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Tech effect and generational age implications on jury verdicts

Abstract

Over the past 30years, forensic science and the analysis of physical evidence have become increasingly influential in courtroom proceedings. Although, forensic evidence and expert testimony has been utilized on the state and federal level, it is introduced into trials relatively unchecked and scrutinized. Today's media not only provides knowledge and understanding of the different types of forensic science fields, but also has become the main information source where people learn about the law. The media is also thought to have inspired a "CSI effect" which distorts jurors' views by asserting that forensic science and technology has the ability to generate evidence. Past research has been conducted on certain demographic variables and their effect on jury verdicts, but there has been little research on the impact of age on jury decisions. In addition, although juries are cross-generational, past studies have been conducted primarily using college age students as mock jurors. It is the goal of this study to determine if there is a correlation between the tech effect, the age of jurors and trial verdicts. A questionnaire was administered to a cross generational sample which includes both fixed response and Likert based questions. The results may be used in the future to assist court officials in creating more effective ways to address jurors, their expectations and knowledge.

Keywords: CSI effect, tech effect, forensic, jury verdicts

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Introduction

Technology is part of our everyday life. A world without a cell phone, computer, or other electronic devices at our fingertips would be unthinkable. News and information are instantly available through the Internet.[1] In North America alone, 78.6 % of the population uses the Internet, growing 153% between the years 2000-2012.[2] This wave of information and technology has crossed generational lines so that it is estimated ninety two percent of Americans under the age of 60 have used a computer at some point in their lives.[1] Science and technology have also become an integral part of courtroom proceedings, not only introduced as key pieces of evidence, but during trial presentations. Citizens who were born between the years 1960-1999 account for 40percent of the jurors.[1] Thus, the assumption that a jury would not be able to comprehend the evidence and technology would be a huge misunderstanding.[1] Little current research has been conducted on the impact of juror age on verdicts. It is the focus of this study to combine these areas of research and determine if the outcome of a trial is influenced by the age of a juror and if the tech effect varies among this jury pool. Research on both the "CSI effect" and "tech effect" has been mainly divided into three methods of testing.[3] These are:

I. Surveying those in the Judicial System-Surveys has been completed by prosecutors, defense attorneys, public defenders and judges.

II. Surveying a Jury Pool-University students and jurors' pools (pre and post-trial) have been surveyed in order to determine hypothetical verdicts.

III. Statistical Analysis - This encompasses the analysis of acquittal rates over a specific time period.

By examining the multitude of studies involving the "CSI effect" and its progression to the tech effect, the results have been open to more than one interpretation. Different sampling designs have been used in different studies that have opened the doors to much criticism.[4] Mancini[5] pointed out several studies that he believed contained flaws. Podlas[6] study contained information that he felt was irrelevant; Shelton[7] along with Baskin et al.,[4] weakened their validity by oversimplifying the crime scenarios; Schweitzer et al.,[8] failed to use enough participants. In addition, Baskin et al.,[4] relied on a telephone for survey purposes and thus weakened their validity. Many of the studies used college age students or undergraduates as part of their studies. These younger participants may not have had the opportunity to obtain life experiences and prior beliefs due to their age.[9]

Although previous research has neither confirmed nor refuted the existence of the "CSI effect" or tech effect, it is apparent that these studies have not only added to the myth of the "CSI effect," but also perpetuated its existence. Considerable time and effort has gone into understanding why juries make the decisions they do. Many studies have used undergraduates as a testing pool, which does not provide an acceptable representation of an actual jury. While it is clear that in today's world there exists a culture permeated by technology and information, no studies have sought to understand a specific factor that has influenced jury decisions. This study aims at enhancing the body of existing research by narrowing the scope of study and isolating a factor that may further explain the relationship between the tech effect and jury verdicts.

