thought processes." (Burgoon *et al.* 1974, Strawn *et al.* 1977, p. 384). They pointed to the phenomenon of many juries wanting to take immediate straw polls at the beginning of deliberations as illustrating the human tendency to want to rush to resolution. They recommended that the case is more likely to be approached in a careful and methodical way by the jury if complex legal issues are explained as a series of component-decisions to be made.

Strawn *et al.* (1977, p. 385) analogized the situation to the law student who can provide a higher quality exam answer if she or he dissects the legal issue into its component parts rather than providing a general conclusory statement as an answer. This perspective contrasts sharply with the "undue pressure to convict" concern voiced in *United States v. Spock* and *United States v. Palmeri* although no empirical literature is cited in either of these cases to ground these concerns about impact on juror behavior (*United States v. Spock* 1969, para 51, *United States v. Palmeri* 1980, para 42). Instead, Strawn argues that a focused and rational discussion would help ensure that verdicts are "lawful, intelligent and just" rather than a rush to judgment based on prejudice or misconceptions (Strawn *et al.* 1977, p. 386).

Judge Strawn reported on his results in using the step-by-step instructions in an insurance case over which he presided. The primary issue for the jury was whether the plaintiff's death was "accidental" or a "suicide." In the first trial, he employed the traditional style of instructions but the jurors were log jammed and could not reach a verdict. In the second trial, Judge Strawn focused on explaining the process by which the jury should make its determination and provided a path of questions for the jury to consider while deliberating. For example, the first question for the jury was: "Has the plaintiff proved by the greater weight of the evidence that Donald Ervin Harris died by an accidentally inflicted gun-shot wound?" If the answer was no, the jury was instructed to decide the case for the defendant. If the answer was yes, the jury was instructed to consider whether the defendant has proven the defense of suicide and so on (Strawn *et al.* 1977, p. 388). Judge Strawn reported that the jury in the first trial had been confused with the instructions, unable to agree on a verdict, and left the jury room angry with one another and still debating the law. In contrast, the second jury, which had been given a pathway of questions, had been far more satisfied with the jury process and the format of the instructions. The jury appeared to be more confident in its verdict although it was a complex case and had "stressed the superiority of the instruction method they had used" (Strawn *et al.* 1977, p. 388).

More recently, three leading American jury reform proponents and researchers, Judge Michael Dann, Professor Valerie Hans, and Professor David Kaye, tested the usefulness of a decision tree in helping a jury understand scientific evidence, specifically mitochondrial DNA ("mtDNA") evidence. Concerns have been raised in the last twenty years over jurors' ability to appropriately understand and evaluate mtDNA evidence (Adams 2005). In a simulation study, 69 percent of the participants found the decision tree "somewhat," "very," or "extremely" helpful (Dann *et al*. 2004, pp. 59-60). When asked why they considered the decision tree to be helpful, the most common reason from jurors was that the decision tree helped them understand the mtDNA evidence. Of the 133 jurors in the pool, 56 percent (n = 75) reported that the decision tree helped them understand the

evidence, while 24 percent (*n* = 32) indicated that it was helpful because it aided them to remember the evidence (Dann *et al*. 2004, p. 60). Those deliberating jurors who had access to decision trees performed significantly better on the ten-item comprehension scale than those who deliberated in conditions with other innovations such as juror notebooks (Dann *et al*. 2004, p. 60). However, when the performance was compared to the no aid control group, there were no significant differences in performance on the comprehension test (Dann *et al*. 2004, p. 62). These results suggest that the decision tree may play a role in enhancing juror comprehension of mtDNA evidence but that additional research is required. It is possible that the ten item comprehension scale may not have been sensitive enough to pick up the decision tree's role in enhancing comprehension of the mtDNA evidence when compared to the control group although an effect was detected when compared to other aids. Other possibilities are that the decision tree works best when used with another aid such as written instructions or when combined with a step-by-step style of instructions, which reinforces the question format used in the decision tree.

