

DECONSTRUCTING THE MINDS OF JURORS: BELIEFS ABOUT DNA

EVIDENCE AND THEIR RELATION TO GUILTY VERDICTS

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## DEDICATION

This dissertation is dedicated in loving memory to the late Virginia “Ginny” Nadeau and Bijoux “Boo” Charron et Ducharme. Two very special females who are greatly missed. May they both rest in peace.

In addition, I dedicate this work to all of the wrongfully accused, convicted and imprisoned individuals who have suffered an injustice within the criminal court system.

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## ABSTRACT

MICHELLE L. NADEAU

### DECONSTRUCTING THE MINDS OF JURORS: BELIEFS ABOUT DNA EVIDENCE AND THEIR RELATION TO GUILTY VERDICTS

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The purpose of this study was to investigate the ways in which juror beliefs and attitudes about Deoxyribonucleic Acid (DNA) evidence impact juror decision making and verdicts. Accordingly, this study utilized a mock jury trial that included a deliberative phase to examine the impact of juror attitudes and beliefs about DNA evidence on juror pre- and post-deliberation verdicts. After reviewing a written trial summary, 91 male and female jury-qualified adults were selected to participate as research jurors on eight 12-person juries and deliberate a criminal case via the Internet. Following deliberations via a private Internet chat room, jurors were then assessed for their beliefs about DNA evidence and the personality variable of authoritarianism. Limitations in data analysis from this initial study led to the decision to conduct a second study. Participants in Study 2 included 72 male and female jury-qualified adults who agreed to take part as research jurors on six 12-person juries and deliberate a criminal case on the Internet. Three regression analyses examined whether beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation were significant predictors of post-deliberation verdicts and change in post-deliberation verdicts. No

significant predictors of post-deliberation verdict or change in post-deliberation verdict were found. However, additional findings from exploratory direct entry logistic regression analyses revealed that (a) non-Asian jurors who rendered pre-deliberation verdicts were more likely to vote guilty post-deliberation, and (b) married, Catholic, Republican jurors with positive beliefs about DNA evidence were more likely to change their verdict preference post-deliberation. Implications of the present study for forensic practice as well as for future research on the effect of jurors' beliefs about DNA evidence on verdict outcomes are discussed.

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## CHAPTER I

### INTRODUCTION

Imprisonment of even one innocent person is a perversion of justice. In the United States over the last two decades, it has been proven that at the very least hundreds of innocent people have been wrongfully prosecuted, convicted and imprisoned (Bedau & Radelet, 1987; Garrett, 2008; Gross, Jacoby, Matheson, Montgomery, & Patil, 2005; Radelet, Bedau, & Putnam, 1994; Scheck, Neufeld, & Dwyer, 2000), although many suspect this estimation is quite modest (Gross & O'Brien, 2008; Huff, 2004). This reality has represented a gross inequity in our judicial system. Even more sobering has been the notion that some of these wrongly convicted individuals have been sentenced and put to death as others die or languish in prison while waiting to be exonerated. Obtaining reliable data on the number of people who have been wrongly convicted has been extremely challenging since false convictions are inherently obscured (Gross & O'Brien, 2008; Huff, 2004; Spencer, 2007). The actual number of people who have died or been put to death while unjustly incarcerated has never been determined (Bedau & Radelet, 1987; Gross, Jacoby, Matheson, Montgomery, & Patil, 2005; Scheck, Neufeld, & Dwyer, 2001), although more recent estimates have suggested that the frequency of wrongful death sentence cases is at least 2.3% (Gross & O'Brien, 2008).

To ensure a fair and just legal process, new methods of minimizing the conviction, imprisonment and potential execution of innocent people must be

investigated. In recent years, a group of scholars in the social sciences and the legal community have focused their efforts on discovering ways to increase the accuracy and reliability of the criminal justice system. Of particular concern for many legal advocates has been the issue of jury selection. In our society's litigious climate, jury selection has been recognized as a critical part of the legal process (Bonazzoli, 1998). In fact, the process of choosing jurors (*voir dire*) has been considered by many to be instrumental to winning or losing at trial (Bonazzoli, 1998; Couch & Sundre, 2001; Saks & Hastie, 1986).

Jurors have been central to every defendant's constitutional right to a fair trial. Under the Sixth Amendment of the United States Constitution, all American citizens accused of a crime have been assured an impartial jury of their peers. The accused have been considered innocent until proven guilty under the law. Therefore, effective selection of jurors has been essential to ensure that juries' decisions are based on the law and not on jurors' personal biases. However, the jury selection process may not have gone far enough to guarantee the accused individual's right to a fair trial.

One important way that legal advocates have explored the potential for juror biases has been through the questioning of jurors during *voir dire* (Allen, Mabry, & McKelton, 1998; Deverman, 1995; Luginbuhl & Burkhead, 1994; Schniederjans & Hollcroft, 2005). During this process, the judge solicits potential jurors for a self-assessment of their ability to be impartial and excuses prospective jurors for cause when they are perceived by themselves or the judge as biased (Rose & Diamond, 2008). In

contrast, the goal for legal counsel during voir dire has been to influence the composition of juries in their favor by identifying and striking potential jurors on the panel who may hold biases against their side (Bonazzoli, 1998; Hurney & Sellers, 2008; Rose & Diamond, 2008). As the presumption of innocence has been the incontestable right of the defendant, it is imperative that the legal system make a concerted effort to mitigate juror bias when impaneling juries. Obviously, bias among jurors has served to hinder their objectivity and undermine the soundness of jury decision making; therefore, screening out jurors who hold potentially relevant biases may result in a more just legal system. Ultimately, social scientific investigation of juror bias in relation to jury decision making has served as an important contribution to the jury selection process by attempting to uncover juror attitudes and prejudices that could prevent a true and just verdict.

Various factors have been studied in an effort to determine their potential influence on juror decision making. Considerable research has been conducted to explore different decision making models that jurors have employ to organize and process trial evidence and arrive at a verdict. Findings from studies investigating the impact of certain juror characteristics (i.e., demographic variables, dispositional variables, personality variables) on juror decisions have demonstrated consistently that the personality characteristic of authoritarianism plays a persuasive role in juror decision making (Bonazzoli, 1998; Couch & Sundre, 2001; Narby, Cutler & Moran, 1993; Nadeau, 2006; Shaffer & Wheatman, 2000; Wasieleski, 1996). Research has also shown that the process of jurors deliberating a case has been another significant factor that can impact juror

decisions and final jury verdicts (Bray & Kerr, 1979; Devine, Clayton, Dunford, Sneying, & Pryce, 2001; Diamond, 1997; Hans & Vidmar, 2004; Severance, Greene, & Loftus, 1984; Shaffer & Wheatman, 2000). Like everyone else, jurors have tended to base their decision making to some extent on their own worldview. Thus, social scientists have studied the effects of jurors' attitudes and beliefs on judicial decision making in an effort to reduce juror bias and select impartial juries (Devine et al., 2001). Little research has been conducted in this area and more investigation is necessary to produce more conclusive findings as to how these factors influence juror decision making and, more specifically, jury verdicts.

In recent years, jurors' beliefs about forensic evidence have become particularly salient to legal trials due to significant scientific and technological advances and the introduction of these cutting-edge, highly sophisticated forensic tools and techniques into the courtroom. The frequency with which forensic evidence is now presented in criminal trials has led to a surge of criminal feature stories, crime dramas and investigative-related programming in the news, television, and other print and electronic media outlets. Indeed, the permeating nature of the media has contributed to their vast influence (Surette, 2006). Nonetheless, prosecutors and defense attorneys alike have argued that the media's portrayal of crime and justice may have had an unforeseen influence on the general public (including potential jurors) by drastically shaping their beliefs and expectations about the role and weight of scientific evidence in criminal trials (Brickell, 2008; Mann, 2005; Schweitzer & Saks, 2007; Shelton, Kim & Barak, 2006). Prosecutors

have argued that potential jurors' exposure to the media has increased the prosecution's burden, claiming jurors have higher expectations for the inclusion of scientific evidence at trial and greater demands for conviction; while defense counsel view the media's influence as increasing their burden to overcome jurors' perceptions that scientific evidence is irrefutable (Brickell, 2008; Hans, Kaye, Farley, Albertson, & Dann, 2007; Mann, 2005; Schweitzer & Saks, 2007).

The innovation of Deoxyribonucleic Acid (DNA) typing methodologies, currently considered the gold standard of forensic testing (Giannelli, 1997; Lieberman, Miethe, Carrell, & Krauss, 2008; Mellon, 2001; Thompson, 1993), has only served to further fuel the public's fascination with forensics and shape their beliefs and expectations about criminal trial evidence. Because DNA analysis involves such precision and has been recognized to be a scientifically validated genetic tool, jurors' beliefs about DNA evidence have often been relevant to jury selection. As with other types of scientific evidence, jurors frequently have had misperceptions and unrealistic expectations about forensic DNA evidence due to their exposure to the mass media's presentation of DNA. Investigating the influence of this type of forensic evidence on juror decision making has become paramount to learning more about how jurors' beliefs have influenced their decisions, affected the jury's final verdict, and ultimately upheld a defendant's right to a fair trial.

Answering this question has become even more essential as DNA evidence has become increasingly more prominent in the courtroom. As jury-eligible adults have

experienced greater exposure to forensic science through the media and their expectations about what constitutes evidence have evolved, this has had an extraordinary impact on their perceptions of trial evidence. For example, forensic DNA evidence is not available, does not exist, and is not relevant in every case. DNA testing is also an expensive and time-consuming process (Carroll, 2007; Cooley, 2007; McDonald, 1998). Popular media portrayals of crime and our criminal justice system may have perpetuated jurors' misconceptions by conveying the opposite message: that DNA evidence is necessary, available and material to all criminal cases and, without this type of infallible evidence, the evidence in the case is weak (Brickell, 2008; Lieberman et al., 2008; Mann, 2005; Schweitzer & Saks, 2007; Surette, 2006). Thus, it has been critical to determine how jurors' beliefs about DNA have impacted their verdicts both prior to and following deliberations and the jury's final verdict. If jurors' predisposed beliefs about DNA have unduly influenced their decision to convict or acquit, a defendant's right to a fair trial and just verdict may have been compromised (Lemieux, 2008). Equally, if jurors have held beliefs about DNA that were out of proportion with reality, this mindset could have hindered society's ability to successfully prosecute individuals for their criminal behavior. In either case, DNA evidence should never be used to convict the falsely accused or exonerate the guilty (Marx, 1988).

As such, this study sought to examine the mediating role of jurors' beliefs about DNA evidence as they relate to juror and jury decision making in criminal trials. Specifically, this study attempted to answer questions about the ways that jurors' beliefs

about DNA impact both their pre- and post-deliberation decisions. Thus, the first section of the literature reviewed past and current models for juror decision making; influences on jurors, such as juror characteristics; and the jury deliberation process. The second section reviewed the empirical and non-empirical studies that investigated the influences of scientific evidence, including DNA evidence, on juror attitudes and juror and jury verdicts. Methods, results, and discussion have been presented.

### **Definition of Terms**

The following terms were operationally defined for the purpose of this study. They also served to provide a basic language for further discussion on beliefs about DNA and juror and jury decision making.

- Authoritarianism: A personality construct used to describe an individual who is rigid, conventional, and exceedingly reverent to authority and considers societal rules and laws to be fundamental to preserving discipline and social stability (Allport, 1954).
- Bayes' Theorem: A mathematical theorem that dictated the rules for how decision makers (jurors) should combine new statistical evidence with existing evidence (Smith, Penrod, Otto, & Park, 1996).
- Beyond a Reasonable Doubt: Reasonable doubt referred to a decision maker's belief in the legitimate possibility that the defendant was innocent or feelings of doubt that preclude being completely convinced the defendant was guilty. *Beyond a Reasonable Doubt* referred to the standard of proof used by a jury to decide whether a defendant was guilty in a criminal case. To find a defendant guilty, decision makers must

initially presume the defendant was innocent and guilt must ultimately be proven beyond a reasonable doubt (Garner, 2004).

- Circumstantial Evidence: Referred to any evidence of a fact presented in a given case that was based on inference rather than on direct observation or personal knowledge. Also referred to as indirect evidence (Garner, 2004).
- Direct Evidence: Referred to any evidence of a fact presented in a given case that was derived from direct observation or personal knowledge. If this evidence was accurate, it established the validity of a fact without inference or assumption. Also referred to as positive evidence (Garner, 2004).
- Dogmatism: A personality trait (similar to authoritarianism) that described an individual who was inflexible and closed-minded in thought, but did not display right-wing political qualities (Devine et al., 2001).
- Deoxyribonucleic Acid (DNA): The genetic material that is present in human cells (and the cells of all living organisms) that represented an individual's unique genetic code (Garner, 2004).
- DNA Typing: Referred to a broad range of methods for examining genetic variations. DNA typing methods used molecular biology procedures to examine person-to-person differences in DNA and used this data in forensic applications for the purposes of personal identification (National Research Council, 1992).
- Laboratory Error Rate (LE): Referred to the probability of a match being declared as a result of human error in the DNA laboratory (Schklar & Diamond, 1999).

- Multi-Target/Frequency Frame: When statistical DNA evidence was presented with the possibility that there were other individuals in the population who could match but who were not the source of the DNA evidence (multiple targets) and the DNA statistic was framed as a frequency (Koehler, 2001).
- Random Match Probability (RMP): The possibility that a match could be declared due to random chance (as opposed to the defendant being the true source of the crime scene evidence). Also referred to as coincidental-match probability (Schklar & Diamond, 1999).
- Scientific Evidence: A term used to identify evidence collected from complex and systematic procedures that assisted the fact-finder in understanding evidence at trial (Devine et al., 2001; Garner, 2004). For the purposes of this paper, scientific evidence included evidence such as fingerprints, fibers, hair, bloodstains, ballistics, drugs, body samples, pathology, and explosives (Alldridge, 1994).
- Single-Target/Probability Frame: When statistical DNA evidence was presented as targeting the main suspect (single target) and the DNA statistic was framed as a probability (Koehler, 2001).
- Strength of the Evidence (SOE): Referred to the quality and quantity of evidence presented at trial by the prosecution (Devine et al., 2001).
- The Prosecutor's Fallacy: Referred to the mistaken assumption by jurors that population proportions and statistics on the probability of a match between the

defendant and perpetrator directly estimated the probability of the defendant's innocence (Thompson, 1989).