History of forensic science in the courtroom

The public has always had a fascination with solving crimes and their interest in this field has changed with the times. The early mystery stories like Edgar Allen Poe's Murders in the Rue Morgue and Arthur Conan Doyle's Sherlock Holmes, led to the radio mysteries of the 1930s and 1940s, which eventually grew into the earlier television crime shows like Perry Mason and Colombo. The introduction of

forensic science as a significant piece of evidence was acknowledged as early as 1982 during the murder trial of Wayne Williams in Atlanta. Accused of killing over 20 young men, scientific analysis of physical evidence was recognized in this case as a major development not only in the courtroom, but as a new mainstay in cases involving circumstantial evidence.[10] Over the years the media has brought high profile murder trials into our living rooms such as those involving O. J. Simpson, Robert Blake, Phil Spector and others. The O.J. Simpson case is generally thought of as the benchmark for the introduction of forensic science and new scientific technology to millions of people through the media.[11] As recently as 2011 the nation was fixated on this type of evidence during the murder investigation and subsequent trial of Casey Anthony. Accused of killing her two-year-old daughter, Casey Anthony, was being prosecuted on three major offenses.[12] While the case was largely circumstantial, the prosecution built its case mostly on forensic evidence and expert testimony.[13] When the jury acquitted Casey Anthony on all three charges, the media immediately centered their attention on the lack of actual physical evidence and the influence of the so-called "CSI Effect".[12,14]

The fascination with forensic science has not been limited to the courtroom. A 2005, San Diego Tribune article reported that over the course of one week, six broadcast networks had televised a total of 63 homicides on forensic based crime shows.[15] These cases were investigated using a variety of scientific techniques and equipment. Whether based on reality or fiction, these cases all involved forensic science and providing education to the public. With the advances in science and technology permeating today's courtroom, it is imperative for prosecutors, defense attorneys and judges to keep up with new concepts, procedures and applications in order to effectively determine what evidence should be used.[16] In 1923, Frye vs. United States established a standard for the admittance of scientific evidence and expert testimony into courtroom proceedings and was generally accepted on the state and federal level. For years, this standard served as a benchmark directing how the scientific community should go about testing and accepting evidence.[16] During the 1980s the Frye standard began to be abandoned or overturned in numerous states allowing for the introduction of new sciences and technology by attorneys.[17] In 1993 Daubert vs. Merrell Dow Pharmaceuticals overturned Frye on the federal level and established new standards for the admission of science and expert testimony.[17] In 1999, Kumho Tire Co. v. Carmichael further expanded on the Daubert standard and was applicable to expert testimony. Judges were required to act as the gatekeeper, evaluating the experts in their field of knowledge in order to determine "reliability". Courts have scrutinized so-called scientific evidence and some forensic fields were found to be weak.[8]

The National Research Council report[18] concluded that in cases where so called "experts" testified on the forensic sciences involving the firearms, fingerprints, tool marks and handwriting analysis, these experts lacked in scientific approach and training.[19] Thus, courts have been ineffective in evaluating what type of research should be used as the basis of each specific forensic science field.[19] Scholars have criticized the courts for failing to hold admissibility hearings, misinterpreting court rulings, failing to explain admissibility decisions and accepting precedents in lieu of examinations.[20] The mere availability of forensic evidence does not automatically attach reliability and admissibility.[12] Thornton & Peterson[21] explained while scientists work with hypothesis, forensic scientists use deductive conclusions that have not undergone significant testing. Jonakait[22] believed that peer review of forensic analysts and their respective techniques by the broader scientific body are not sufficiently used to detect methodological flaws. Forensic science has been labeled a "pseudo-science" because the conclusions that are made by forensic experts are considered only judgments and not replicable.[23] Although, the aspects of this legal topic are beyond the scope of this paper, several concerns have arisen in regards to evidence involving forensic science. These concerns involve jurors placing too much weight on the scientific evidence;[10] convictions having been a direct result of a juror's prior beliefs regarding forensic evidence[24] and jurors biased in their interpretation and significance of new evidence.[9]

The emergence of the "CSI Effect"