Early in their report, Dann and Hans acknowledged the concerns that may exist about whether decision trees can be used in U.S. jury trials. They took the position that the decision tree is a legally permissible jury innovation tool when it is used to help jurors understand complex scientific evidence in a criminal jury trial (Dann *et al*. 2004, p. 18). While it is a narrow use of the decision tree—for example, they do not suggest that the decision tree can be used to understand a judge's instructions on murder—it nonetheless represents an important stamp of approval for beginning to use decision trees in criminal cases in the United States. It is difficult to assess whether this recommendation has gained general acceptance in the United States and it is unknown if it has led to increased reliance on decision trees in trials where mtDNA evidence is used. There is some evidence of general acceptance of decision trees in the legal community. The decision tree was identified in a 2007 Department of Justice Focus Group Report on scientific and forensic evidence as an innovative and useful practice (McClure 2007 p. 20). A sample of a decision tree was included as an appendix and it was the only tool singled out in this way. The report also suggested two prerequisites for the use of a decision tree in a trial with scientific evidence: 1) that the decision tree be balanced and 2) that counsel from both sides agree on the decision tree's use. These requirements would help to allay any concern that the decision tree might unfairly influence the jury by placing the focus on clarifying rather than on persuading.

The third study in which there was evidence that decision trees might improve jurors' comprehension, but in which the results did not reach significance levels, was the Wiener *et al*. (2004) death-penalty study of Missouri Approved Instructions (MAI). In that study, those experimental jurors who were provided with a decision tree achieved 6 percent higher accuracy scores than those given the standard MAI penalty phase instructions but the results were not significant (Wiener *et al.* 2004, p. 556-Figure 2). Those who were given simplified MAI instructions achieved 15 percent higher accuracy scores than those given the standard MAI instructions and the difference in scores was statistically significant (Wiener *et al.* 2004, p. 556-Figure 2). Wiener used a large sample of 665 jury-eligible participants. There were eight conditions of which MAI instructions, decision tree, and simplified instructions were three. The other five were baseline (or no instructions), debunking instructions, practice instructions with life in prison as outcome, practice instructions with death as outcome, and practice instructions with no outcome. However, the decision tree was used in isolation and did not complement a set of instructions as they normally would in a real trial. If jurors had received the decision tree in addition to a set of pattern instructions, the impact of the decision tree on comprehension may have been even stronger. The comprehension test included 36 true-false items that were divided into constitutional law and state law questions with both declarative and procedural questions. Declarative was defined

as "meaning and content based information stored as semantic concepts, schemata, scripts, or prototypes" (Wiener *et al.* 2004, p. 526). While this study provides some early signs that the decision tree might play a positive role in enhancing juror comprehension, a future study is needed to assess the impact on comprehension when a decision tree is provided in addition to either standard instructions or simplified instructions.

While the three American studies discussed provide promising signals that decision trees may be a useful tool in improving juror comprehension, there are lingering questions and the need for more definitive studies. The Strawn study provides anecdotal evidence from a trial judge that providing a decision tree list of questions within the instructions resulted in a deliberation process that was more successful and rewarding for jurors. While those with decision trees did perform significantly better on the comprehension test than those with other aids in the mtDNA study, unfortunately there was no significant difference when comparison was made to those jurors in the control group without an aid. Similarly, in the Missouri death-penalty instructions study, while the performance of those with a decision tree was superior to those with only the instructions, again the results were not significant. Another drawback to the design of the Missouri study was that the decision tree was tested in isolation. A decision tree would never be used alone without any kind of oral explanation of the legal concepts from the trial judge in a trial, so the design of the study was weakened because it did not mimic the real-life circumstances of a criminal trial in this important aspect.

4.3. Australia question-trails

The most extensive and recent research on decision trees has emerged from Australia, where the decision tree aid is currently called a question-trail (Ede and Goodman-Delahunty 2013, Essex and Goodman-Delahunty 2014). This section will examine the findings of these studies, and the conclusions the researchers have drawn about how this tool affects juror comprehension.

In the first Australian study, Semmler and Brewer (2002) found promising evidence that a decision tree facilitates juror understanding of legal instructions in a criminal jury trial. The experimental jurors were individually tested on their ability to define self-defense and apply their knowledge to four scenarios. On the definition question where jurors were asked to describe the four elements of self-defense, those who received the flow-chart[13] plus oral instruction performed 28 percent better than those who received no instruction and 11 percent better than those who received only an oral instruction (Semmler and Brewer 2002, p. 265). On the other questions, where jurors were asked to apply their knowledge of self-defense to new scenarios, there were no significant differences in performance among the various aid and instruction conditions. However, those who received a decision tree in addition to an oral instruction performed best overall (Semmler and Brewer 2002, p. 266). This study is limited by the fact that it tested a very narrow concept in criminal law rather than a broad range of legal concepts. While there was not strong evidence that the decision tree improved jurors' ability to apply their knowledge of self-defense, there was evidence that the decision tree, when accompanied with oral instructions, significantly improved the jurors' ability to define correctly self-defense.