- The Defense Attorney's Fallacy: Referred to jurors' erroneous presumption that statistical evidence of a match between the defendant and perpetrator with respect to a rare characteristic was immaterial to the likelihood the defendant was guilty (Thompson, 1989).

## CHAPTER II

### LITERATURE REVIEW

The American judicial system is the most well-known system of justice in the world. Unlike legal systems in many other countries, the United States judicial system is a common law system, in which legal cases are decided based on decisions in previous cases that then form a stable body of judge-made law. This body of law is then used to decide subsequent cases involving similar matters (Hwang, 2006). Under the Sixth Amendment of the United States Constitution, those accused of a crime have the option to have a trial by jury (U.S. Constitution, Amendment VI). In a trial by jury, a jury is impaneled to hear and make legal decisions on a case with a judge presiding over the case. Although frequently the target of criticism, the American common law jury system has demonstrated amazing resilience over time (Devine et al., 2001). The American jury symbolizes a central and distinguishing feature of our common law system and the United States is one of only a handful of countries to utilize juries in rendering judicial decisions. Thus, juries represent a crucial part of our system of justice (Gastil & Weiser, 2006; Kelso, 1996). As citizens fulfilling their civic duty, jurors are confronted with an awesome responsibility and the difficult task of rendering legal decisions in often complex cases.

Extensive research has been conducted in an effort to explore juror behaviors and decision making processes. Jury research studies have shown that in a majority of the

cases, juries and judges were in agreement on the verdict when presented with the same evidence in a criminal case (Brickell, 2008; Ellsworth, 1989; Hannaford, Hans, & Munsterman, 2000; Hans & Vidmar, 2004; Heuer & Penrod, 1994; Kalven & Zeisel, 1966; Vidmar, 1989). Since jurors and juries have been an essential part of our jury system (Greene, Chopra, Kovera, Penrod, Rose, Schuller, & Studebaker, 2002; Hans & Vidmar, 2004; Kelso, 1996; King, 1999), it was vital to uncover the processes by which jurors and juries arrived at legal decisions and the influences on those processes. More specifically, understanding the many variables that influenced jurors, how jurors processed trial information, the strategies that jurors employed in decision making, and the role jury deliberations played in the decision process and final verdicts was fundamental to accomplishing that goal.

Before examining the numerous influences on jurors' decision making processes, it was first necessary to consider several theoretical decision making models that jurors may utilize in deciding a case. For decades, researchers have studied various psychological and mathematical models in an effort to better understand juror decision making (Devine et al., 2001; Kerr, 1993; Hans & Vidmar, 2004; Hastie, 1993; Pennington & Hastie, 1981). It was particularly important for legal advocates to gain a better understanding of the cognitive processes of a typical juror in order to present the evidence most effectively to the jury. Jurors were required to listen to trial information and evidence from multiple, diverse sources and ultimately asked to arrive at a single judgment regarding a defendant's guilt or innocence (Meissner, Brigham, & Pfeifer,

2003; Ostrom, Werner, & Saks, 1978). How jurors organized information and performed reasoning tasks with respect to often ambiguous and/or complex data have been central to this issue. To that end, this review included a brief description of traditional models of jury decision making and a more detailed overview of the most widely accepted decision making model: the Story Model.

### **Traditional Models of Jury Decision Making**

Initially, juror decision making was conceptualized by four major types of models: information integration models, Bayesian models, a Poisson process model, and sequential weighting models. Information integration models suggested that jurors made decisions by utilizing an algebraic combination rule. Using this type of model, jurors first evaluated and weighed all of the information and evidence items individually (Kaplan & Kemmerick, 1974; Ostrom, Werner, & Saks, 1978). At the trial's conclusion, jurors integrated all of the evidence to arrive at a weighted average that consisted of the jurors' initial opinion and the evidence that was presented during the trial (Ostrom, Werner, & Saks, 1978; Pennington & Hastie, 1986; Pennington & Hastie, 1981). Jurors then compared this weighted average to a threshold of reasonable doubt, culminating in their final judgment regarding the defendant's guilt or innocence (Holstein, 1985; Ostrom, Werner, & Saks, 1978; Pennington & Hastie, 1981).

As with information integration models, Bayesian models assumed that jurors hold prior opinions about the culpability of defendants (Pennington & Hastie, 1981; Schum, 1975; Schum & DuCharme, 1971). With the presentation of each new piece of

evidence, jurors continued to reevaluate their initial opinion and revised their judgment for or against the guilt of the defendant (Pennington & Hastie, 1981). At the trial's conclusion, jurors arrived at a subjective estimate of guilt and compared this estimate to their threshold for beyond a reasonable doubt in order to arrive at a final verdict (Pennington & Hastie, 1986).

The sequential weighting model, which shared a close resemblance to the information integration model, represented another traditional model of juror decision making (Pennington & Hastie, 1981). Within this model, jurors changed their opinions repeatedly over the course of the trial in response to particular communications and presentations of new evidence (Pennington & Hastie, 1981). Jurors engaged in sequential judgment tasks in which each opinion they arrived at was transformed by both the current evidence and their previous judgment. Thus, jurors continued the process of making successive judgments after each new communication or piece of evidence was presented until a final verdict was reached (Lemieux, 2008; Pennington & Hastie, 1981).

Stochastic models like the Poisson model have also been tested and applied to jury decision making. Applying the Poisson model to jury decision making, jurors first studied the evidence for and against the defendant and then combined this evidence together to determine a weighted estimate of the defendant's culpability or lack thereof (Pennington & Hastie, 1981; Thomas & Hogue, 1976). Each juror had a decision criterion that she or he used to divide the apparent weight of the evidence into guilty and not guilty decision categories. Jurors continued to weigh the evidence until there was a

critical event, at which time the weighted evidence was compared to their decision criterion and a decision was made (Pennington & Hastie, 1986). In accordance with this model, jurors arrived at a guilty verdict when the apparent weight of the evidence was greater than their decision criterion. Similarly, jurors rendered a not guilty verdict when the apparent weight of the evidence was less than their decision criterion (Pennington & Hastie, 1981; Thomas & Hogue, 1976).

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While traditional decision models have served to improve researchers' command of the process jurors undergo when making judicial decisions, these models have fallen short in addressing important elements related to realistic and complex legal decision tasks that often arise in deciding criminal cases (Lemieux, 2008; Pennington & Hastie, 1986). To further illustrate this point, researchers Pennington and Hastie (1986) found that jurors did not show a pattern of continuously updating their decisions across evidence presentation, that interdependencies among items of evidence commonly occurred, and that jurors frequently made inferences about omitted or unstated trial information. These authors also pointed out that when jurors experienced uncertainty, their reasoning in judgment and decision making was incompatible with conventional probability theory (Pennington & Hastie, 1986). Further, these researchers reported that, during the final stages of their decision processes, jurors' considered multi-attribute decision categories rather than a single dimension of culpability (Pennington & Hastie, 1986). In response to the pragmatic limitations inherent in traditional decision making models, researchers Pennington and Hastie (1986) have sought and developed an

alternative model to better explain juror decision making processes. In general, researchers seem to have come to a consensus that the Story Model was the preferred model for understanding judicial decision making (Devine et al., 2001; Hastie, 1993; Hastie, Penrod, & Pennington, 1983).

### **The Story Model**

The Story Model represented an explanation-based theory of judicial decision making. This model was predicated on the proposition that jurors construct a narrative story structure based on the information presented at trial, while focusing predominantly on causal and intentional relations between events (Pennington & Hastie, 1992, 1988, 1986, 1981). Jurors combined information and evidence presented at trial with their own personal worldviews to create one or multiple stories to explain evidence introduced at trial (Pennington & Hastie, 1988). Pennington and Hastie (1986) suggested that organizing trial information in this way allowed jurors to better understand the evidence and come to an initial verdict before deliberating with fellow jurors. The Story Model consisted of three components, including story construction, verdict category establishment, and story classification. An overview of each component follows.

#### **Story Construction**

During this initial stage, jurors used an active, constructive comprehension process to organize the information presented at trial into one or more plausible stories (Pennington & Hastie, 1992). Stories were constructed from trial information and events in an effort to understand what really happened in the case (Pennington & Hastie, 1992,

1986). This process was particularly salient since legal trials typically involved sizeable amounts of evidence presented in a disjointed manner over several days or weeks, leaving jurors to sort through diverse and often incomplete data, connect pieces of evidence, and reconstruct the chronology of events. Pennington and Hastie (1992) also pointed out that some parts of evidence items are interconnected and therefore should not be evaluated individually, as the meaning of one part (e.g., individual statements) may be influenced by the meaning of the remaining parts (e.g., other related statements).

According to the Story Model, jurors attempted to make sense of the evidence presented during the trial by integrating this information into logical mental representations or stories (Pennington & Hastie, 1992). Jurors structured stories about the trial using three types of knowledge: knowledge about case specific trial evidence, world knowledge about events similar to the trial issue, and general knowledge about complete story structures (Pennington & Hastie, 1992). Human action sequences that focus on the relationship between physical causality and intentional causality of events were pivotal to these stories. Stories were also organized into interrelated units called episodes, with each episode containing initiating events, goals, actions, and states that were configured based on causality (Pennington & Hastie, 1992, 1988).

Story structure was vital to juror comprehension of the evidence and to making legal decisions. Jurors constructed stories that included events and causal relationships that were derived from the trial evidence presented, suggestions from the attorneys, and the jurors' own inferences about the case (Pennington & Hastie, 1992). These inferences

helped jurors fill in gaps within the story structure. Therefore, jurors' knowledge and expectations about what information was required to create a story cued them when pieces of the story were missing, at which point they made their own inferences. Additionally, looking at the hierarchy of the story helped jurors pinpoint the most salient story events. Finally, jurors used their knowledge of story structures to arrive at an opinion regarding the thoroughness of the evidence and to determine if the story was complete (Pennington & Hastie, 1992).

Jurors may have created one or more stories to explain events, but generally they would have perceived one story as more reasonable than the others (Pennington & Hastie, 1992). Jurors evaluated stories based on both levels of acceptability and confidence. The acceptability of a story was determined by two principles: (1) coverage, the degree to which the story took into account the evidence presented at trial, and (2) coherence, the degree of consistency, completeness, and plausibility of the story (Pennington & Hastie, 1992). The coverage of a story was positively related to the story's acceptability and confidence. If the story was perceived as having a high degree of coverage, jurors would accept it more readily as an explanation of the evidence and have more confidence in the story, should it be accepted (Pennington & Hastie, 1992).

### **Verdict Category Establishment**

The second stage of the Story Model, verdict category establishment, involved jurors learning and gaining an understanding of the verdict categories for the case. Jurors received most of this information following the conclusion of the trial when the judge

instructed the jurors on the law. Many jurors also had preconceived notions about the decision categories (i.e., what constitutes first degree murder, second degree murder, etc.) that contribute to their conception of the verdict categories. With respect to criminal trials, jurors' primary task at this stage was to define each verdict alternative as a discrete category (i.e., verdict A, verdict B, verdict C) and the essential features of each category (i.e., identity, mental state, actions, and circumstances), in addition to a decision rule indicating their appropriate combination (Pennington & Hastie, 1992, 1986).

### **Story Classification**

Story classification represented the final stage of jurors' decision making processes within the Story Model. In this phase, jurors made judgments by engaging in a classification process that assisted them in best matching the features of the accepted story to verdict category features (Pennington & Hastie, 1992, 1986). Thus, jurors tried to cogently connect episode schemas related to the case (i.e., initiating events, goals, actions, and accompanying states) with the crime elements (i.e., actions, mental state, circumstances, and identity) of the case. During story classification, jurors were also directed to apply the procedural instructions given by the judge regarding the presumption of innocence and the standard of proof (Pennington & Hastie, 1992, 1986). Therefore, if the events in the accepted story satisfied, beyond a reasonable doubt, the verdict attributes for a given verdict category, jurors were instructed to render a guilty verdict. If the standard of proof was not met for these criteria, the defendant was presumed innocent and the jurors were required to return a default verdict of not guilty.

(Pennington & Hastie, 1992, 1986). According to the Story Model, jurors made their final verdict decision based on consensus between the accepted story and the verdict category.

### **Influences on Juror Decision Making**

Over the last three decades, social scientists have attempted to identify whether social, economic, and psychological variables influence juror decision making and jury verdicts. Demographic factors, attitudes/values, and personality characteristics of jurors represent important constructs that have been studied with respect to juror decisions. Despite the social scientific interest in the relationship between juror characteristics and juror verdict preferences, researchers have now concluded that few characteristics of jurors have good predictive validity of juror verdict choice (Bonazzoli, 1998; Saks, 1997).

#### **Demographic Factors**

Juror demographic characteristics, such as socio-economic status (SES), race, gender, and education, have received considerable attention in the psycholegal literature (Devine et al., 2001; King, 1999). However, these demographic factors have been weakly linked to juror behavior and verdicts (Bonazzoli, 1998; Diamond, 1990; King, 1999). One important phenomenon with respect to jury demographic characteristics, jury-defendant similarity bias, has been consistently demonstrated across numerous studies and contexts (Devine et al., 2001). This bias occurred when juror demographic factors interacting with characteristics of the defendant led jurors to view defendants who

were similar to them more favorably (Bonazzoli, 1998; Chadee, 1996; King, 1999; McGowen & King, 1982). Thus, demographically similar juries were generally more lenient when presented with weak or inconclusive evidence against a defendant and tended to be more unforgiving when the evidence strongly pointed to a defendant's guilt (Devine et al., 2001).