The interest in forensic science has been fueled by a combination of two significant factors. The first factor is the revolution involving science, technology and information.[7] The changes in an individual's attitude and beliefs that are attributed to these scientific and technological innovations have been termed a technological effect or "tech effect".[12] The second factor is the influence of the media, specifically television, and the emphasis on crime and crime scene related shows. More than 67million viewers watch *CSI* shows every week[12] Georgette,[3] stated "The show depicts extensive photographing...elaborate chemical and ballistic tests...a black light [that] reveals every surface of every crime scene…brimming with DNA...incredible software and immense imaginary databases... instantly linking a chip of paint or a piece of glass to a single car or building... [with] never a question of cost" (p.4). The "CSI effect" is a term coined by the media, which asserts that forensic science and technology has the ability to generate evidence and raise juror's expectations in court proceedings.[25] The style of these shows and the information presented allegedly distorts the views of potential jurors and ultimately affects their decisions. The belief is that there is no need to present any eyewitness testimony, statements or circumstantial evidence since forensic evidence is foolproof and infallible. Claims have been made by criminal prosecutors that the "CSI effect" has rewritten the standard of proof by effectively changing "beyond a reasonable doubt" to "above and beyond a reasonable doubt".[6,26]

In civil litigation, the standard of "beyond a preponderance of the evidence" has been raised to the standard in criminal proceedings.[12] Although the "CSI effect" assumes to be based only on the assumptions and opinions of court officials, scientists and the police, this belief has generated action within the criminal justice community.[5] In 2009,[18] the National Academy of Sciences called for a re-examination and reparation of the nation's forensic science investigation system partially based on the CSI suppositions facing jurors and the outcomes of court trials affected. The Ohio State Bar Association Jury Instructions Committee also addressed this issue by creating jury instructions warning about the possible influence and impression generated by legal dramas and CSI type shows.[5,27] The media has continued to fuel these concerns. Georgette[3] believed that the main sociological method existing behind the "CSI effect" is the "cultivation process" developed in 1976 by Gerbner and Gross. The general hypothesis is that those individuals who spend a great deal of time "living in the world of television are more likely to see the real world in terms of the images, values, portrayals and ideologies that emerge through the lens of television".[28] Georgette[3] believes it is this cultivation process that is the driving force behind the "CSI effect", continually bombarding our senses with information and storytelling. This process is not restrictive to a specific race or economic class but can influence anyone who watches television.[3]

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The evolution from the "CSI Effect" into the "Tech Effect"

Shelton et al.,[29] attempted to obtain empirical evidence that would prove the existence of the "CSI effect" through the analysis of juror expectation regarding forensic evidence. This was based on both the television shows' success in terms of worldwide viewership, franchises, and spinoffs[5] along with the public's increase media exposure to police and crime scene type shows. The study resulted in four significant concepts. First, no evidence was obtained to suggest a relationship between watching CSI/crime scene shows and the acquittal of defendants. Second, no evidence was obtained in the majority of the incident scenarios where CSI/crime scene shows influenced juror demands for scientific evidence. Third, the survey participants had strong beliefs and expectations that scientific evidence would be presented in almost every criminal trial. Lastly, and a central point to this study, is that these high expectations were believed to be a direct result of advances in technology and a revolution in information distribution. Juror expectation is not solely a "CSI effect" anymore, but has blossomed into a forensic "tech effect".[29] The "tech effect" is simply the impact and influence that science and technology has over various aspects of our society and culture.[25] There has been limited studies examining the "tech effect" in the legal system and there are no known studies analyzing the relationship between the "tech effect" and juror credibility.[30] What Shelton et al.,[29] theorized was that the "CSI effect" was too limited in nature to account for the jury needs and expectations. The origins of these heightened expectations of forensic evidence do not exist entirely from television shows, but in the overall change in our culture. This change has been brought about by the advances in science and technology, which spreads throughout society using the media as an information platform.[31] The criminal justice system must acknowledge and understand that this perception of scientific evidence is not a problem as the "CSI effect" has been depicted, but simply is the result of a new cultural reality and constitutes the real "tech effect".[32] It is a fundamental principal of our legal system that jurors should be fair and impartial, efforts have been made in the past to identify any factors which could contribute to juror bias. In the ideal world the jurors and subsequent verdicts would be unaffected by pre-trial bias and erroneous preconceptions. It has yet to be determined if the amount of forensic evidence presented in a trial has a direct relationship on the verdicts, or whether this expectation favors either the prosecution or defense. What appears to be of concern is that prospective jurors are now being summoned to trials more knowledgeable in the forensic science field, but it is uncertain if this information, whether accurate or inaccurate, is directly impacting verdicts.