In the next study, Brewer *et al*. (2004) found that the decision tree[14] improves juror comprehension when used in combination with animation. They found that when a decision tree was combined with an animation sequence using crash-test dummies from vehicle safety tests to depict jury instructions, juror comprehension was significantly increased by 40 percent (Brewer *et al*. 2004, p. 769). This large

[13] At the time of this study, "question-trail" was not yet commonly used. The decision tree tool is referred to as a flow-chart in the article.
[14] Brewer *et al.* use the terms flow-chart and decision tree interchangeably in their article.

increase in comprehension occurred among the jury-eligible citizens—the increase among the law students (who were considered 'experts') was not as large. The researchers were able to demonstrate that although the no aid condition resulted in a wide discrepancy between the jurors from the community and the expert group of law students, this gap closed when animation was combined with a decision tree. Unfortunately, one of the limitations of the study was that it did not separate out the effect of the decision tree from the animation used to illustrate the instructions.

The use of animation to illustrate legal instructions is likely to be seen as a controversial proposal for the deeply conservative institution of law. Creating unbiased animation sequences would also be far more challenging than drafting neutral decision trees. Expanding judicial instructions to include animation would require resources and expertise that are not currently an integral part of judicial institutions. Even if institutional approval existed for this novel method of imparting knowledge in the courtroom, lack of funding to hire animators would be a substantial roadblock. By contrast, drafting decision trees is a low-cost option within the skill set of judges and lawyers. Thus, while it is exciting to theorize about the potential to modernize the jury trial to make better use of visual technologies, it is not practical to expect widespread adoption of animation whereas greater use of decision trees is a more achievable goal.

Most recently, Goodman-Delahunty has worked with Ede and Essex in two separate research projects to investigate how question-trails (the current term used in Australia for a decision tree tool) affect juror comprehension and whether the complexity of the trial has any influence on its effectiveness (Ede and Goodman-Delahunty 2013, Essex and Goodman-Delahunty 2014). In both studies, the jurors assessed the cognitive load that the trial placed on them by rating the mental effort used to understand and apply the judicial instructions (Essex and Goodman-Delahunty 2014, p. 84). In the first jury study, the mother was accused of killing one of her triplets (Ede and Goodman-Delahunty 2013, pp. 123-124). The jurors were randomly assigned to one of three aid conditions: 1) the question-trail condition (a set of sequential questions given at the end of trial that led the jurors to a verdict based on their answers); 2) the written instructions condition where the jurors received a copy of the judge's oral summation in written format at the end of trial; and 3) the no instructions condition in which the jurors received no aid (Ede and Goodman-Delahunty 2013, p. 124). While the researchers found that those who received the question-trail performed better on the complex legal questions than those in the other two conditions, this improvement effect was not present for the simple legal questions that focused on recall of the legal instructions (Ede and Goodman-Delahunty 2013, p. 127). Instead, it was the group of jurors who received the written instructions who performed better on the simple substantive questions, and there was no significant difference between the performance of those who received no aid and those who received the question-trail. These results suggest that there may be a role to be played by each of the two different aids, the structured question-trail as well as written instructions, and that the decision tree may be more effective in more complex trials.

A fascinating aspect of the infanticide jury simulation study was that question-trails were rated by jurors as reducing their cognitive load although the differences among the specific conditions did not reach statistical significance (Ede and Goodman-Delahunty 2013, p. 126). Ede and Goodman-Delahunty theorize that the question-tree reduces cognitive load by breaking down the judicial instructions into manageable units, which, in turn, places a smaller burden on working memory (Ede and Goodman-Delahunty 2013, p. 130). Because only a small proportion of the study sample voted guilty, the researchers were unable to delve into how the question-trail affected the perceived cognitive load among jurors who voted guilty (Ede and Goodman-Delahunty 2013, p. 130). Not surprisingly, Ede and Goodman-Delahunty recommend further research on the impact of the question-trial on

cognitive load and whether this varies when the complexity of the trial changes (Ede and Goodman-Delahunty 2013, p. 134).