### **Attitudes, Values, and Personality**

In addition to juror demographic factors, the relationship between juror attitudes and values and juror voting behavior has been explored. Researchers have investigated juror attitudes, some of which included views on capital punishment, childhood sexual abuse, rape, women, and the judicial process. However, the majority of previous studies conducted have simply examined the relationship between juror attitudes and juror verdict choices rather than looking at the process by which juror attitudes influenced jury verdicts (Devine et al., 2001). Research focusing on juror values, such as levels of moral reasoning, have also been investigated (Devine et al.). In general, research was lacking on juror attitudes and values to make any clear-cut inferences about these variables, with the exception of attitudes jurors hold toward capital punishment (Devine et al.). Specifically, research regarding death-penalty attitudes and verdict preferences showed that death-qualified jurors (jurors who served on juries in capital cases who were willing to impose the death penalty) tended to vote for conviction more often than excludable jurors (jurors who were excluded from serving on capital juries due to their unwillingness to impose the death penalty) (Allen, Mabry, & McKelton, 1998; Butler & Moran, 2002;

Cowan, Thompson, & Ellsworth, 1984; Ellsworth & Mauro, 1998; Filkins, Smith, & Tindale, 1998; Horowitz & Seguin, 1986). However, specific juror demographic and attitudinal variables had the potential to influence juror decision making and impact juror verdicts (Bonazzoli, 1998; Hans & Vidmar, 2004; Jones, 1997; Lemieux, 2008; Pfeifer & Ogloff, 1991).

In the quest to determine what factors influenced juror decision making, social scientists have focused their attention heavily on juror personality characteristics. Contrary to other dispositional variables, findings from numerous studies on the impact of juror personality variables on juror decisions have consistently demonstrated that personality affects decision making (Bonazzoli, 1998; Nadeau, 2006; Narby, Cutler, and Moran, 1993). A majority of the studies conducted on personality traits and juror decision making have concentrated on authoritarianism or its related trait dogmatism (Devine et al., 2001). In particular, the personality construct of authoritarianism has received considerable attention in the literature and has been considered by many social scientists to be a reliable predictor of juror decisions (Bonazzoli, 1998; Couch & Sundre, 2001; Narby, Cutler & Moran, 1993; Nadeau, 2006; Shaffer & Wheatman, 2000; Wasieleski, 1996). Previous research has also shown a positive association between levels of authoritarianism/dogmatism and both individual juror verdicts and jury decisions (Devine et al., 2001). Since this particular aspect of personality has demonstrated influence on legal decisions, the personality variable of authoritarianism was reviewed in more detail.

Highly authoritarian individuals were characterized by their unwavering loyalty to conventional values, willful submission to perceived authorities, and a general tendency to pass judgment, reject, and impose punishment on individuals who violate traditional societal norms (Altemeyer, 1996). Previous research on the authoritarian personality has shown that highly authoritarian individuals tend to impose more severe sentences, favor capital punishment, and vary in their evaluation and recall of the evidence (Altemeyer, 1981; Garcia & Griffitt, 1978; McGowen & King, 1982). Additional studies have reported that highly authoritarian individuals were more punitive toward dissimilar defendants and those of low socioeconomic status (Altemeyer, 1981; Berg & Vidmar, 1975; Mitchell & Byrne, 1973). Such findings suggested that authoritarian attitudes fundamentally contain a bias toward defendants that naturally worked against the fairness and impartiality that was required to arrive at a just verdict. This bias may have unduly influenced the process by which jurors reached a verdict and could also have affected the dynamics of the jury as a group. Based on these findings, the personality variable of authoritarianism was considered an important criterion in juror decision making and jury selection procedures (Couch & Sundre, 2001; Nadeau, 2006).

Given that previous findings point to authoritarianism as a face-valid predictor of judicial outcomes, much of the psycho-legal research has focused on this personality construct and its influence on juror decision making (Bonazzoli, 1998; Shaffer & Wheatman, 2000). A great deal of research has accumulated over the last 40 years with regard to the authoritarianism-verdict relation of jurors in criminal trials. Most studies

detected positive correlations between authoritarianism and guilty/conviction juror verdicts. Narby et al. (1993) conducted a meta-analysis of 20 studies exploring the relationship between authoritarianism and verdict. Most of the experiments utilized student populations (15 studies), while the remaining studies used non-student registered voters, jury-eligible adults, and non-student/non-voter adults. This analysis confirmed that authoritarian attitudes correlated significantly with the inclination to convict. Specifically, jurors high in authoritarianism were more prone to rendering a guilty verdict than low-authoritarian jurors.

### **Jury Deliberations**

Compelling findings from the voluminous body of research on deliberating juries indicated that the initial verdict recommended by the majority of jurors prior to deliberation was selected post-deliberation as their final verdict about 90% of the time (Devine et al., 2001; Kalven & Zeisel, 1966; MacCoun & Kerr, 1988; Sandys & Dillehay, 1995). Despite this statistic, the process of jurors deliberating a case did influence juror decision making and verdict preference in some cases (Hans & Vidmar, 2004). Given that a sizeable number of jury trials take place each year in the United States, a considerable number of these cases were decided based on the deliberation process of juries (Devine et al., 2001).

It is believed by many social scientists that jury deliberations have been a fundamental aspect of jury decision making and; therefore, an important component of any investigation of the juror decision making process (Bray & Kerr, 1979; Devine et al.,

2001; Diamond, 1997; Severance, Greene, & Loftus, 1984; Shaffer & Wheatman, 2000).

In their review of numerous studies, Shaffer and Wheatman (2000) found that jurors who were not required to deliberate with other jury members may have felt less accountable for decisions rendered and; therefore, less responsive to legal instructions and/or less likely to disregard inadmissible information when rendering their verdicts. This finding suggested that non-deliberating jurors (research jurors who were not required to deliberate with other jurors before rendering a verdict) may have been less impartial when considering the evidence and determining the defendant's guilt or innocence. These data also spoke to the importance of examining pre- and post-deliberation verdicts of research jurors (Nadeau, 2006).

Conversely, deliberating jurors were more accountable for their decisions and were often required to justify their position to the other jury members. In a study by Lieberman and Sales (1997), deliberating jurors were more likely to comply with jury instructions than those jurors who rendered individual verdicts. Research by McCoy, Nunez, and Dammeyer (1999) found that deliberating jurors were better able to systematically match the evidence to alternative verdict options than jurors who did not participate in jury deliberations. Other findings from research conducted by Lamberth, Krieger, and Shay (1982) revealed that authoritarian jurors were more likely to change their verdicts after jury deliberations. These authors suggested that these results lend support for the theory that authoritarian jurors who were required to deliberate with fellow jurors before rendering their final verdicts felt a greater need to be identified with

the group and conformed accordingly during deliberations when compared to lower authoritarian jurors. As people high in authoritarianism were more likely to change their verdict during deliberations, these jurors were critical to the group decision making process (Lamberth et al., 1982; Nadeau, 2006). Without the moderating effect of jury deliberations, the individual verdicts of highly authoritarian jurors would likely be more punitive in nature as compared to lower authoritarian individuals (Kramer, Kerr, & Carroll, 1990; McGowen & King, 1982). These findings attested to the importance of jury deliberations and their influence on individual juror decision making and final verdicts (Nadeau, 2006).

Deliberating jurors faced challenges with respect to both complex cognitive tasks and social demands that were inherent in working toward a unanimous verdict (Holstein, 1985). One task jurors were expected to carry out involved interpreting trial evidence and testimony and presenting these interpretations to fellow jury members during deliberations. Empirical research on the dynamics of jury deliberation has indicated that the number of interpretations offered among jury members has influenced the group deliberation process. More specifically, as the number of interpretations of the evidence increased, so did the complexity of the decision making task, the time for deliberations, and the difficulty of arriving at a consensus (Holstein). Additionally, the number and persuasiveness of arguments offered during jury deliberations promoted a more accurate and complete recollection of the evidence by the jury (Hans & Vidmar, 1986; MacCoun, 1989).

In general, the literature on jury deliberations showed that juries were reasonably efficient at bringing to light and critically examining the facts of the case as well as identifying and correcting their own mistakes and biases during deliberations (Ellsworth, 1989; Hans & Vidmar, 1986; Hastie, Penrod, & Pennington, 1983; Holstein, 1985). However, juries have proven to be less adept at comprehending instructions from the judge and interpreting the law (Devine et al., 2001; Lieberman & Sales, 1997; Saks, 1997). Deliberating jurors may also be influenced by the jury's deliberation style (an evidence-driven style was preferred over a verdict-driven style) and by the opinion polling sequence used in the jury room (Davis, Kameda, Parks, Stasson, & Zimmerman, 1989; Davis, Stasson, Ono, & Zimmerman, 1988; Hastie et al., 1983; Kameda, 1991; Sandys & Dillehay, 1995). Juries that employed an evidence-driven deliberation style reviewed all of the trial evidence before polling the jury; whereas, juries that used a verdict-driven deliberation style took an initial poll of the jury to determine the direction of further deliberations (Hastie et al.). Since jurors often misinterpreted the judges' instructions, the jury deliberation process might have served to positively influence jury outcomes by increasing the accuracy of jurors' understanding of the instructions and their interpretation of the law (Devine et al.).

### **Scientific Evidence and Jurors**

Scientific or forensic evidence refers to evidence presented at trial that is produced from the application of complex, scientific procedures (Devine et al., 2001; Garner, 2004). Forensic evidence, now commonplace in American criminal courtrooms,

is regarded as an important element of legal proceedings. This evidence is derived from fingerprints, handwriting, hair and fibers, bite and tool marks, ballistics, voice exemplars, fires, arson, firearms, explosions, blood, poisoning, drugs, gun powder residue, and bodily fluids that are identified and collected at a crime scene (Alldridge, 1994; Devine et al.; Murphy, 2007). Forensic evidence is systematically preserved and submitted to a crime lab for analysis and testing by forensic science technicians (Devine et al.; Roberts, 1994). Forensic science technicians later present forensic evidence in court and provide expert testimony to describe their procedures and findings (Devine et al.).

In recent years, revolutionary technological and scientific advances have transformed the United States justice system. Advancements in traditional forensic techniques have led to their frequent use in court by legal counsel. First-generation techniques such as hair and fiber analysis, handwriting analysis, and fingerprint analysis have been technologically straightforward and easily understood by laypersons (Murphy, 2007; Thompson, 1989). New (second-generation) forensic procedures, such as DNA typing, data mining, biometric scanning, and electronic location tracking, have also been utilized in today's trials (Murphy, 2007; Thompson, 1989). These more scientifically robust forensic methodologies have been unfamiliar to most laypersons and have required highly specialized knowledge and expertise (Murphy, 2007).

Increased use of forensic evidence in the courtroom has proven both beneficial and challenging to legal decision makers. Jurors deciding criminal cases that included forensic evidence may have encountered more powerful evidence that both increased

their decision making accuracy and reduced their uncertainty. Increasingly technical and statistical methods have now been utilized to analyze forensic evidence (National Research Council, 1996). Consequently, jurors might have faced challenges in understanding terminology and properly evaluating complex scientific evidence that might include concepts of molecular biology, genetics, statistics, and probabilistic calculations (National Research Council, 1996; Smith et al., 1996; The Harvard Law Review Association, 1995).

The manner in which forensic evidence has been discussed and presented in legal contexts has often been critical to an accurate understanding and application of these data by fact finders. For example, Thompson (1989) pointed out that forensic test results may only be significant when presented together with supporting statistical data. Accordingly, numerous studies have explored jurors' abilities to understand statistical information pertaining to scientific evidence (Britton, 1998; Cosmides & Tooby, 1996; Koehler, 1996; Rowe, 1997; Schklar & Diamond, 1999; Taroni & Aitken, 1998). Additional research has focused on how jurors weigh scientific evidence in their decision making processes. The weight jurors have attached to scientific evidence may also vary according to the particular test utilized to yield the evidence, such as handwriting analysis versus Deoxyribonucleic Acid (DNA) typing, as well as depending on whether the statistics were presented separately or combined (Smith, Penrod, Otto, & Park, 1996). Compelling data from numerous studies on juror decision making and scientific evidence indicated that jurors have a tendency to significantly undervalue statistical information

associated with forensic evidence (Kaye & Koehler, 1991; Schklar & Diamond, 1999; Smith et al., 1996).

Research studies have also been conducted to determine the most efficacious means of conveying the probative value of statistical evidence to jurors. According to Koehler (1996), statistical information presented in different, but mathematically equivalent, formats has led jurors to make different inferences about the data. Research on individuals' abilities to reason with probabilities has indicated that jurors are confused by and struggle to comprehend and utilize likelihood ratios (Gigerenzer & Hoffrage, 1995; Koehler, 1996). For instance, Koehler (1996) found that jurors presented with likelihood ratios in a mock rape trial were more likely to believe that the defendant was the source of the biological material recovered from the victim and more likely to render a guilty verdict as opposed to jurors who received frequency ratios. Similarly, other researchers found that when statistical information was presented in a probabilities format, jurors had difficulty using the evidence appropriately, which led to errors in judgment (Thompson & Schumann, 1987). Gigerenzer and Hoffrage (1995) found that statistical information presented in a frequency format was computationally easier for individuals to understand than in other formats, as this format corresponded to a person's natural cognitive algorithms. Consequently, individuals could process frequencies more readily than probabilities or percentages. In general, findings from several studies indicated that presenting statistical information as a frequency ratio (i.e., 1 in 1,000) rather than a probability (i.e., 0.1%) or likelihood ratio (14,000:1) increased jurors'

understanding and accuracy in decision making (Cosmides & Tooby, 1996; Gigerenzer & Hoffrage, 1995; Thompson & Schumann, 1987).

Another important variable related to scientific evidence and juror decision making included the strength of the evidence in a case. The term strength of the evidence (SOE) referred to both the magnitude and quality of the evidence presented at trial (Devine et al., 2001). A review of the psychological literature on the impact of the strength of the evidence on jury decision making indicated that, in most cases, SOE was strongly related to guilty verdicts (Diamond, Saks, & Landsman, 1998; Hazelwood & Brigham, 1998; Horowitz & Kirkpatrick, 1996; Kerr, Niedermeier, & Kaplan, 1999; Saks, 1997). However, this review did not examine the effects of the strength of the evidence on legal decision making in further depth, as this variable was beyond the scope of this study. Since an accurate understanding of statistical information was required for jurors to appropriately weigh scientific trial evidence, a more detailed review of the literature on statistical information associated with scientific evidence and judicial decision making has been presented below.