Juror information processing

It has been theorized that since the layperson has no real knowledge or experience in the forensic field to draw upon, an unrealistic perception of reality and evidence may occur.[7] The media, and especially television, has been shown to be the prime information source concerning the law, influencing people's perceptions, attitudes and assumptions of the law. Most people learn about the law, not from scholarly books or resources, but from television.[6] Since these people have never had the opportunity to participate in a jury or have even seen court proceedings up close, their concepts are drawn upon by what they observe through the media. These images from crime scenes and courtrooms take hold in each person's mind, where they develop their own understanding of the law.[33] It is possible that the division between what is real and what is fiction has begun to fade.[7] The new cultural landscape, created in part by CSI, may help to provide a jury pool more knowledgeable of the forensic evidence and better prepared when it comes time to serve on a jury.[6] One approach used by attorneys to explain arguments to juries is through the story model in order for jurors to better understand and relate to the defense or prosecution. Solomon[34] observed numerous civil and criminal deliberations and identified several factors incorporating the story model to aid attorneys in their persuasion strategies. First, jurors' use their common sense and concentrate on the issues and not the facts. Jurors have their own interpretation of how the world works based on their own set of values and beliefs. These beliefs would filter the facts and relate them to each juror's life experience issues. These facts help to corroborate the story, but the overall understanding of the issues is more important to the framework of the story. Second, the psychological mechanism of attribution, or "who is to blame" is in effect during deliberations. Lastly, though Solomon[34] suggests that demographics (age, sex, race etc.) have little relationship to decision making, it is possible that one specific demographic could be responsible for a particular belief or value and this view passed along through a number of jurors.

Age of jurors

Though there has been some research on certain demographic variables (i.e. gender) and their impact on jury verdicts, there has been only limited research on the impact of age. Research on age as a variable has been conducted using post-trial surveys and mock trials.[35–37] It is vital to understand the role of age in juror decision making for two important reasons. First, the pool of participants for research studies on mock juries' has mostly concentrated on college age students. This age group is not usually found in real juries.[38] The large proportion of real jurors is made up of older adults.[39] Second, although older jurors may elicit some bias in their verdicts,[39] it is necessary to understand the effects of aging on decision-making. This would be important as questions have arisen concerning the ability of older jurors to understand and evaluate complex trials.[40] A mock jury study was conducted by Mossiere et al.,[36] An important relationship was observed between the mock juror age and decisions. Though the youngest age group was most likely to find the defendant guilty, the group was the least likely to favor incarceration. In contrast, the oldest age groups were least likely to find the defendant guilty but mostly likely to favor incarceration. These results may be important to prosecutors and defense attorneys in understanding the potential biases and age tendencies with these types of cases. Anwar et al.,[35] examined the role of juror age on trial outcomes. They found that when the jury has an average age over 50years, the defendants were convicted 79% of the time and when the jury had an average age of less than 50years, the conviction rate drops to 68%. Overall, the conviction rate increases about 1% for each year the average age increases. These results implied that

I. The prosecution tends to remove younger jurors during the jury selection process while the defense tends to remove older jurors

II. The older the jury, the greater the likelihood of a conviction.

Lastly Horvath[41] examined the age of the prospective jurors and the generational implications upon their decision-making. This generational theory implies that when an individual is born, there are certain social and cultural beliefs of the world that influence their viewpoints. These experiences create a norm for that generation. These generations hold different views on different topics, and one important area that influences their perspectives is the amount of information they had access to. Horvath[41] breaks these generations down into four categories: Builders, Boomers, Busters and Bridgers.

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I. Builders–respects authority especially expert witnesses and hopes to outlive technology. Their technology included radio, rotary phones and slide rules.

II. Boomers –a distrust of authority and wish to master technology. Their technology included TV, touch-tone phones and calculators.

III. Busters–ignore authority and believe that they can figure things out themselves. They enjoy technology and grew up with video games, cell phones and lap top computers.