A more recent Australian study on question-trails focused exclusively on reasonable doubt instructions. The trial simulation was based on an actual case in which a grandfather was accused of sexually assaulting his sixteen-year-old granddaughter (Essex and Goodman-Delahunty 2014). No comprehension improvement was associated with the use of question-trials. Although there was no association between question-trails and performance on the comprehension test, there were several features of the study design which may have affected the results. Essex and Goodman-Delahunty suggest that the fact scenario used was too simple because there was only one charge, and no defense evidence was called. In addition, there was only one legal concept tested (beyond reasonable doubt) and only limited legal instructions were given to explain it.[15] The High Court of Australia has stated that proving guilt beyond a reasonable doubt is a concept that is in common use, is well understood, and requires no further explanation (Essex and Goodman-Delahunty 2014, p. 79). Another theory that has been suggested is that question-trails may provide more benefit for technical or property offenses as opposed to crimes against the person where jurors may resort to relying on commonsense notions of justice (McKay *et al.* 2014, p. 507). The role of the question-trail in enhancing juror comprehension may be reliant on the complexity of the facts and legal issues in a trial and when the case does not tax the cognitive load of jurors (as theorized in this study), there may be little opportunity to boost comprehension. Further research is required to explore more fully the relationship of trial complexity and question-trails (or decision trees) to juror comprehension.

4.4. Decision trees in England

In the birthplace of the common-law jury trial, England, there have been several reports recommending that trial judges use a structured aid tool, called a "Route to Verdict," in jury trials (Auld 2001, Leveson 2015). In this section, the recommendations of the Auld Review and the 2015 *Review of Efficiency in Criminal Proceedings* on increasing the use of a factual series of questions to lead the jury to a verdict will be discussed. In addition, I will explore how the "Route to Verdict" has been put forward as a defense against those in Europe who criticize the general verdict in criminal trials as arbitrary and unfair to defendants because no reasons are rendered. Finally, the section will end with an examination of empirical research on juror comprehension and whether there is any evidence that structured aids such as a Route to Verdict enhance juror comprehension.

In 2001, Lord Justice Auld released his report entitled *Review of the Criminal Courts of England and Wales* and recommended that juries be instructed using a method like the "Route to Verdict" method (Auld 2001, p. 172).[16] He suggested that "the judges should devise and put to the jury a series of written factual questions, the answers to which could logically lead only to a verdict of guilty or not guilty," and that the questions be provided in a separate list to jurors at the end of trial (Auld 2001, p. 538). He also recommended that the time had come for judges to provide substantially more information about the law and legal issues at the beginning of the trial. He suggested that jurors be provided with both an oral and written "Route to Verdict" (a summary of the case and its issues) at the beginning of the trial. The "Route to Verdict" should identify the charges, provide a brief narrative, identify facts in issue, and end with a list of the likely questions to be answered by the jury with little or no reference to the law (Auld 2001, p. 521). He likened the traditional

[15] Half of the jurors were given the "sure" instruction in which reasonable doubt is described "as a very high standard of proof that required the jury to be sure, but not absolutely certain, that the accused was guilty." The other half of the sample was given the "high standard" instruction in which reasonable doubt is described as "a high standard of proof" (Essex and Goodman-Delahunty 2014, p. 84).

[16] It is only in more recent years that this phrase is the one commonly applied in England to the set of factual questions that can be provided to jurors at the end of trial.

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approach of summing-up at the end of trial with a lengthy review of the law and its application to the facts as a "long and burdensome journey for judge and jury alike" (Auld 2001, p. 533). Rather than requiring the jury to listen to a treatise on the law, the trial judge should do more to protect the jury from the law. One of the ways to do this, he suggested, was to identify the facts, which if found by the jury, would render the defendant guilty and translate these into a series of questions (Auld 2001, p. 534).