### **Jurors and Statistical Information related to Scientific Evidence**

Smith, Penrod, Otto, and Park (1996) conducted a study that explored mock jurors' use of probabilistic scientific evidence. Participants included 189 men and women ( $M$  age = 25 years) from the University of Minnesota community. Participants were randomly assigned to one of 16 conditions and asked to view a videotaped simulated rape trial that was manipulated with respect to the strength of non-statistical

evidence, quantification of non-statistical evidence, strength of statistical evidence, combination of two pieces of statistical evidence, instruction in use of Bayes' Theorem, and presentation of fallacies concerning use of statistical evidence. Mock jurors were asked to answer questions pertaining to the defendant's guilt following testimony by each of the four witnesses (victim, neighbor, expert, and defendant) and at the conclusion of the trial. Jurors were also instructed to rate each witness following the witnesses' testimony and render a final verdict.

Smith, Penrod, Otto, and Park's (1996) findings demonstrated that, in most cases, jurors had a tendency to slightly underuse probabilistic evidence as compared to Bayesian calculations. This finding was consistent with other research on jurors and statistical evidence (Kaye & Koehler, 1991; Schklar & Diamond; 1999). Even when presented with examples of how to apply Bayes' Theorem, jurors were still inclined to undervalue the statistical evidence in the case. An unexpected finding from the Smith et al. study was that, in some instances, jurors overused statistical evidence. However, study results revealed that combining pieces of statistical evidence did not lead jurors to overuse evidence, produce higher guilt judgments, and was not more compelling than separate evidence. Additionally, presenting a Bayesian instruction with the probabilistic evidence did not increase the weight of the evidence.

Despite this tendency, results showed that jurors were sensitive to the strength (or lack thereof) of both statistical and non-statistical evidence. In fact, the strength of non-statistical evidence and probabilistic evidence were the only variables that significantly

influenced juror verdict preferences. Thus, when the strength of the statistical evidence was relatively strong, jurors were more likely to find the defendant guilty. Similarly, when the quantification of non-statistical evidence was high, jurors were more likely to vote for guilt (Smith et al., 1996).

This research also explored some possible misapplications of probabilistic evidence. The authors predicted that the prosecutor and defense attorneys' fallacies would affect juror judgments. The prosecutor's fallacy was the mistaken assumption by jurors that population proportions and statistics on the probability of a match between the defendant and perpetrator directly estimated the probability of the defendant's innocence (Thompson, 1989). For example, a juror who was presented with evidence that the defendant and the perpetrator both had a blood type that was found in five percent of the population might jump to the conclusion that there was only a five percent chance that the defendant, if innocent, would have this blood type. Based on this fallacious logic, this same juror might have then erroneously concluded that there was a 95 percent chance that the defendant was guilty (Thompson). Conversely, the defense attorney's fallacy occurred when jurors erroneously presumed that statistical evidence of a match between the defendant and perpetrator with respect to a rare characteristic was immaterial to the likelihood the defendant was guilty (Thompson). Results from this study failed to show support for either hypothesis. Jurors did not accept the prosecutor and defense attorneys' fallacies, nor were they more likely to vote for guilt when exposed to these variables. Smith et al. (1996) concluded that the strength of the probabilistic evidence, presentation

of the defense attorney's fallacy, or providing the Bayesian instruction may have influenced the effectiveness of the prosecutor's fallacy.

In two research studies, Thompson and Schumann (1987) investigated the effects of presentation and instruction of statistical evidence on mock jurors' decision making. The first experiment examined the relationship between the presentation of incidence rate statistics and juror decision making. Participants included 144 university volunteers who were asked to read a written summary of a robbery trial and a summary of testimony by a forensic expert in the case. Participants were randomly assigned to one of two experimental conditions: the expert reported the incidence rate as a conditional probability (i.e., "there is only a two percent chance the defendant's hair would be indistinguishable from that of the perpetrator *if he were innocent*") or as a percentage and number (i.e., "only 2% of people have hair that would be indistinguishable from that of the defendant and...in a city of 1,000,000 people there would be approximately 20,000 such individuals"). Participants were asked to give a final estimate of the probability of the defendant's guilt.

Results from their first study showed that the presentation method of the statistical information influenced jurors' use of fallacious reasoning and guilt judgments (Thompson & Schumann, 1987). When the expert reported the incidence rate statistics as a conditional probability, significantly more jurors fell victim to the prosecutor's fallacy compared to when the incidence rate was presented as a percentage and number. Accordingly, jurors who committed the prosecutor's fallacy were more likely to believe

that there was a 98% chance that the defendant was guilty. Jurors who committed the defense attorney's fallacy were more likely to retain their original estimate of the defendant's guilt. Another significant finding from this study involved jurors' guilt judgments. Jurors' final judgments of guilt were significantly lower than guilt judgments calculated using the Bayesian formula, a finding that was consistent with previous studies of jurors undervaluing statistical evidence as compared to Bayesian calculations (Kaye & Koehler, 1991; Schklar & Diamond, 1999; Smith et al., 1996).

In their second experiment, the authors again sought to learn how jurors assessed and weighed statistical evidence and used this information in legal decision making (Thompson & Schumann, 1987). Participants included 73 undergraduate students who were asked to read a written summary of a murder trial in which the victim was known to have wounded the killer with a knife, but the killer's identity was unknown. All participants were instructed to read two arguments (the prosecutor's fallacy argument and the defense attorney's fallacy argument) regarding the significance of blood type evidence. Participants were randomly assigned to one of two experimental groups manipulated by the presentation order of the arguments: the prosecution-defense condition and the defense-prosecution condition. Participants were then asked to decide whether and how much law enforcement should revise their initial estimate of the suspect's probability of guilt, given the presentation of new evidence.

The arguments significantly affected the participants' judgments of probable guilt (Thompson & Schumann, 1987). Participants who read the prosecutor's fallacy

argument had higher estimates of the suspect's probability of guilt than participants who read the defense attorney's fallacy argument. The presentation order of the two arguments also influenced participants' judgments of probable guilt. Participants who read the prosecutor's fallacy followed by the defense attorney's fallacy had higher estimates of the suspect's probability of guilt than participants who read the defense attorney's fallacy followed by the prosecutor's fallacy. Replicating results from Thompson and Schumann's initial study (1987), participants in experiment two who read the defense attorney's fallacy did not subsequently increase their estimates of the suspect's probability of guilt. Findings from this second study also demonstrated participants' conservative bias regarding revising an initial judgment when presented with new evidence. Specifically, participants tended to undervalue the statistical evidence by underestimating the probability of the subject's guilt when compared to the Bayesian model.

Faigman and Baglioni (1988) conducted an experiment to explore the use of statistical and probabilistic evidence and the Bayesian instruction in juror decision making. Participants included 180 continuing education student volunteers from several community colleges in the Virginia area who were asked to read a written summary of a burglary trial, assume the role of a mock juror, and provide a final verdict in the case. Jurors were randomly assigned to one of three blood type conditions: A, O, or AB. Jurors also answered one of three different sets of probing questions at critical junctures in the trial to measure probability estimates.

As the authors predicted, the results indicated that jurors significantly underused statistical evidence compared to Bayes' Theorem (Faigman & Baglioni, 1988). This finding was also supported by previous research findings on jurors and statistical information related to scientific evidence (Smith et al., 1996). Findings from Faigman and Baglioni's study (1988) also suggested that jurors were not overwhelmed by the expert's Bayesian formulation. Additionally, jurors tended not to place a great deal of weight on the expert's Bayesian interpretation of the evidence. Based on these data, legal practitioners would do well to focus more on effectively communicating the importance of the statistical techniques presented in court rather than assuming that jurors would be overwhelmed by statistical information (Faigman & Baglioni, 1988).

The past three decades have witnessed the proliferation of the number of legal cases involving complex and scientific evidence (The Harvard Law Review Association, 1995). Despite the increased application of forensic evidence in legal settings, little research has been conducted to investigate the impact of different kinds of scientific evidence on juror decision making. The few studies that have been conducted to examine scientific evidence have concentrated on polygraph testing (Devine et al, 2001). Findings from these studies consistently showed that polygraph data had little if any influence on juror decision making and jury verdicts (Carlson, Pasano, & Jannuzzo, 1977; Markwart & Lynch, 1979; Myers & Arbuthnot, 1997; Spanos, Myers, DuBreuil, & Pawlak, 1992-1993). Despite the increased use of scientific evidence in the legal system, research investigating the effects of other types of scientific evidence has also been limited. Little

research has been conducted to investigate the relationship between DNA evidence and juror decision making. A review of the current literature on this area has been presented below.

## **DNA Evidence and Jurors**

DNA, an acronym for deoxyribonucleic acid, is the genetic material present in human cells (and the cells of all living organisms) that represents an individual's unique genetic code (Garner, 2004). DNA is present in biological materials, including an individual's blood, semen, vaginal fluids, hair, saliva, skin cells, brain cells, tissue, organs, muscle, bone, teeth, mucus, perspiration, fingernails, urine, and feces (Garner, 2004). Human beings share much of the same DNA. However, a portion of DNA is unique to each individual (with the exception of identical twins) (National Research Council, 1996; Schklar & Diamond, 1999; Wise, 2004). It is the analysis of these human variations in DNA profiles that has allowed scientists to identify and study with extraordinary precision distinctions between individuals (National Research Council, 1996; Wise, 2004). Through the process of forensic DNA testing, scientists have identified and analyzed biological evidence related to criminal cases (Federal Bureau of Investigation, n.d.).

DNA typing methodologies to analyze forensic biological evidence were first introduced into the United States legal system in 1988 (National Research Council, 1996). DNA evidence has been accepted in every state and federal circuit in America (Giannelli, 1997) as well as used worldwide to resolve identity issues raised in criminal

cases (Budowle, Allard, Wilson, & Chakraborty, 2003). The advent of DNA testing represented a revolutionary improvement to traditionally used techniques for forensic serological analysis of physical evidence from a crime scene. Prior to DNA typing, scientists relied on blood-grouping and serum-protein typing to examine blood group characteristics and proteins in the blood; however, these techniques analyzed gene products rather than DNA (National Research Council, 1996). The more discriminating method of DNA analysis allowed for unprecedented specificity in obtaining genetic information. DNA has endured environmental conditions that other biological materials (i.e., protein sample) cannot withstand. Even severely degraded or extremely small DNA samples have been able to provide copious data (National Research Council, 1996; Thompson & Ford, 1989). This ground-breaking tool of molecular biology has dramatically impacted criminal investigations and the legal system and was arguably the most influential forensic analysis methodology since the development of fingerprint analysis (Giannelli, 1997; Kaye, 1995; Thompson, 1993).

DNA and DNA typing analytical methods were founded on a substantial body of scientific and technological principles that have been universally recognized by the scientific community (McDonald, 1998; National Research Council, 1996; Thompson & Ford, 1989). Despite this impressive foundation, DNA analysis has received its share of criticisms. For a number of years after its introduction, the admissibility of DNA test results sparked a firestorm of controversy within the forensic science and legal communities. The debates surrounded statistical and population genetics issues as they

apply to DNA evidence. Specifically, arguments focused on the forensic methods used to calculate the statistical probability of a coincidental DNA match, uncertainty about the availability of population data on DNA frequencies for different population groups and subgroups, and laboratory error rates (McDonald, 1998; National Research Council, 1996). These concerns led to serious disagreement among defense counsel, scientists, and scholars regarding the admissibility of DNA evidence. Responding to the controversy, the National Research Council released a report in an effort to address the outstanding issues related to the scientific validity of DNA evidence (National Research Council, 1996). The findings from the 1996 National Research Council report indicated that “the technology for DNA profiling and the methods for estimating frequencies and related statistics have progressed to the point where the reliability and validity of properly collected and analyzed DNA data should not be in doubt” (p. 2). Concerns regarding DNA evidence have now shifted to nonstandard forensic crime laboratory procedures and potential laboratory errors and effective ways to present scientific evidence to jury members (McDonald, 1998; Murphy, 2007; Thompson, 1993).

DNA testing could determine with great discrimination whether a particular individual could have been the source of biological material (i.e., blood, semen, tissue, etc.) by identifying distinctive patterns in genetic material (Thompson & Ford, 1989). The probability that identical DNA profiles existed between two unrelated people has been almost nonexistent, falling in the millions, billions, or even less (Goodman, 1992; Koehler, Chia, & Lindsay, 1995). As the probability of a random match decreased in

size, the likelihood that the DNA samples came from the same individual increased (National Research Council, 1996). Therefore, in a murder case, a small probability (i.e., 1 in a billion) resulting from a comparison of the defendant's DNA (i.e., blood) to an evidence blood sample has pointed to the suspect as the contributor of the DNA.

DNA typing has been regarded as a crucial part of criminal investigation, identification, and legal trials (National Research Council, 1996; Peterson, Ryan, Houlden, & Mihajlovic, 1987). The successful convictions and exonerations of individuals repeatedly have attested to the substantial influence of forensic DNA analysis on the American justice system (Cassidy & Gonzales, 2005; Cooley, 2007). DNA testing has assisted those falsely accused to resolve questions of guilt and be excluded as suspects. DNA analysis has also been instrumental in exculpating wrongly convicted individuals and facilitating their release from prison, many of whom have been incarcerated for years (Carroll, 2007; Cooley, 2007; Scheck, Neufeld, & Dwyer, 2000). Conversely, DNA evidence has represented an inextricable link between a perpetrator and a crime. Ideally, DNA testing has contributed toward exonerating the innocent and convicting the guilty, with the goal of ensuring both justice and accountability in our legal system.