IV. Bridgers–strong reliance on what you know rather than what somebody else, including experts, know. They employ technology and use it daily like the Internet, DVD's, and IPODS etc.

The study of specific demographic variables and their influence on verdicts have been limited. Unlike gender, age is a category that is continuous and ever changing. Depending on what portion of the age factor one examines, the influence of culture, technology, experiences and even biology can have drastic influences on the same individual over the course of their life. All of these factors come in to play when attorneys' are trying to understand the makeup of the jury pool and who may be more influenced during court proceedings. Additionally, with increased life expectancy comes a larger age range in the jury pool. As juries are cross-generational, trial lawyers must adjust their styles to conform to the majority view of the jurors.[41]

Methodology

The intent of this study was to examine whether the forensic tech effect directly influences jury verdicts by increasing the likelihood of conviction, and that this relationship may be altered depending on a juror's age. This study does not aim to identify a specific science or technological field associated with the "tech effect" nor what type of bias or preconception a jury may have leading to the ultimate verdict. The study proposes to determine if the outcome of the trial is influenced by the forensic tech effect and if the age of a juror or generation alters this effect. The research questions are threefold:

I. Does the forensic tech effect have an influence on jury verdicts?

II. Are older jurors less influenced by the forensic tech effect than younger jurors?

III. Does the increase in juror age change jury decisions?

The recruitment of eligible candidates for the survey was conducted through the use of Survey Monkey®, a web based survey provider. Through their online email database, Survey Monkey forward this questionnaire to their subscribers. With this web-based-type survey, data entry errors can be reduced and results obtained faster.[42] Participants included a mixture of males and females whom met the criteria of basic jury eligibility. This eligibility was based on the United States District Court Jury Qualifications for the State of Connecticut (28 U.S. Code § 1865). Specifically, the pool of candidates were those individuals who are

I. 18 years of age or older

II. A citizen of the United States

III. Never been convicted of a felony.

The 42 participants in the study were presented with a survey containing questions patterned after similar research surveys developed and used by Shelton et al.,[29] Shelton et al.,[32] Paullet et al.,[30] and the Minnesota Department of Education.[43] Additional questions were created in order to develop data concerning forensic knowledge and belief variables.

Findings

The aim of the study was to isolate a factor, specifically age, which would show a whether a correlation exists between the forensic tech effect and jury verdicts. To date, no current studies exists which identifies a specific variable that can directly influence jury decisions. The results of the survey showed that the majority of the respondents were in the 18-25year old age group (35.7%) with the next two largest groupings being the 26-30year olds (19%) and those over 65 (19%). Overall, more than half (65.2%) of those surveyed were 18-35 years old. The majority of respondents were female (78.6%) and half (50%) had attained a college education. In fact, 83.3percent had at least an associate degree or some college experience. The survey also examined the respondent's involvement with the criminal justice system, either through their experience with the courts or as a victim of crime. Their experience in the court system was fairly modest with 81% having no jury service and 85.7% never having testified in a courtroom. In addition, the majority of the respondents had never been the victims of a crime (71.4%). The survey presented the respondents with four different scenarios. A short explanation of burden of proof and reasonable doubt was provided prior to the scenarios. The incidents involved a homicide; a bank robbery; a motor vehicle/pedestrian accident and a shooting. Equal amounts of physical, testimonial and circumstantial evidence was provided at the end of each scenario. The respondents were then placed in the position of a juror and given the opportunity to vote for guilty or not guilty by weighing the importance and amount of the evidence presented. In addition, respondents were asked to rate which evidence most strongly influenced their decisions. A 3-point Likert type scale was used with answers ranging from least important to most important. Cross tabulations were conducted on each of the four scenarios using the verdicts (guilty / not guilty) as one variable and the three types of evidence (physical/circumstantial/testimonial) as the second variable. In this fashion potential relationships between the two variables could be observed. In Scenario #1 (Murder), thirty-five respondents (83.3%) found the suspect Not Guilty. Of the thirty five respondents, twenty-two (62.9%) found physical evidence to have most strongly influenced their not guilty decision, eight (22.9%) found testimonial evidence most important while five respondents (14.28%) found circumstantial evidence the most important Table 1.