In the recent report entitled *Review of Efficiency in Criminal Proceedings* (Leveson 2015), the President of the Queen's Bench Division, Sir Brian Leveson, recommended that the "Route to Verdict" tool and a written copy of the legal directions be provided to the jury in every case. He described the "Route to Verdict" aid as a "logical progression of propositions which apply the law to the specific facts then being considered" (Leveson 2015, p. 75). Penny Darbyshire, an English academic and jury expert, has recounted in her study on the lives of judges that while the use of written materials for jurors by judges has increased since the Auld report, it is still the exception rather than the rule (Darbyshire 2011, p. 216).[17] Leveson also recommended that a judge's legal directions and tools such as the "Route to Verdict" be provided before the closing speeches of counsel (Leveson 2015, p. 80). The reason for this is twofold: 1) the lawyers can tailor their remarks; and 2) it will avoid repetition as the lawyers will not need to review the law.

One of the advantages cited by Leveson for using the "Route to Verdict" is that it provides an answer to those who criticize the fairness of general verdicts in criminal jury trials. He referred specifically to the fair trial requirement in Article 6 of the *European Convention on Human Rights* and the finding by the European Court of Human Rights in *Taxquet v. Belgium* that "for a trial to be fair, the accused (and the public) must be able to understand the verdict given by a jury" ([2012] 54 ECHR 933). After this decision was released, alarm was raised in countries such as England, Ireland and Wales about whether the tradition of general verdicts was endangered and whether juries would now have to release reasons (Daly 2010). Leveson concluded that the judge's practice of summarizing and analyzing the evidence when combined with the "Route to Verdict" (which outlines the reasoning process that the jury can follow to reach its verdict) provides an alternative to reasons from the jury. He concluded that "it should be beyond argument that the accused and the public can understand the verdict and so satisfy the requirements of Article 6" (Leveson 2015, p. 77).

While there has been limited empirical research to date on juror comprehension in England,[18] there was an important empirical study by Professor Cheryl Thomas, which included some analysis of juror aids. The study was a large-scale research project involving 797 jurors at three courts in England (at Blackfriars, Winchester, and Nottingham), in which Thomas tested jurors' comprehension of legal instructions. Previous studies in English courts had focused solely on jurors' subjective assessments of their comprehension levels, which were generally quite robust (Zander and Henderson 1993). Thomas found that objective comprehension levels did not match the subjective ratings. While the perception of over half of the jurors was that the legal directions were easy to understand, only 31 percent actually understood the directions fully (Thomas 2010, p. vi).

[17] Darbyshire found that written directions were not given in more routine cases, but tended to be given in "murder, reckless arson, rape, joint enterprises and dangerous driving" cases (Darbyshire 2011, p. 216). The instructions usually included a sequence of questions like a flow-chart (Darbyshire 2011, p. 216).

[18] In a previous study, jurors were asked to assess their comprehension levels and whether the jury directions given were difficult to understand but there were no objective measurements (Zander and Henderson 1993, p. xiv). Cheryl Thomas stated the reality starkly in her report: "There is no empirical research in this country on the extent to which jurors understand directions on the law delivered by the judge at the end of the trial (Thomas 2010, p. 35).

Thomas found that a written summary of the instructions, provided at the time the legal directions were delivered, significantly improved comprehension so that almost half of the jurors (48 percent) fully understood the directions (Thomas 2010, p. vi). However, it is difficult to know whether the comprehension improvement was due to the "Route to Verdict" (the English decision tree tool) or other written materials in the package given to jurors or a combination of all of the materials.[19] Since the study had multiple aims,[20] the aspect testing juror comprehension was limited and rather narrow. There were only two comprehension questions. Jurors were asked to identify the two questions the judge indicated as relevant for assessing self-defense (1. Had the defendant believed it was necessary to defend himself?; and 2. Had the defendant used reasonable force?) (Thomas 2010, p. 36).

In England, there appears to be very strong institutional approval for broad use of the "Route to Verdict" in every case. It remains to be seen whether the recent recommendation that a "Route to Verdict" be used in every case and if the promising results from Thomas' empirical research will lead to more widespread use of this tool.