In recent years, a proliferation of popular crime shows like *CSI: Crime Scene Investigation*, *Law and Order*, and other investigative genre programming that involve forensic evidence, including DNA evidence, have exploded into the mass media and been embraced by the public at large (Murphy, 2007). At the same time, forensic science has

infiltrated news and other media outlets, schools, and institutions of higher learning. Media reports of people being exonerated and released due to DNA testing have been more common than ever before. Information on forensics has also been incorporated into high school science curriculums. In a similar vein, forensic departments have quickly been initiated at colleges and universities in response to intense interest by students (Almirall, 2005; Almirall & Furton, 2003). Thus, the public has become infatuated with forensics.

This public fascination with forensic science has also seeped into the American legal system and led to individuals' enhanced expectations of the presence of forensic crime scene evidence, including DNA evidence, in criminal cases. Many jurors have had unrealistic expectations of DNA evidence and have demanded this type of evidence in every case (Cooley, 2007; Murphy, 2007; Schweitzer & Saks, 2007; Shelton, Kim, & Barak, 2006). This phenomenon, referred to as "the CSI effect," has suggested that "popular media portrayals of forensic scientific evidence lead jurors to unfairly weigh DNA evidence in their decision making" (Lieberman et al., 2008, p. 28). Thus, CSI-watching jurors have the perception that if forensic evidence, particularly DNA evidence, was not presented in the courtroom, then the evidence was not strong and this may have led them to speculate about the adequacy or inadequacy of evidence in the case (Brickell, 2008; Mann, 2005; Shelton, Kim, & Barak, 2006).

The argument that the CSI effect has influenced jurors has affected how legal advocates deal with juries. In a study investigating the impact of crime scene evidence

on juror decision making, Modin (2007) found that the CSI effect was alive and well among research jurors, as evidenced by jurors' numerous references to forensic-oriented television shows and verbalizations of their expectations about these programs. DNA testing has been expensive and is not necessary or pragmatic for every case. Additionally, DNA analysis has been a time-intensive process and many crime laboratories have been inundated with forensic testing requests, resulting in enormous backlogs (Cooley, 2007). With this in mind, legal advocates on both sides have now considered the impact of CSI-educated jurors' increased sophistication and expectations of forensic evidence in court.

Research conducted by Modin (2007) examined the effects of bias related to photographic crime scene evidence on juror decision making and jury verdicts. Specifically, the author examined the impact of color, black and white, or no photographic evidence on jurors' verdict choice, confidence in verdict, perceived impartiality, and emotional reactions. Participants included 52 jury-eligible community members from the Denver, Colorado area. Participants completed a screening questionnaire to collect demographic data, a participant questionnaire to measure jurors' emotional reactions to photographic evidence, and a verdict questionnaire to render their verdict and provide a rating of their confidence in their verdict. Jurors were asked to view a videotaped presentation of trial summary statements and listen to judicial instructions in a criminal murder case. Jurors were randomly assigned to one of three experimental groups manipulated by photograph condition: stimulus materials containing

a color crime scene photograph, a black and white photograph, and no photograph.

The findings suggested that photographic crime scene evidence failed to demonstrate a statistically significant effect on jurors' pre-deliberation verdict confidence ratings or verdict choice. Thus, jurors who viewed crime scene photograph evidence were no more likely to render a guilty verdict than jurors who were not exposed to crime scene photograph evidence. However, results revealed that the effect of photographic crime scene evidence on juror verdict preferences and verdict confidence (with regard to pre-deliberation inclinations of most jurors) may be mediated by the strength of the evidence and jury deliberations. Modin (2007) also found that jurors in this study may have been desensitized to violence and had inflated expectations about forensic evidence (particularly DNA evidence of defendant guilt). Further, the CSI effect may have extended the influence of photographic crime scene evidence on jurors' emotional reactions and beliefs about impartiality.

Consistent with the Story Model, jurors relied on their personal knowledge, worldviews, and biases along with trial information when constructing stories about criminal cases (Pennington & Hastie, 1992). Juror expectations and beliefs about forensic evidence may have also been influenced by the effects of previous exposure to forensic science in the media. The decision making process was further complicated when jurors were presented with complex forensic evidence in a trial. Few studies have investigated jurors' beliefs about DNA evidence and how juror beliefs influenced decision making and jury verdicts. For these reasons, jurors' understanding and beliefs

about DNA evidence presented in the courtroom cannot be overlooked. Thus, a more detailed review of the specific literature on jurors' beliefs about DNA evidence and judicial decision making has been presented below.

### **Jurors' Beliefs about DNA**

Schklar and Diamond (1999) conducted a study to examine jurors' potential reactions to probabilistic DNA evidence. In this study, the authors were interested in learning the degree to which jurors' reactions to DNA evidence were influenced by both systematic errors and lay expectancies about the source of a DNA match report. This experiment involved 219 jury-eligible undergraduate psychology students who participated as decision makers. Participants were randomly assigned to groups of 7-15 people and asked to read a written crime scenario vignette involving a sexual assault. Decision makers in this study also read one of seven versions of a criminalist's expert testimony indicating that the defendant's DNA matched DNA extracted from semen stains on the victim. The expert testimony was manipulated based on the random match probability (RMP), laboratory error rate (LE), or both. Random match probability referred to "the probability of a match being declared due to random chance" (Schklar & Diamond, 1999, p. 160). The laboratory error rate referred to "human error in the DNA laboratory" (Schklar & Diamond, 1999, p. 161). Participants were divided across four experimental conditions, including single estimate (SE), two separate estimates (TSE), two separate estimates plus combination instructions (TSECI), and single combined estimate (SCE).

These study data by Schkler and Diamond (1999) revealed that jurors tended to underweight the probative value of DNA evidence in their decision making, which supported previous research findings (Kaye & Koehler, 1991; Smith et al., 1996). For instance, when jurors were required to aggregate separately presented probability estimates, they tended to underweight probabilistic evidence due to misaggregation. As a result, jurors presented with two separate probability estimates voted for conviction significantly more often than jurors presented with a single estimate. Conversely, decision makers tended to overweight extremely small probabilities due to their misunderstanding of how to combine two separate probability estimates. Jurors made this error even when instructions for combining probabilities were provided. Thus, jurors voted to convict significantly more often when presented with an extremely small probability estimate as compared to when provided with only a larger normatively combined probability estimate.

Further analysis by Schkler and Diamond (1999) revealed that jurors who were presented with very small RMP (i.e., one in a billion) and larger LE estimates (i.e., two in 100) were less likely to vote for conviction than decision makers who were given very small LE estimates and larger RMP estimates. Thus, jurors viewed test results that demonstrated a lower probability of a DNA match due to random chance and a lower probability of human error in the lab more favorable than test results that indicated a higher probability of a DNA match due to random chance and a higher probability of human error. Additionally, jurors' expectations about missing lab error rates and random

match probabilities information influenced their use of DNA evidence. For example, jurors voted to convict significantly more often when they were presented with extremely small LE estimates and no information about RMP as compared to when they were given extremely small RMP estimates and no LE data.

In another study by Golding, Stewart, Yozwiak, Djadali, and Sanchez (2000), researchers conducted two experiments that focused on the impact of DNA evidence in a child sexual assault case. In particular, the authors studied mock jurors' use of DNA evidence and the testimony of an alleged child sexual assault victim in relation to their decision making and verdict preference. In the first experiment, participants included 128 jury-eligible, introductory psychology university students. Participants were asked to read one of three versions of a trial summary of a child sexual assault case in which the trial evidence was manipulated (DNA evidence only, the alleged child victim's testimony only, DNA evidence and the alleged child victim's testimony, and DNA evidence and a recommendation from the court-appointed psychologist that the alleged victim not testify). Participants were then asked to complete a question packet based on the trial summary, which included their rating of the defendant's guilt and their verdict choice.

Results from Golding et al.'s study (2000) indicated that when both DNA evidence and the alleged victim's testimony were presented at trial, more jurors voted for guilt and believed the testimony of the alleged victim than when only the testimony of the alleged victim was presented. Conversely, jurors found the DNA evidence only condition more compelling than the child testimony only condition. In fact, jurors were

not more likely to vote for conviction or believe the alleged victim when the child's testimony was included with the presentation of DNA evidence than when DNA evidence was presented alone. Therefore, jurors used the DNA evidence to make their verdict choice.

In a second experiment by Golding et al. (2000), the researchers sought to identify specific contexts that could challenge the impact of DNA evidence. Participants included 94 jury-eligible, introductory psychology students who were asked to read one of three versions of the same trial summary of a child sexual assault case that was used in the first experiment. However, in these versions, when DNA evidence was presented, it was countered by alibi witness testimony that accounted for the defendant's whereabouts at the time of the alleged assault. Participants were then asked to complete a question packet based on the trial summary similar to the materials used in the initial experiment.

As the researchers (Golding et al., 2000) suspected, the data demonstrated that jurors did not view DNA evidence as incontrovertible in some child sexual assault cases. Results showed that when alibi witness testimony was presented to offset DNA evidence, jurors were less likely to vote for guilt and believed the alleged victim as compared to when no alibi witness testimony was presented. However, the inclusion of alibi witness testimony still led to more guilty verdicts and higher victim believability than when only the alleged victim testified. Based on these findings, the authors concluded that jurors' confidence in DNA evidence could be challenged in some instances, in this case with the presentation of alibi evidence.

Koehler (2001) conducted three experiments to explore the relationship between the statistical presentation of DNA evidence and the persuasiveness of the evidence. Participants for the first experiment included 72 jury-eligible, introductory business students from a large public university in the southwest. Participants were randomly assigned to one of two conditions in which the presentation of statistical DNA evidence was manipulated. In the first presentation, the DNA evidence involved multiple suspects and DNA information was framed as a frequency. In the second presentation of the DNA evidence, there was a single suspect and the DNA evidence was framed as a probability. Participants were asked to read a written stimulus based on the Clinton-Lewinsky scandal and then instructed to estimate the probability of a DNA match (that Clinton was the source of the DNA).

From his first experiment, Koehler (2001) found that a single-target/probability frame presentation of DNA match statistics was more persuasive than the mathematically equivalent, multi-target/frequency frame presentation of DNA statistics. Thus, decision makers were persuaded more when DNA statistics were presented in a way that targeted an individual suspect and framed in terms of probabilities (i.e., .000001) than when multiple suspects were targeted and the statistics were framed as frequencies (i.e., 1 in 1,000,000). This finding suggested that single-target/probability frame decision makers tended to believe more often that Clinton was the DNA source as compared to their multi-target/frequency frame counterparts. This finding was particularly interesting considering previous research, which suggested jurors better understand statistics when

framed as frequency ratios (Cosmides & Tooby, 1996; Gigerenzer & Hoffrage, 1995; Thompson & Schumann, 1987).

In his second experiment, the author (Koehler, 2001) again sought to learn how jurors assessed the value of DNA evidence. Participants included 227 jury-eligible students from a business law class at the same university as in the first study. Participants were randomly assigned to one of six conditions and asked to read a case summary of a mock murder trial that was manipulated with respect to the DNA match statistic (in terms of the target and frame). Participants were asked to estimate the probability that the defendant was the source of the DNA, the probability that the defendant committed the crime, and indicate their verdict preference.

Findings from the first experiment were replicated in experiment two. Results showed that participants in the single-target/probability frame condition tended to believe that the defendant was the source of the DNA evidence and committed the crime more often than those participants in the multi-target/frequency frame or dual condition. Further, participants in the multi-target/frequency frame condition were significantly less likely to render a guilty verdict than participants in all of the other conditions. Again, results from Koehler's (2001) study found that DNA match statistics were more persuasive when presented in terms of a single target, probability frame as opposed to a multiple-target, frequency frame.

Koehler's (2001) third experiment attempted to identify the relationship between persuasiveness and various presentations of small DNA match probabilities. Participants

included 440 jury-eligible business students from the same university as in investigations one and two. Jurors were randomly assigned to one of 12 conditions in which the target (single, multi), frame (probability, frequency), and incidence rate (1/1,000; 1/1,000,000; 1/1,000,000,000) were manipulated. Jurors were asked to read a case summary similar to the trial stimulus used in the second experiment. Jurors were then instructed to estimate the probability that the defendant was the source of the DNA, the probability that the defendant committed the crime, and indicate their verdict preference.

Results from this experiment (Koehler, 2001) indicated that the target and frame effects observed in the author's previous experiments were dependent upon incidence rate levels of DNA match statistics. Specifically, as incidence rate levels decreased, target and frame effects decreased. Therefore, these results found that when jurors were presented with smaller and smaller incidents rates of match probabilities, they were more likely to render a guilty verdict.

Koehler and Macchi (2004) conducted two studies to investigate the influence of statistical presentation of DNA evidence and incidence rates on jurors' ratings of the strength of the evidence and verdict preferences. In particular, the authors predicted that individuals would assign more weight to low-probability events when it was easier for them to think of examples (i.e., exemplars) for the event than when they could not, a model they termed exemplar-cuing theory (Koehler & Macchi, 2004). The first experiment examined the target (single, multiple), form (frequency, probability), and reference-class size (small, large) of DNA match statistics presented in a criminal case in

relation to jurors' ratings of the evidence strength, the probability that the defendant was the source of the DNA evidence, and the defendant's guilt. Participants included 441 undergraduate and graduate introductory psychology students from an Italian university who were asked to read a written summary of a murder trial involving DNA evidence and then serve as mock jurors on the case. Participant-jurors were assigned to one of eight conditions in which the wording of the DNA match statistic and the reference-class size were manipulated. Jurors completed the study in Italian.

Results indicated that the type of target and reference-class size influenced evidence strength, the probability that the defendant was the DNA source, the probability of guilt, and guilty verdicts. Specifically, jurors who had DNA match statistic evidence with multiple targets and a large reference-class tended to be less impressed by the evidence than jurors in other conditions. As predicted, Koehler and Macchi (2004) failed to find a significant interaction between the form of DNA statistics presentation and the reference class size for evidence strength, source, guilt, or verdict. Conversely, the results revealed a slightly significant main effect for the form of DNA statistics presentation on the probability that the defendant was the source of the DNA evidence and the probability that the defendant committed the crime. Other findings revealed that when DNA match statistics were presented in a frequency format, jurors rated the defendant less likely to be the source of the DNA evidence and were less likely to believe in the defendant's guilt than when DNA evidence was described in a probability form.