Table 1 Murder scenario

Most important evidence-murder	Not guilty	Guilty	Total
Physical evidence	22 (62.9%)	6 (85.7%)	28 (66.7%)
Testimonial evidence	8 (22.9%)	1 (14.3%)	9 (21.4%)
Circumstantial	5 (14.3%)	0 (0.0%)	5 (11.9%)
Total	35 (83.3%)	7 (16.7%)	42

In Scenario #2 (Bank Robbery), thirty-four respondents (80.9%) found the suspect Guilty. Of these thirty-four respondents, fifteen (44.1%) found physical evidence to have most strongly influenced

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their guilty decision, six (17.7%) found testimonial evidence most important while thirteen (38.2%) respondents found circumstantial evidence the most important Table 2.

Table 2 Bank robbery scenarios

Most important evidence- robbery	Not guilty	Guilty	Total
Physical evidence	3 (37.5%)	15 (44.1%)	18 (42.9%)
Testimonial evidence	3 (37.5%)	6 (17.7%)	9 (21.4%)
Circumstantial	2 (25%)	13 (38.2%)	15 (35.8%)
Total	8 (19%)	34 (80.9%)	42

In Scenario 3 (M/V accident), thirty respondents (71.4%) found the suspect Guilty. Of these thirty respondents, twenty (66.6%) found physical evidence to have most strongly influenced their guilty decision, four (13.3%) found testimonial evidence most important while six (20%) respondents found circumstantial evidence the most important Table 3.

Table 3 Motor vehicle accident scenario

Most important evidence- MVA/Ped.	Not guilty	Guilty	Total
Physical evidence	6 (50%)	20 (66.6%)	26 (62%)
Testimonial evidence	4 (33.3%)	4 (13.3%)	8 (19%)
Circumstantial	2 (16.7%)	6 (20%)	8 (19%)
Total	12 (28.5%)	30 (71.4%)	42

Finally in Scenario 4 (Shooting), twenty-four respondents (57.1%) found the suspect Guilty. Of these twenty-four respondents, seventeen (70.8%) found physical evidence to have most strongly influenced their guilty decision, seven (29.2%) respondents found circumstantial evidence the most important and no respondents 0 (0%) found testimonial evidence important at all Table 4.

Table 4 Shooting scenario

Most important evidence - shooting	Not guilty	Guilty	Total
Physical evidence	12 (66.6%)	17 (70.8%)	29 (69%)
Testimonial evidence	0 (0.0%)	0 (0.0%)	0 (0.0%)
Circumstantial	6 (33.3%)	7 (29.2%)	13 (31%)
Total	18 (42.9%)	24 (57.1%)	42

The Pearson Chi-square tests were conducted to address the three research questions and determine if there existed statistically significant responses. The age variable was broken down into 10 age groupings. The tech effect variable was arrived at by having respondents chose one of five different levels (between 1 (none) and 5 (expert) that best described their technological familiarity and skill. The third variable involved jury decisions where respondents who were then given the opportunity to decide on the guilt or innocence of the suspect. In order to examine the first research question (Does the forensic tech effect have an influence on jury verdicts?), all of the four crime scenarios were analyzed. Results indicated that no matter how each respondents perceived their technological skill level, their decision involving the guilt or innocence of the suspect were unaffected by this tech effect and thus the results were not statistically significant. Due to the low observations in the cells, categories were collapsed. The results of the test rejected the hypothesis that claimed an association between the forensic tech effect and the number of convictions. However, the minimum number of observations for each cell fell below the recommended number of five, so results of statistical significance cannot be relied upon. The results of the second research question (Are older jurors less influenced by the forensic tech effect than younger jurors?) indicated there was no statistical significance when comparing the age of the respondents to their perceived technological skill level. This second part of the study also rejected the hypothesis that claimed the forensic "tech effect" would be associated with the jurors' age. Again, analysis showed no statistical significance. In order to analyze the results of the third research question (Does the increase in juror age change jury decisions?), the verdicts of each of the four crime scenarios were analyzed against the age of the respondents. Again, no statistical significance was identified in any of the scenarios, though in the bank robbery scenario the value did approach statistical significance (0.058). The results also reject the hypothesis that claimed guilty verdicts would be statistically associated with the age of the juror. Though no statistical significant relationships were found, the overall analysis of the data did uncover some interesting and important aspects worth discussing.