4.5. Decision trees on the continent - Austria

An interesting example of the use of a decision tree aid in Continental Europe is that of Austria. In Austria, jury trials are mandated for serious offenses such as murder, and the political offenses of treason and espionage (Taylor 2011, pp. 284-285). However, the right to a jury trial has been limited and in 2009, aggravated robbery was removed from the list of offenses requiring a jury trial (Taylor 2011, p. 308). At the end of the trial, section 312(1) of the *Code of Criminal Procedure* (1850) in Austria requires that the eight jurors must be given two copies of a list of written questions that lead them through the elements of the offense as well as any defenses relied upon by the defendant, regardless of whether there is any legal foundation for the defense (Taylor 2011, pp. 308-309). The written questions may not contain any reference to intention (Taylor 2011, p. 310). The jury does not provide a general verdict, but provides yes or no answers to each of the questions (Taylor 2011, p. 303). The jury is also required to provide a rationale for their answers but, in practice, these responses amount to little more than staccato references such as "the evidence" or "the response of the accused" (Taylor 2011, p. 304). Unfortunately, there do not appear to be empirical studies testing how the list of questions affects Austrian jurors' acquisition of legal knowledge.

While Taylor recommends that the system of written questions leading the jury through their deliberations might serve as a source of inspiration for other jury systems, he also points out peculiar aspects to the instruction process that are troubling. The summing up process conducted by the leading judge is done in private with the jury with neither the parties nor their lawyers present (Taylor 2011, p. 301). While there are standard instructions used, it is common knowledge that the judge routinely deviates from the script and there is no transcript recording of the instructions delivered to the jury (Taylor 2011, p. 304). Appeals are available to allege errors in the written version of the law provided to the jury under section 23 of the *Code of Criminal Procedure* (Taylor 2011, p. 303). The end result is that there can be no appeal from substantive errors in how the law is explained to the jury in the private audience between the judge and jurors. It is nonetheless of interest to know that a country such as Austria mandates that a tool similar to the decision tree be used and provided to jurors to assist them in the reasoning process.

[19] For example, was the improvement due to a written version of the oral instructions within the aide-memoire package?

[20] The study also looked at racial discrimination, juror impropriety, and the impact of media coverage and the internet (Thomas 2010, p. 6).

4.6. Use of decision trees in medicine

Decision trees have been experimented with in medicine for over twenty years in a myriad of ways from improving patient comprehension of treatment options, helping physicians navigate treatment protocols, to determining who is responsible when patient safety has been endangered (Podgorelec *et al.* 2002). While there are calls for greater use of decision trees in medicine, it is nonetheless a tool that has had a longer history of use than in the legal field (Tillquist and Maddox 2011).[21] In this section, I argue that the body of research on the use of decision trees in the treatment of cancer, hypertension, heart valve replacement, and response to patient endangerment may have important lessons for the use of decision trees in civil or criminal jury trials (Whelan *et al.* 2004, Meadows *et al*. 2005, Thomson *et al.* 2006, Col *et al.* 2007, Rahimtoola 2010, Tillquist and Maddox 2011).

There are two primary types of decision trees commonly used in medicine: the medical decision tree and the clinical guidance tree (Turner 2009, p. 237). The medical decision tree is designed for use by physicians in their clinical practice. The medical decision tree is intended to summarize the complex array of treatment options that are available depending upon the medical condition of the patient. For example, a standard decision tree for heart valve replacement requires the clinician to make an assessment of the life expectancy of the patient, which in turn affects whether a mechanical valve or stented bioprosthesis is an option (Rahimtoola 2010, p. 2413). A clinical guidance tree ("CGT") is intended to be used by the layperson (i.e. patient) to assist in choosing among treatment options and in becoming knowledgeable about recommended lifestyle changes (Turner 2009). However, some physicians have argued that CGTs are also valuable educational tools for medical professionals in providing a comprehensive summary of the different choices for treatments and the contraindications and implications of each choice (Turner 2009). Kenneth Turner, in his work on creating computer programs for the creation of clinical guidance trees, has recognized that the application potential of decision trees is not limited to medicine but could be used in almost any domain outside of the healthcare field (Turner 2009).

In a meta-analysis study, which systematically analyzed the findings of decision aids in medicine, the researchers reported that there was strong evidence that aids such as decision trees improved patient's knowledge about options and reduced decisional conflict (Estabrooks *et al.* 2001). For example, decision boards were found to be a highly effective tool in explaining treatment options for women with breast cancer (Whelan *et al.* 2004). The decision board used was a visual and written explanation of the various considerations in deciding between mastectomy and lumpectomy. The board was organized into four sections: 1) treatment choice; 2) side effects; 3) results of treatment choice for the breast; and 4) results of treatment for survival (Whelan *et al.* 2004, p. 436). In total, there were eight covered panels addressing each of these sub-topics for the two primary treatment options. When the panel was opened by the physician with the patient, the information was conveyed with bullet points and accompanied sometimes by a diagram (Whelan *et al.* 2004, p. 436).