In their second experiment, Koehler and Macchi (2004) explored the size of incidence rates and jurors' ratings of evidence strength. Participants included 178 students from a large public university in the southwest who were asked to read a written summary of a murder trial involving DNA evidence and then serve as mock jurors on the case. Case materials were comparable to those in the multi-target, frequency condition from the first experiment. However, all materials were in English and two incidence rates were introduced in this experiment.

Results showed a main effect on the number of exemplars on evidence strength, source, guilt, and verdict (Koehler & Macchi, 2004). Thus, as the number of exemplars increased, jurors' views of the statistical evidence, the case against the defendant, and their likelihood of voting for conviction diminished. When the exemplars were represented by fractions (i.e., 0.1-exemplar condition), jurors were more likely to believe that the defendant was the source of the DNA match and more likely to vote for guilt as compared to when the exemplars were presented in the 1-exemplar and 2-exemplar conditions. Further analysis revealed a main effect for incidence rate on the probability that the defendant was the DNA source and also committed the crime. Thus, these results provided support for exemplar-cuing theory.

Nance and Morris (2005) investigated the impact of the presentation of DNA evidence on juror decision making. In particular, this study examined the effect of the format for random match evidence (frequency, likelihood ratio, or chart) and the type of lab error testimony (unquantified, quantified, or aggregated) on jurors' tendency to

convict. This study involved 1,520 jury-eligible citizens who were summoned for jury service in Kane County, Illinois. Participants were randomly assigned to one of 11 experimental groups with two comparison groups (a no forensic evidence condition and a mere match condition). Respondents were asked to read a written trial summary of a hypothetical rape case and then estimate the probability of guilt of the defendant and their willingness to vote for a conviction. The no forensics condition presented jurors with all of the case evidence except testimony regarding a DNA match, while the mere match condition provided testimony indicating that the defendants' DNA profile matched a semen sample obtained from the victim.

The results from this study replicated previous research findings that jurors were inclined to undervalue forensic match evidence (Kaye & Koehler, 1991; Schklar & Diamond, 1999; Smith et al., 1996). However, the results from Nance and Morris' study were remarkably different from most other studies in demonstrating that variations in the method used to present and explain the random match probability (RMP) evidence could decrease the undervaluation (2005). Specifically, the authors found out that when evidence was presented using a likelihood ratio format that included a chart to communicate the RMP, jurors were more likely to vote for conviction. Findings also showed that in cases in which jurors' decision making was affected by the presentation of information about relatively large lab error rates, the result was an increase in jurors' willingness to convict the defendant (Nance & Morris, 2005).

Lemieux (2008) conducted two studies that explored various factors that influence mock juror decision making and verdict choice in criminal cases that included DNA evidence. More specifically, this research focused on jurors' beliefs about DNA evidence, the strength of the evidence (SOE), expert testimony, and the statistical presentation of DNA evidence. The first experiment examined the relationship between jurors' beliefs about DNA evidence and juror decision making in relation to a criminal trial in which the strength of the trial evidence presented was manipulated. Participants included 71 undergraduate university students who were first asked to complete a DNA beliefs questionnaire and then read one of two versions of a transcript of a mock murder trial in which the evidence presented against the defendant was weak or strong. Jurors were then instructed to provide ratings on the SOE against the defendant as well as the strength of the defense and prosecution cases, rate the credibility of the expert witness, rate their confidence in their verdict, and indicate their verdict choice.

Results from this experiment (Lemieux, 2008) showed no interaction between the strength of the evidence and jurors' prior beliefs about DNA. Other findings suggested that SOE significantly influenced jurors' ratings of the strength of DNA against the defendant and the strength of the prosecution case. However, SOE failed to show a significant effect on jurors' ratings of the strength of the defense's case. Findings also revealed that SOE was positively related to jurors' verdict ratings. Thus, when the DNA evidence presented in the case was strong, jurors gave higher ratings of guilt as compared to jurors' ratings of guilt when the DNA evidence was weak.

Lemieux's (2008) second experiment investigated the statistical presentation of DNA evidence in relation to SOE and expert testimony offered to explain the meaning of DNA statistics to jurors. Participants included 228 jury-eligible, first year psychology students from the Ontario, Canada area. Jurors were asked to read one of 12 versions of a transcript of a mock murder trial in which SOE, expert testimony, and statistical presentation of DNA evidence were manipulated. Jurors were again asked to rate specific aspects of the case and provide a verdict choice.

Results from this second study replicated the first study findings in that jurors gave higher guilt ratings when strong rather than weak trial evidence was presented. Additionally, jurors gave higher ratings of guilt and rated expert witnesses more persuasive and their testimony more useful when DNA error rates were presented as frequencies versus probabilities or ratios. Lemieux (2008) also found a significant relationship between statistical presentation of DNA evidence and type of expert testimony. Specifically, when expert witnesses testified that statistical information regarding DNA error rates could be presented in the courtroom using different but equivalent methods, jurors presented with frequency error rates viewed defendants as more guilty than jurors who were given probability or ratio error rates.

In another study by Pozzulo, Lemieux, Wilson, Crescini and Girardi (2009), researchers conducted an experiment to investigate the influence of eyewitness identification decision type and physical evidence on juror decision making. Specifically, researchers examined the effects of identification decision type (positive

identification, foil identification, non-identification) and DNA evidence (general and consistent; general and inconsistent; statistical and consistent; statistical and inconsistent) on jurors' perceptions of evidence reliability, witness credibility, and verdict decisions. Participants included 391 undergraduate students from introductory psychology classes who were asked to read a written summary of a fictitious murder trial that involved a lethal knife attack. Participants were randomly assigned to one of 12 experimental groups. After reading the written trial summary of a hypothetical murder case, respondents were then provided with a questionnaire booklet and asked to answer the questions in the order of appearance. Participants were allowed to refer back to the trial transcripts if needed. Participants were then asked to render their verdict by indicating whether they believed the defendant was guilty or not guilty.

Results revealed no significant interactions between identification decision type and DNA evidence on verdict choice (Pozzulo et al., 2009). Conversely, the results suggested that eyewitness identification decision type impacted on jurors' ratings of the reliability and credibility of eyewitness' accounts of various crime details. More specifically, eyewitnesses who made a positive identification or a non-identification were viewed as significantly more credible when describing the suspect than witnesses who made a foil identification. Furthermore, eyewitnesses who made positive identifications were perceived as the most reliable as compared to eyewitnesses who made non-identifications or foil identifications. The type of identification decision also influenced verdict decisions, as jurors had higher conviction rates when a positive identification or a

non-identification was made by the eyewitness than when the eyewitness made a foil identification.

Other findings from Pozzulo et al's study (2009) revealed that the type of DNA evidence presented influenced ratings of expert witness reliability/credibility. In general, the presentation of inconsistent DNA evidence, especially when presented in a statistical format, led to jurors' yielding lower reliability/credibility ratings of the expert witness as compared to jurors' assessment of expert witness reliability/credibility ratings when presented with consistent DNA evidence. The consistency of DNA evidence was also found to impact on verdict choice, as the presentation of consistent DNA evidence resulted in an increase in the number of guilty verdicts in comparison to when inconsistent DNA evidence was presented at trial.

### **Summary**

The studies described above involved an initial investigation into how jurors' beliefs about scientific evidence, specifically DNA evidence, affected jury decision making. Of particular interest was that only one of the previous experiments (Modin, 2007) included a jury deliberation process, which has been believed to be fundamental to juror decisions and a necessity for research on juries. Consequently, these designs could not compare individual jurors' verdicts with the jury's final judgment. Some of these studies also did not present the statistical DNA evidence in a frequency format, which has been found to be more easily processed and understood by jurors, contributing to their increased understanding of the evidence and precision in decision making. Thus, the

work of previous researchers (Cosmides & Tooby, 1996; Devine et al., 2001; Gigerenzer & Hoffrage, 1995; Kramer, Kerr, & Carroll, 1990; Lemieux, 2008; McGowen & King, 1982; Nadeau, 2006; Thompson & Schumann, 1987) suggested that including jury deliberations and presenting scientific evidence in a frequency format enhanced the study and had positive effects on juror/jury decision making.

Jurors and juries have played a vital role in legal decision making and, on a larger scale, the preservation of a fair and just legal system. For these reasons and others, researchers have attempted to study and understand juror behaviors and decision making processes through the conception of juror decision making models (Devine et al., 2001; Hans & Vidmar, 2004; Hastie, 1993; Hastie, Penrod, & Pennington, 1983; Holstein, 1985; Kerr, 1993; Ostrom, Werner, & Saks, 1978; Pennington & Hastie, 1992; Pennington & Hastie, 1986; Pennington & Hastie, 1981; Schum, 1975; Schum & DuCharme, 1971; Thomas & Hogue, 1976). Influences on juror decision making have also been explored extensively through the study of juror variables, some of which include demographic characteristics, attitudes, and personality characteristics. Much of the research on personality trait variables has focused on authoritarianism. The findings reported in the literature have implications for the importance of authoritarianism as a reliable predictor of juror decision making (Bonazzoli, 1998; Couch & Sundre, 2001; Devine et al., 2001; Nadeau, 2006; Narby, Cutler & Moran, 1993; Shaffer & Wheatman, 2000; Wasieleski, 1996).

Jury deliberations have also been found to be an integral part of jury research and important to the study of juror/jury decision making processes (Bray & Kerr, 1979; Devine et al., 2001; Diamond, 1997; Nadeau, 2006; Severance, Greene, & Loftus, 1984; Shaffer & Wheatman, 2000). Due to substantial scientific and technological advances in recent years, areas of jury research have broadened to focus on the influence of scientific evidence, including DNA evidence, on jurors' beliefs and decision making (Britton, 1998; Cooley, 2007; Cosmides & Tooby, 1996; Diamond, Saks, & Landsman, 1998; Gigerenzer & Hoffrage, 1995; Golding et al., 2000; Hazelwood & Brigham, 1998; Horowitz & Kirkpatrick, 1996; Kaye & Koehler, 1991; Kerr, Niedermeier, & Kaplan, 1999; Koehler, 2001; Koehler, 1996; Lemieux, 2008; Murphy, 2007; Rowe, 1997; Saks, 1997; Schklar & Diamond, 1999; Smith, Penrod, Otto, & Park, 1996; Taroni & Aitken, 1998; Thompson & Schumann, 1987). Although researchers have found a relationship between jurors' beliefs about scientific evidence and juror verdicts in criminal cases, few recent studies were available in this area and even fewer focusing on DNA evidence. Therefore, this relationship deserved further consideration.

It is important to recognize that as society and the field of psychology evolves, these changes have influenced and driven the evolution of the field of counseling psychology (Forrest, 2008). The professional practice of counseling psychology has now expanded into the forensic arena. In recent years, there has been an increased need for mental health professionals in the legal system. The specialty area of forensic psychology has exploded over the past 25 years (Otto & Heilbrun, 2002) and counseling

psychologists have become a natural fit for providing professional psychological expertise within the judicial system.

Within the counseling psychology specialty, the tenets of social justice and multicultural competency have been especially relevant to the various aspects of forensic work. Expanding the role of counseling psychologists has led to the implementation of social justice initiatives that affect societal concerns and values, policies, and practices (Speight & Vera, 2008; Vera & Speight, 2003). By integrating social justice research and practice into forensic work, counseling psychologists have challenged unjust practices against disadvantaged or marginalized groups and applied psychological knowledge toward solving social problems, improving public policy, and enhancing the public's understanding of issues of social inequalities, law, and public policy (Ali, Liu, Mahmood, & Arguello, 2008). Through the integration of science and practice, counseling psychologists have advocated for social justice for all members of society to have equal rights and treatment under the law within the legal system. By conducting new studies to address public policy and legal issues that lack a sufficient research base, counseling psychologists have made important contributions and improvements to the field of counseling psychology, forensic psychology, the judicial system, and the greater society (Prilleltensky, 1997; Vera & Speight, 2003). For these reasons, the current study had particular relevance to the field of counseling psychology.

## **Purpose of the Study**

### **Rationale**

The present experiment extended and replicated previous studies examining juror beliefs and DNA evidence. The purpose of this study was to investigate the ways in which juror beliefs and attitudes about DNA evidence impacted juror decision making and jury verdicts. With respect to jury research, social scientists have utilized four main approaches to study jury decision making processes (Devine et al., 2001). These methods included mock jury trials involving simulated trials, surveys of ex-jurors/post-deliberation interviews with ex-jurors, archival analyses of jury verdicts, and experiments or field studies using real juries (Devine et al.). Of these, mock jury formats have been used most often in jury research. Some advantages of utilizing mock juries in jury research included a greater degree of control over extraneous variables and immediate access to deliberating juries (Devine et al.). A mock jury format allowed for live, interactive deliberations, another key consideration with regard to research on juror decision making.

Research on jury deliberations has consistently shown that the jury deliberation process represents an important element of juror decision making and can impact juror and jury verdicts (Bray & Kerr, 1979; Devine et al., 2001; Diamond, 1997; Severance, Greene, & Loftus, 1984; Shaffer & Wheatman, 2000). With respect to this review, none of the research studies focusing on jurors attitudes about DNA evidence required jurors to deliberate the case before reaching a final verdict. Therefore, to increase realism and

accuracy in juror decisions, the current study included a deliberative phase.

Another important issue related to jury research involved juror beliefs in relation to juror decision making. A majority of the jury research studies conducted have examined juror attitudes and beliefs in relation to individual juror verdict preferences. However, little research has been conducted to explore the influence of juror beliefs on jury verdicts when the group interaction inherent in the deliberation process was included (Devine et. al, 2001). Additionally, the relationship between juror beliefs about DNA evidence and juror/jury decision making has been another area of research that was in need of study. Accordingly, this study aimed to further research in the area of juror beliefs about DNA and juror decision making by utilizing a mock jury trial that included a deliberative phase to examine the impact of juror attitudes and beliefs about DNA evidence on juror and jury pre- and post-deliberation verdicts (Nadeau, 2006).