Conclusion

As mentioned earlier in this study, the majority of respondents were young, 18-25years old (35.7%) with respondents' 18-35 years old accounting for 65% of those tested. Because of this large number of young men and women, it is not surprising that there was very limited experience with crime (71%) and court room experience. With such limited experience, the question arises as to where these young inexperienced individuals acquire knowledge and perceptions of forensic science? Earlier studies focused on forensic television shows, specifically CSI, as a main influential source this acquisition of information. This study showed that 33.3 % of the respondents now saw television as being important and only 19.05% of those saw TV as most important. The Internet had now become the standard with 30.95% of the respondents feeling it was important but 61.9% believing it to be most important. This standard coincides with the results from this study identifying the desktop/laptop computer and the cell phone with Internet access as the most frequently used devices (85.7%). In their 2006 study, Shelton et al.,[29] were able to show that jurors expected to see scientific evidence presented in trials. This current study showed that when eight different types of crimes were presented to respondents, anywhere between 45.2% (larceny) and 100% (murder) of the respondents expected to see evidence presented in a trial which could be forensically analyzed. In addition, an overwhelming majority of those surveyed considered physical evidence more reliable in violent crimes (92.9%) and property crimes (85.7%) than circumstantial or testimonial evidence. The solvability factor based on this forensic analysis was calculated at 59% indicating that a large to very large portion of criminal cases had the capacity to be solved. This combination of technological breakthroughs and almost instant information dissemination contributes to a society where the average person now has the ability to be at least familiar with forensic science concepts.[29] This may be related to the results in this study where the respondents in all four scenarios listed physical evidence as the most important of the three types of evidence presented. This view varied between 52% and 80% of the respondents. In three of the four scenarios (shooting, M/V accident

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and bank robbery) the suspect was found guilty with between 57% and 80% of the respondents having this viewpoint. The highest percentage observed in favor of one verdict was the murder scenario where 83% of the respondents found the suspect not guilty. They may reflect on the type of information presented in each scenario and how each respondent weighed the importance of each piece of evidence. There were three main research hypotheses that were analyzed in this study. In all three instances, no statistical significance was found. At this point several limitations should be addressed. First, the verdicts decided upon by each respondent are not indicative of what actually occurs during the course of a real trial. Each incident was merely read by the respondents and their respective opinions determined solely on each individuals knowledge and perceptions of the type of evidence presented. It is unknown whether the impact or influence of expert witnesses would have had on each juror, or how they might have been influenced by the attorney's personalities and performances.[44]

Second, there is no pressure on a respondent/ juror to arrive at a verdict. It is uncertain how the decision making process would work without the pressures of assessing real evidence, listening to instructions of the court and facing the possibility that your decision can forever impact another's life.[6] In addition, each respondent does not face the pressure of deliberation and possibly defending their opinion. Their decisions are made independently with only their imaginations and the computer screen in front of them. Findings from past studies involving group discussions and deliberations have been mixed. While some studies have shown these interactions can increase individuals biases,[45] or polarize group members,[46] other studies suggests deliberation can actually eliminate the impact which personalities may have during this phase of the trial.[47] Third, there is already an inherent bias using a web- based survey. The sample population focused on those individuals who were jury eligible while also being subscribers to Survey monkey. Obviously there are a great many more jury eligible candidates in society from which jury pools are created in the United States than those registered with a computer web site. Though random selection was indeed a part of the Survey monkey demographic framework, the respondents were not an accurate reflection of an overall random sample population. Fourth, the sample population used in this study was both too small and was not a representative sample of the jury eligible candidates in the U.S. Because of Survey Monkey policies and procedures, only 44 respondents were ultimately used in the study. This small number impacted the overall study by effectively eliminating the opportunity for additional middle age range respondents to be included in the study. This in turn affected the statistical analysis, as chi square cells had numerous zero entries due to small sample size.