The breast cancer study found an improvement in comprehension and a reduction in decisional conflict when a decision board was used (Whelan *et al.* 2004). Patient knowledge was tested in the breast cancer study with a questionnaire containing forty-four items, the majority of which were statements that the patient had to recognize as true or false (Whelan *et al.* 2004). There were four multiple-choice

[21] There appears to be some movement within American legal education to use decision trees to facilitate comprehension of legal concepts. Professor Mark Edwards of William Mitchell College is the creator of ChartaCourse—an interactive website that delivers law school course content electronically. ChartaCourse uses a decision tree (which it calls a guidepost) to lead students through a list of questions to analyze a legal issue. Based on their yes or no answers to the questions posed, students are led to the legal conclusions that follow from their determinations (Edwards 2014).

questions about numerical risk for which the patient had to choose among four options. The researchers detected a 9 percent improvement in the performance on the comprehension test for the patients who received a decision board when compared with those who did not (Whelan *et al.* 2004, p. 437). They also found that the decision board decreased the patients' decisional conflict and increased their satisfaction with the decision making process (Whelan *et al.* 2004, p. 438). Decisional conflict was measured by sixteen questions which assessed how the patients felt about their choices, the benefits and risks, how clear their values were, the support they received in making their decisions, and their level of uncertainty (Whelan 2004, p. 437).

While there are important differences in the medical and jury context, there are also similarities. In both, the person of authority (i.e. the physician or judge) needs to impart technical information about a topic on which the patient or juror is unlikely to be an expert. Second, there must be a decision made by the patient about the treatment or the jury about the verdict. One of the key differences between the two contexts is that following receipt of the instructions from the judge, the juror must then engage in a group dynamic where the goal is to deliver a unanimous verdict. The patient, in contrast to this, can elect whether to make an individual decision or to consult with family and friends in the decisionmaking process. Another key difference is that the patient is emotionally involved in the decision, whereas the juror is supposed to be impartial and disinterested in the outcome.

Decision trees have also been used in medicine to deal with situations where the safety of a patient has been endangered and there are questions concerning the role played by medical professionals. The National Health Service in the United Kingdom developed a decision tree to guide managers in carefully assessing the conduct and responsibility of staff who were involved in the patient safety incident (Meadows *et al*. 2005). The goal of the decision tree in this context is to "provide a clear framework and methodology for managers to make decisions on suspension and disciplinary action" as well as to "stimulate decisionmakers into thinking about systems and organizational issues" (Meadows *et al*. 2005, p. 390).

Since 2006, there have been efforts to establish consistent criteria to assess the effectiveness of decision aids according to the Delphi Process. The international Delphi Process is a "group communication process that aims at conducting detailed examinations and discussions of a specific issue for the purpose of goal setting, policy investigation, or predicting the occurrence of future events" (Hsu and Sandford 2007, p. 1). The process originated out of the Rand Corporation in the 1950s and is well accepted as a method of collecting data to arrive at a convergence of opinion (Hsu and Sandford 2007, p. 1). The technique frequently involves using questionnaires to be distributed to selected Delphi participants, first, for soliciting views on the identified issues, and then, through subsequent rounds for the purpose of coming to agreement on factors and criteria. While the names of the participants are known, individual feedback is anonymous and care is taken to maintain confidentiality of views through the successive rounds of questionnaires.

A conference was convened in 2003 to begin an international Delphi Process to establish quality criteria for patient decision aids in medicine. Before beginning this process, there was general consensus that there was substantive research evidence that patient decision aids have positive outcomes such as increasing knowledge, but there was not agreement on the content of the aids (Elwyn *et al*. 2006, p. 1). The study involved 212 participants including researchers, patients, policy makers and health professionals from 14 countries with most coming from the U.S., Canada, the United Kingdom and Australia (Elwyn *et al*. 2006). Out of this conference, The International Patient Decision Aids Standards (IPDAS) Collaboration was formed (Elwyn *et al*. 2006, p. 2).