## **Research Questions and Hypotheses**

Findings from considerable research that has accumulated over the last 40 years with regard to authoritarianism and its influence on judicial outcomes have clearly established a link between the personality construct of authoritarianism and juror decision making (Bonazzoli, 1998; Chapdelaine & Griffin, 1997; Howard & Redfering, 1983; Lamberth, Krieger, & Shay, 1982; McGowen & King, 1982; Moran & Comfort, 1982; Narby, Cutler, & Moran, 1993; Shaffer & Wheatman, 2000). Demographic factors such as race/ethnicity and gender have also been focused on extensively in prior research. However, findings have shown these variables to have a weak and inconsistent

relationship to jury decision making (Bonazzoli, 1998; Devine et al., 2001; King, 1999; Saks, 1997). However, since results remain inconclusive, these variables were retained in the present study. Previous research also suggested that jury deliberations were a vital part of the jury decision making process and could impact the jury's final verdict (Bray & Kerr, 1979; Devine et al., 2001; Diamond, 1997; Lieberman & Sales, 1997; Severance, Greene, & Loftus, 1984; Shaffer & Wheatman, 2000). These findings were particularly true with respect to highly authoritarian jurors, who were more likely to change their verdict if a deliberative phase was included (Lamberth et al., 1982; Nadeau, 2006). Thus, jury deliberations provided a moderating effect on the typically more punitive verdicts by highly authoritarian jurors, impacting the final jury verdict (Kramer, Kerr, & Carroll, 1990; McGowen & King, 1982). Additionally, these findings further highlighted the importance of examining pre-and post-deliberation verdicts of research jurors. Finally, the relationship between jurors' beliefs about DNA evidence and juror decision making has been investigated (Lemieux, 2008), but more research is needed in this area as most studies have not focused on jurors' beliefs about DNA evidence as a primary variable of analysis. These bodies of literature formed the basis for the following research questions and hypotheses.

**Research question one.** The first question was, "Which variables were significant predictors of verdict?" It was hypothesized that beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation verdict.

**Research question two.** The second research question was, “Which variables were significant predictors of change in verdict?” It was hypothesized that beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation change in verdict.

**Research question three.** The third question was, “Which variables were significant predictors of verdict when there was no pre-deliberation verdict obtained?” It was hypothesized that beliefs about DNA evidence, authoritarianism, gender, and race/ethnicity would be significant predictors of post-deliberation verdict when no pre-deliberation verdict was obtained.

## CHAPTER III

### METHOD

#### Participants

First year psychology students ( $N = 96$ ) at a large public university in Texas were solicited to participate in this study. Eligibility criteria included the following: (1) Participants were at least 18 years of age and under 70 years of age, (2) a citizen of the United States, (3) able to communicate in English, and (4) if previously convicted of a felony, they must have had their civil rights restored. These study eligibility requirements met the statutory eligibility criteria that determine whether an individual is qualified to serve as a juror. The sample consisted of mostly educated European American women in their young adult years claiming Christianity as a religious affiliation, while showing more variation in terms of marital status and political persuasions. See Table 1 for more information on participants' demographics.

Table 1

*Demographics of Sample for Study One*

Variable	Gender				<u>Total %</u>
	Female (n = 90)	<u>Freq.</u>	<u>%</u>	Male (n = 1)	
Age Group					
	18-24	75	82.42%	0	0.00%
	25-34	12	13.19%	1	1.10%

Table Continued

Table Continued

Variable	<u>Gender</u>				
	Female (n = 90)	Male		Male (n = 1)	
	Freq.	%	Freq.	%	Total %
<b>Age Group</b>					
35-44	1	1.10%	0	0.00%	1.10%
45-54	2	2.20%	0	0.00%	2.20%
55-64	0	0.00%	0	0.00%	0.00%
65-70	0	0.00%	0	0.00%	0.00%
<b>Race/Ethnicity</b>					
European American	40	43.96%	1	1.10%	45.05%
African American	26	28.57%	0	0.00%	28.57%
Hispanic	15	16.48%	0	0.00%	16.48%
Asian	9	9.89%	0	0.00%	9.89%
Other	0	0.00%	0	0.00%	0.00%
<b>Religion</b>					
Christian	54	59.34%	1	1.10%	60.44%
Catholic	12	13.19%	0	0.00%	13.19%
Non-denominational	13	14.29%	0	0.00%	14.29%
Other	0	0.00%	0	0.00%	0.00%
None	10	10.99%	0	0.00%	10.99%
<b>Political Affiliation</b>					
Democrat	47	51.65%	0	0.00%	51.65%
Republican	26	28.57%	0	0.00%	28.57%
Independent	11	12.09%	1	1.10%	13.19%
Other	6	6.59%	0	0.00%	6.59%
<b>Education</b>					
Some college	84	92.31%	1	1.10%	93.41%
College degree	4	4.40%	0	0.00%	4.40%
Advanced degree	2	2.20%	0	0.00%	2.20%
<b>Relationship Status</b>					
Single	71	78.02%	1	1.10%	79.12%
Married	6	6.59%	0	0.00%	6.59%
Separated	0	0.00%	0	0.00%	0.00%
Divorced	0	0.00%	0	0.00%	0.00%
Widowed	0	0.00%	0	0.00%	0.00%
Co-habiting	13	14.29%	0	0.00%	14.29%

NOTE: N = 91

## **Materials**

### **Juror-Qualifying Survey**

Prospective jurors were asked to complete an online juror-qualifying survey (See Appendix A) by accessing the study website. The survey was developed and used by the experimenter in a previous jury study (Nadeau, 2006) to elicit pertinent demographic and socio-economic information from potential research jurors prior to jury selection. This survey was designed to screen potential jurors and ensure that the chosen participants had the same demographic and socio-economic criteria as jury-eligible adults found in courthouse jury pools.

### **DNA Beliefs Questionnaire**

The DNA Beliefs Questionnaire was developed in a previous study by Lemieux (2008) and modified for the current experiment in an effort to learn more about participants' beliefs regarding Deoxyribonucleic Acid (DNA) evidence. This ten item questionnaire was designed to assess participants' beliefs about both the significance and accuracy of DNA evidence (See Appendix B). The questionnaire also examined participants' opinions about how often errors occur with DNA evidence. The questionnaire included ten questions that tap participants' opinions about DNA evidence presented at trial. The objective of the questionnaire was to uncover participants' beliefs specific to DNA evidence. Each item was scored on a five-point Likert scale to which jurors rated their answers, ranging from not at all important to extremely important. The scores ranged from 10-50. Scores in the high range, falling one standard deviation above

the mean of the distribution of scores, were representative of more positive beliefs about DNA and scores falling in the low range, one standard deviation below the distribution of scores, signified skeptical beliefs about DNA evidence.

The survey items were developed and tested for reliability by the current researcher using established procedures. Results showed that the DNA Beliefs Questionnaire demonstrated adequate reliability (George & Mallery, 2003), exhibiting a Cronbach's alpha of .72.

### **Right-Wing Authoritarianism Scale**

The Right-Wing Authoritarianism (RWA) Scale is a 34-item scale that measured authoritarianism as defined by the categories of authoritarian aggression, authoritarian submission, and conventionality (See Appendix C). Specifically, the scale measured an individual's: (1) tolerance for recognized authority figures who fail to adhere to the established principles of democracy, (2) acceptance of law as the foundation for moral conduct, (3) punitiveness toward individuals who commit legal transgressions, (4) continued adherence to childhood teachings of religion, (5) and partiality to right-wing political groups (Altemeyer, 1981). Each item was scored on a nine-point response scale on which jurors rated themselves, ranging from very strongly disagree to very strongly agree. Scores in the high range, the top quartile of the distribution of scores, were representative of high levels of authoritarianism and scores falling in the low range, the bottom quartile of the distribution of scores, signified low authoritarianism.

The RWA has been demonstrated to be a highly reliable scale. In his study of the psychometric properties of seven authoritarianism scales, Altemeyer (1981) found that the RWA exhibited the highest reliability ( $\alpha = .88$ ) even though it was the shortest scale in the group. The Right-Wing Authoritarianism Scale has also demonstrated an inter-item correlation of .23 (Altemeyer), which was the highest in the same study of authoritarianism scales. In his cross-validation, Altemeyer confirmed the RWA Scale's overall soundness, yielding higher inter-item correlations ( $M = .19$ ,  $\alpha = .85$ ), higher internal consistency and greater factor structure than the other scales (Altemeyer). In his analysis of nearly all measures of authoritarian personality, Christie (1991) found the RWA Scale to have the highest correlation with the criterion variables: authoritarian submission, authoritarian aggression, and conventionalism.

### **Trial Stimulus**

The trial stimulus consisted of a summary of trial proceedings in a fictitious case of a male defendant accused of murdering his male friend. Three written trial summaries were originally developed by Lemieux (2008) for use in a previous study. In the original study, participants read one of three versions of the case summary. To create the written trial summaries, Lemieux modified copies of transcripts previously used in mock jury research (Schuller, 1990; Schuller, 1992; Schuller & Hastings, 1996; Schuller & Yarmey, 2001; Schuller, McKimmie, & Janz, 2004; Schuller, Smith, & Olson, 1994; Schuller, Wells, Rzepa, & Klippenstine, 2004), which produced three experimental versions: “Strong DNA,” “Weak DNA,” or “Ambiguous DNA.” The current study utilized the

“Ambiguous DNA” version of the case (See Appendix D). In an effort to create ambiguity and avoid any preliminary biases by jurors, this variation of the trial included a second expert witness (for the defense) who provided conflicting testimony regarding the probability of a match due to lab error or random match. Further, the defendant was initially hesitant to provide a blood sample, but voluntarily agreed to in the ambiguous trial. All other facts of the case among the three versions were identical. This written case scenario was chosen for this study because it provided an ambiguous presentation of a first degree murder case that involved DNA evidence presented in a frequency format. For this experiment, the trial summary was 11 pages in length and was sent via email to all participants to review before deliberating the case.

The written trial summary was based on copies of trial transcripts used in previous jury research. The crime involved the defendant, Jim Anton, who was charged with one count of Murder in the First Degree. In this trial, the defendant was accused of stabbing his friend, Darren Williams, in the chest with a machete and was pleading not guilty to the charge. The prosecution claimed that Anton became incensed when Williams refused to pay him his winnings (\$1,000) following an evening of playing cards. The prosecution contended that on the night of the murder, Anton and Williams argued over the money, but both men eventually walked away from each other, although Anton was still infuriated. Approximately 30 minutes after the two men departed, the victim, Williams, was discovered dead along the roadside. The prosecution then claimed that Anton, who witnesses testified had a history of verbal and physical violence, was overheard making

death threats to Williams, including stating, “If you don’t pay up, I’m going to kill you.”

An expert witness for the State also testified that DNA from blood samples found on Williams’ body matched the DNA blood samples provided by Anton. The prosecution’s evidence showed that Anton returned in a rage and violently stabbed Williams to death after their argument (Lemieux, 2008).

The defense proceeded with the claim that Anton and Williams were very close friends who, from time to time, got into verbal arguments but immediately forgave each other and moved on. One defense witness testified that, on the night of the murder, she was approached by a strange man and asked if she could spare any change in the same neighborhood where the murder took place. In addition, the defense claimed that the evidence showed that while Williams was over at Anton’s house for card games on the evening in question, Anton had a nosebleed. The defense claimed that even if Williams’ DNA blood samples matched Anton’s DNA, this was not sufficient evidence to conclude that Anton committed the murder. An expert witness for the defense also testified that contamination of the blood samples may have occurred during their analysis, lending uncertainty about the accuracy of the State’s DNA results. The defense also argued that Anton never owned a machete and that the murder weapon in this case was never recovered. The defense acknowledged the tragic nature of this crime, further suggesting that the real person responsible for this murder was free to commit additional crimes. The defense was adamant that the prosecution was unsuccessful in demonstrating that Anton was responsible for Williams’ death (Lemieux, 2008).

## **Procedure**

Potential participants were recruited for this study via a recruitment flyer (Appendix E) that was posted on the university's electronic Blackboard system. Students in freshman-level Introduction to Psychology and Developmental Psychology classes earned research or extra credit for their participation in this study. All prospective participants were invited via the study recruitment flyer to visit the study website and complete the Juror-Qualifying Survey. Interested individuals were recruited to participate as research jurors and deliberate a criminal case via the Internet. Only data from jurors who completed all research study materials were included in the study sample population. Each participant received extra credit or research credit for their participation and was automatically registered for a drawing to win \$50 upon completion of the experimental materials.

Upon accessing the study website, prospective participants were asked to click on a link that directed them to the Informed Consent page (Appendix F) and the Juror-Qualifying Survey (located at PsychData: [www.psychdata.com/survey134754](http://www.psychdata.com/survey134754)). Jurors were asked to enter the survey number and website password to access these documents. The informed consent form asked research jurors for their consent to participate and certified to jurors that their information would remain confidential. Jurors were then directed to complete the Juror-Qualifying Survey. It is important to note that PsychData allowed for automatic separation of identifying and de-identified data. Prospective participants were solicited to participate in this study based on their jury eligibility status,

which was determined from the Juror-Qualifying Survey. In addition to the criteria already mentioned (age, citizenship/residency, English speaking, no felony offenses), selection was determined on a first-come, first-served basis.

From this prospective participant pool, 96 juror-eligible adults were contacted to assume the role of mock jurors for this experiment. Eight 12-person juries were drawn to read a written trial summary and deliberate the case on the Internet. Following jury selection, participants were emailed the written trial summary. Participants were asked to read the trial summary which was based on a fictitious trial of a first-degree murder case. At the conclusion of the summary, judge's instructions regarding the law were provided in an effort to guide participants in reaching a verdict.