Fifth, the types of evidence presented in the scenarios (physical, testimonial and circumstantial) could not be properly weighted. Though each of the three separate evidentiary categories had been given an equal number of facts, the impact and overall importance of each piece of evidence presented to the respondent could not be calculated. This importance is unique to each respondent with no two jurors looking and weighing the same information identically. Lastly, there was no ability to interview the respondents after the completion of the survey. The range of factors, which may have influenced the respondents' decisions, could not be analyzed.[4] While the study shows a number of interesting yet statistically insignificant results, the following recommendations may aid in any future research. First, a larger sample must be acquired in order to incorporate all age ranges. This would aid in providing more of a representative sample of the jury eligible population. Depending on the size of the questionnaire, something other than an online survey-based company may be needed acquire this random sample population. Shelton et al.,[29] was able to survey 1027 persons called for jury duty in Washtenaw County, Michigan. While probably the most effective way to acquire a wide variety of age respondents, this sample may not always be allowed. It is unknown if Judge Shelton's position as a circuit court judge in the same jurisdiction as the survey helped him to gather the necessary data. Second, a shorter survey would be advisable. The length of the current questionnaire barely fit into the parameters set by the online-based survey company. When the response rate fell below their acceptable levels, the study was terminated. This termination impacted the size of the respondent age pool. A shorter survey would also help to remedy possible boredom and fatigue during the answering process. Ultimately the successful completion of the survey is what is desired. Lastly, there needs to be education of the public in regards to what forensic science can and cannot do. This education could occur through the use of citizen police academies, pretrial videos [48] or through continuing education services where experienced forensic science and crime scene personnel separate truth from fiction.

Discussion

What all these studies are striving to achieve is how to create a fair and balanced trial by jury where a juror's decision is unaffected neither by individual bias nor preconceived notions based on erroneous information. Our justice system is historically based through our constitutional framework where individuals can act as a spokesperson of our society and decide on an individual's guilt or innocence. Therefore, society's current culture and trends can be an integral part of jury decisions by demonstrating or revealing today's values.[29] As technology can reflect current culture, this study already demonstrated how certain devices associated with the "tech effect" have changed just over the past 10years yet still has the capacity to inform and therefore influence jurors. What this study shows is that unlike age and verdicts, technology, and specifically the "tech effect" is a subject area difficult to conceptualize. Technology is ever changing, often coming in waves of new inventions, new ideas or simply improvements on old devices and ways of thinking. What has impacted the "tech effect" and the related forensic science applications is the speed of which this information can be disseminated to multitudes of individuals. These are the individuals forming today's jury pools. This study initially assumed that there would be an obvious disparity between the ages when it came down to understanding technology. This was shown to be false as both young and old respondents viewed themselves as average or above in terms of their adeptness with these devices. The "tech effect" variable reflected perception. So how does one quantify what the "tech effect" really encompasses? Can the advances in science and technology and their effect on jurors really be encapsulated down to analyzing electronic devices used by society? As part of their research studies, both Shelton et al.,[29] and Paullet et al.,[30] used technological device questions in their surveys as a means to conceptualize this abstract idea of "technology". This framework used to define technology is something that needs to be considered in future research. This study sought to determine if one specific factor had a significant influence on jury verdicts. What was realized during this research and reiterated by Baskin et al.,[4] is that it may not be one single factor that totally controls an individual's ability to make decisions, but may be a multitude of interrelated variables. A large percentage of the respondents in this study were female. The gender variable, for example, has been analyzed to determine its role in decision-making. While some studies have not found verdicts as a function of gender,

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others have found differences in verdicts for specific cases (crimes against children and sexual harassment) with woman more prone to convict than men.[38] Likewise the age variable has been studied to a limited degree to determine its influence on verdicts. Whether it be deficits in cognitive thinking,[40] or age bias (favoritism),[38] results more often than not have failed to show differences between college age students and others in the community[49] as cited in Higgins et al.,[38] These variables, whether standing alone or in conjunction with other cultural influences, can be the subject for future studies.

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Conflicts of interest

The author declares that there are no conflicts of interest.

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