In 2006, the results of the initial consultation process were published. The IPDAS Collaboration created a checklist for designing decision aids. The use of plain language is identified as an ideal for which to strive (Elwyn *et al*. 2006, p. 3). The checklist asks whether the guide is written at a level that can be understood by the majority of patients in the target group and recommends that the aid be written at a grade 8 equivalent level or less using the SMOG or FRY reading score (Elwyn *et al*. 2006, Table 3 in Online Supplemental Materials). In addition, the checklist asks whether there are ways for the patient to understand the information in alternate formats such as through audio, video, or in-person discussion.

In 2014, the results of another Delphi Process, whose aim was to identify the minimum standards from the IPDAS checklist, were published (Joseph-Williams *et al*. 2014). The participants created a reduced checklist divided into three categories: 1) qualifying criteria (defining a decision aid); 2) certification criteria (minimum standards), and 3) quality criteria (factors that strengthen a decision aid) (Joseph-Williams *et al*. 2014, p. 701). The sole certification criterion for "information" was the requirement that the aid clearly show the positive and negative features of each option in a balanced way (Joseph-Williams *et al*. 2014, p. 702). Similar to the decision tree in a jury trial, it was critical that the aid assist the patient through the reasoning process but not dictate the final result.

All of the other factors concerning the content and format of the decision aid were identified as quality criteria. They included: whether the aid provides step-by-step directions to make the decision, whether it provides tools such as list of questions, and whether it provides the information in more than one format such as video, audio, or diagram. The researchers suggest that further work is required to assess the feasibility of the criteria and to test and analyze the existing decision aids against the criteria proposed.

The international Delphi Process used over the past decade in the medical field to create checklists and minimum standards for patient decision aids is one that could be used in the legal field for decision trees in jury trials. While there have been numerous studies of aids within individual countries with jury systems, there has not been the same systematic international study of decision aids with a view to establishing consensus on the criteria for developing and assessing the efficacy of such aids. Greater awareness of the positive experience within the medical context may encourage jury and lay participation researchers to consider embarking on a similar process. Such a process could promote greater global awareness of the aids that are used in different countries and could lead to consensus on minimum criteria for the use and implementation of such aids.

5. Concluding thoughts

Decision trees remain an underused tool in the American jury system. This paper has explored the underpinnings of the judicial concern in the *United States v. Spock* case over the power of a set of step-by-step questions to lead a jury to an ineluctable conclusion that interferes with the jury's constitutional right to deliberate freely. The First Circuit's worry about infringements on the jury's freedom was closely tied to the use of a special verdict form requiring the jury to answer specific questions rather than an aid that would lead the jury through a summary of the elements of the offense. The conflation of special verdicts and decision trees has become a tempest in a teapot. It has unfortunately led to a failure to explore and test in a comprehensive way the potential for decision trees to serve as a useful tool in criminal trials in the United States.

This paper asserts that the decision tree does not pose a threat to either the defendant's right to a jury trial or the right of the jury to deliberate without undue influence. The potential for the jury to misuse a tool is not unique to the decision tree. Rather than practicing a blanket avoidance of decision trees, a more nuanced response would be to craft jury instructions reminding jurors that they are not to

provide answers to any of the questions on the decision tree and emphasizing that the decision tree requires no specific verdict and that the power of the jury to decide upon and deliver the verdict remains solely with the jurors.

There are signs that an opening for greater use of decision trees in American criminal jury trials exists as a result of a study on tools to enhance juror comprehension of mtDNA evidence. While the research studies on the impact of decision trees on juror comprehension are limited, there is evidence that this is a tool that has the potential to improve a juror's ability to recall and understand legal concepts. The paper also explored the approach of the field of medicine to use decision trees aids (or similar tools) to improve both physician and patient knowledge in order that the patient may be better equipped to assess and decide about treatment options. Jury researchers ought to consider using the international Delphi Consultation approach that has allowed those in medicine to construct a checklist for the creation, development, and application of decision aids including decision trees. An international collaboration such as this could lead to greater global awareness about how decision trees are used in countries that use juries or some form of lay participation. Participating countries could learn from one another and assist each other in providing lay jurors with tools such as the decision tree to enable them to make well-informed decisions that are informed by the relevant legal principles and that are free from coercion and outside influence.

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