Participants were then scheduled for an online jury deliberations session and received step-by-step instructions (Appendix G) via email on how to access the private chatroom on the jury deliberations website and utilize the designated security password. In an effort to attain higher compliance, participants were also contacted by telephone (Appendix H) to confirm their participation as research jurors, as it was particularly important to verify their involvement to ensure a 12-person jury at the time of deliberations. Participants were reminded to read the trial transcript prior to deliberations and encouraged to log onto the chatroom prior to their jury deliberations session to ensure they could access the chatroom and to prevent delays at the time of their jury deliberations.

On their scheduled day of jury deliberations, participants logged on to the jury chatroom and created a pseudonym to identify themselves to other jurors in the chatroom.

The investigator also logged on to the chatroom and served as the trial moderator for the jury deliberations. The trial moderator first verified that all participants had read the written trial summary. Next, the trial moderator instructed the jury to select a jury foreperson. For four of the juries, the trial moderator asked that jurors electronically enter their initial individual verdicts of guilty or not guilty prior to deliberating the case with the other jurors. In the remaining four juries, no request for a pre-deliberation verdict was made. The trial moderator also provided the judge's instructions to each deliberating jury. Participants then deliberated the case via the virtual chatroom. Upon conclusion of jury deliberations, members of the jury were instructed to electronically enter their post-deliberation verdicts of guilty or not guilty. All members of the eight juries were asked to give post-deliberation verdicts. In the event that a research juror was unable to log on for her/his scheduled jury deliberations, the trial moderator telephoned alternate research jurors that were standing by to enter the jury chatroom on the scheduled day of jury deliberations (three alternate jurors were available to join jury deliberations if necessary). A minimum number of ten jury members was required to be present in the chatroom to conduct jury deliberations. In the event that the minimum ten jury members were not available to log into the jury chatroom to deliberate the case, the trial moderator notified the jury members in the chatroom that jury deliberations would not go forward at that time and would need to be rescheduled for a later date.

Regarding details of the study website, [www.deliber8thecase.com](http://www.deliber8thecase.com), was a private website designed by the investigator exclusively for this research that hosted the jury

chatroom that was utilized to assist facilitation of jury deliberations and record juror verdicts. The website also hosted links to all study materials (survey, questionnaire, and scale) at PsychData ([www.psychdata.com](http://www.psychdata.com)). All juror communications (i.e., survey, questionnaire, scale, jury deliberations and verdicts rendered) were thus conducted on the World Wide Web via this website. Using the jury chatroom, jurors had the opportunity for interactive, real-time chat and deliberations with fellow jury members. Each juror communicated to fellow jurors through the jury chatroom by entering comments or questions into the Input Area of the screen. This information appeared immediately in the Discussion Area of the screen for all jury members to view and provide further response. Jurors also rendered their pre- and post-deliberation verdicts of guilty or not guilty into the Input Area of the screen. The researcher viewed all jury deliberations real-time from a personal computer and downloaded the jury transcripts upon completion of jury deliberations.

Following jury deliberations, jurors were instructed to open a link in the chatroom that directed them to the PsychData website to complete the two scales that were sequenced at the end of the study. Once on the Psychdata website, jurors were asked to enter the survey number and website password and complete the DNA Beliefs Questionnaire and the Right-Wing Authoritarianism Scale. These scales were positioned at the end of the study so that their contents would not influence jurors' deliberations. Participants were also emailed information on tips for coping after jury duty as a means of debriefing following jury deliberations (Appendix I).

Following completion of the study, participants interested in receiving the results of this study were encouraged to email the researcher at [juryresearch@deliber8thecase.com](mailto:juryresearch@deliber8thecase.com) to request this information. At this time, the researcher also conducted the \$50 prize drawing by randomly selecting one name from the pool of participating jurors. The researcher then contacted the winning participant by telephone to inform her that she had won and to verify her preferred mailing address to mail the prize money.

### **Experimental Design and Analysis**

The research design was experimental (Everitt, 2001), as participants were randomly selected and assigned to two conditions (pre-deliberation verdict/no pre-deliberation verdict). The primary research hypotheses were analyzed using logistic regression (Hosmer & Lemeshow, 2000), as the dependent variable being predicted was categorical and dichotomous (guilty/not guilty verdict). The predictor variables included (1) DNA beliefs, which was a continuous variable; (2) pre-deliberation status, a dichotomous variable in which half of the participants were asked to render a pre-deliberation verdict of either Guilty or Not Guilty, and a post-deliberation verdict of Guilty or Not Guilty while the remaining participants were not asked to provide a pre-deliberation verdict, but were asked to render their post-deliberation verdict; (3) Authoritarianism, a continuous variable, and (4), demographic variables including gender and race/ethnicity, both categorical variables. These six predictor variables necessitated a minimum sample size of  $(15 \times 6) = 90$  (Brace & Snelgar, 2000). Given that the virtual

jury configurations were in groups of 12, the target sample size for this study was (12 x 8) = 96. Exploratory analyses were conducted following the analyses of the three primary research questions.

Hypotheses

1. It was hypothesized that beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation verdict.

2. It was hypothesized that beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation change in verdict.

3. It was hypothesized that beliefs about DNA evidence, authoritarianism, gender, and race/ethnicity would be significant predictors of post-deliberation verdict when no pre-deliberation verdict was obtained.

Analysis

1. Logistic regression with verdict as the criterion variable and DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation as predictor variables.

2. Logistic regression with change in verdict as the criterion variable and DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation as predictor variables.

3. Logistic regression with verdict (when no pre-deliberation obtained) as the criterion variable and DNA evidence, authoritarianism, gender, and race/ethnicity as predictor variables.

## **Study One**

As data were initially reviewed for analysis, it became clear that only one of the three research questions could be addressed. Due to the limitations of data analysis, and in consultation with the dissertation chair and committee members, the researcher decided to conduct a second study. Since all participants in the initial study ultimately rendered not guilty verdicts following jury deliberations, it was surmised that the written trial summary did not contain enough ambiguity for a finding of guilt. As a result, the researcher modified the current written trial summary and utilized the revised trial stimulus in a second study in the hopes of obtaining different data and to allow for analysis of all three original hypotheses (See Appendix J).

## **Study Two**

### **Participants**

First year psychology, sociology, government, and women's studies students ( $N = 72$ ) at a large public university in Texas were solicited to participate in study two. Eligibility criteria for participants were identical to those used in study one. The sample consisted of mostly educated European American women in their young adult years claiming Christianity as a religious affiliation, which being mixed in terms of marital status and political persuasions. See Table 2 for more information on participants' demographics.

Table 2

*Demographics of Sample for Study Two*

Variable	<u>Gender</u>				
	Female (n = 64)		Male (n = 8)		
	<u>Freq.</u>	<u>%</u>	<u>Freq.</u>	<u>%</u>	<u>Total %</u>
<b>Age Group</b>					
18-24	21	29.17%	2	2.78%	31.94%
25-34	24	33.33%	4	5.56%	38.89%
35-44	9	12.50%	2	2.78%	15.28%
45-54	6	8.33%	0	0.00%	8.33%
55-64	3	4.17%	0	0.00%	4.17%
65-70	1	1.39%	0	0.00%	1.39%
<b>Race/Ethnicity</b>					
European American	31	43.06%	4	5.56%	48.61%
African American	16	22.22%	3	4.17%	26.39%
Hispanic	9	12.50%	0	0.00%	12.50%
Asian	2	2.78%	1	1.39%	4.17%
Other	6	8.33%	0	0.00%	8.33%
<b>Religion</b>					
Christian	41	56.94%	5	6.94%	63.89%
Catholic	7	9.72%	0	0.00%	9.72%
Non-denominational	6	8.33%	1	1.39%	9.72%
Other	6	8.33%	0	0.00%	8.33%
None	4	5.56%	2	2.78%	8.33%
<b>Political Affiliation</b>					
Democrat	25	34.72%	4	5.56%	40.28%
Republican	21	29.17%	2	2.78%	31.94%
Independent	4	5.56%	1	1.39%	6.94%
Other	14	19.44%	1	1.39%	20.83%
<b>Education</b>					
Some college	50	69.44%	6	8.33%	77.78%
College degree	13	18.06%	2	2.78%	20.83%
Advanced degree	1	1.39%	0	0.00%	1.39%

Table Continued

Table Continued

Variable	Gender				<u>Total %</u>
	Female (n = 64)	Male (n = 8)	<u>Freq.</u>	<u>%</u>	
<b>Relationship Status</b>					
Single	26	3	36.11%	4.17%	40.28%
Married	22	2	30.56%	2.78%	33.33%
Separated	2	0	2.78%	0.00%	2.78%
Divorced	3	2	4.17%	2.78%	6.94%
Widowed	1	0	1.39%	0.00%	1.39%
Co-habiting	10	1	13.89%	1.39%	15.28%

NOTE: N = 72

## Materials

All materials utilized in the second sequence of data collection were the same that were used in the initial study, with the exception of the written trial summary.

**Trial stimulus.** The trial stimulus for the second series of data collection consisted of a summary of trial proceedings in a fictitious criminal case of a male defendant accused of murdering his male friend. The researcher modified the previous written trial summary by incorporating comments and arguments retrieved from the transcripts of previous jury deliberations. In order to ensure that this new version of the case contained sufficient ambiguity and would be effective in obtaining both responses in the new data set, an informal pilot test was conducted prior to proceeding with the second cycle of data collection. Ten participants were asked to read the first revision of the written trial summary and deliberate the case in an online chatroom. Pre-deliberation verdicts showed 40% of jurors undecided and 60% of jurors voting not guilty. As in study

one, all jurors ultimately rendered not guilty verdicts following jury deliberations of the informal pilot test. The case was again revised based on the new feedback from this informal pilot test. Ten new participants were then asked to read the second revision of the written trial summary. Participants were asked to indicate, based on the evidence presented, if they would find the defendant guilty or not guilty. Responses from the second informal pilot test revealed a 50 percent split on Guilty/Not Guilty verdicts. The final revised written trial summary utilized in the second round of data collection was based on information obtained from the transcripts of jury deliberations from study one and from the aforementioned informal pilot tests run prior to conducting the second set of data collection.

The updated trial summary included several changes to the original case, some of which involved a lesser charge and additional evidence and testimony by witnesses. In the modified trial summary, the defendant, Jim Anton, was charged with one count of Murder in the Second Degree and was accused of stabbing his friend, Darren Williams, in the chest with a hunting knife. Evidence was introduced to show that on the night of the murder, the defendant, victim, and two other male friends were drinking alcohol (beer) and playing cards at the defendant's home. The first witness for the prosecution testified that Jim Anton was not seen on video surveillance tapes recovered from the convenience store that the defendant provided as his alibi on the night of the murder. This witness also indicated that investigators requested and received the defendant's clothing from the night of the murder and that the clothes were laundered. In this new scenario, the time

frame between the last known contact between the defendant and the victim and the time of the murder was extended to one hour. In addition, evidence about the defendant tripping and falling and having a nosebleed on the night of the murder was removed from the case. A second witness for the State also testified that at approximately 8:00 p.m. on the night in question, she saw the defendant exit his home, throw an unidentified object onto the passenger's seat of his car, and speed away.

The defense proceeded with the claim that Anton was innocent of the crime and that the State had not proven their case. When asked why he did not appear on the video surveillance tapes from the convenience store, the defendant, Jim Anton, testified that he was very upset after being informed by the police the following morning of his good friend's murder and that he was not thinking clearly about his whereabouts the night before. The defendant claimed that he was not on the corner store video surveillance tapes because he later remembered that when he got into his car, he noticed that he was low on gasoline and decided to purchase the milk at the gas station convenience store. The defendant also testified that he washed his clothes because something had spilled on them the night before during the confrontation at his home. In this version of the case, the Defense's third witness' testimony was changed. References to the man this witness encountered while walking her dog on the night of the murder as "strange" and "nervous" were removed. An expert witness for the defense also testified that she heard a lab technician sneeze, but did not witness which lab technician was responsible for the sneeze.

## **Procedure**

All procedures used in study one were replicated in study two.

## **Experimental Design and Analysis**

The experimental design and analysis were identical for both study one and study two.

## CHAPTER IV

## RESULTS

### **Study One**

The purpose of this study was to determine whether beliefs about deoxyribonucleic acid (DNA) evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation status were predictive of verdict outcomes and change in verdict outcomes. In this chapter, the descriptive statistics of the sample for study one are presented, followed by the data analysis and results for hypothesis two, which was the only analyzable hypothesis in study one. Next, descriptive statistics of the sample for study two are presented, followed by the data analysis, results for hypotheses one and two, and the additional exploratory findings.

### **Descriptive Statistics**

Scores on DNA Beliefs fell in a relatively narrow midrange, indicating a majority of the jurors held moderate beliefs about DNA evidence. Scores on Authoritarianism also tended to be in the midrange, with moderate scores on this scale indicating egalitarian attitudes. Quartile scores are often used with the Right-Wing Authoritarianism (RWA) scale (Altemeyer, 1996; Altemeyer, 1981); in this study, there were only four people (4.4%) in Quartile one which represents low Authoritarianism, and only eight people (8.8%) in Quartile four representing high Authoritarianism. All other

participants fell between these extremes. Descriptive statistics for study one are presented in Table 3.

Table 3

*Descriptive Statistics for Study One*

	DNA Beliefs Questionnaire	RWA Scale
Mean	32.34	162.49
Std. Deviation	2.67	22.12
Actual Range of Scores	26-39	102-221
Possible Range of Scores	10-50	30-270

Results showed that all study participants found the defendant not guilty via their post-deliberation verdicts. These results posed a challenge with respect to data analysis, as the data related to two of the three hypotheses were not able to be analyzed (hypotheses one and three). Data analysis for hypothesis two was possible. Hypothesis two predicted that beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation change in verdict. To test this hypothesis, a binary logistic regression analysis was applied to the variables. The logistic regression analysis revealed no statistically significant predictors of post-deliberation change in verdict. Based on this finding, the second stated hypothesis was rejected. Table 4 shows the coordination between jurors' predicted change in verdict/no change in verdict outcomes as compared

to their actual change in verdict/no change in verdict outcomes (Christensen, 1997).

Table 5 presents the details of the logistic regression analysis.

Table 4

*Classification Table for Changed Verdict*

Actual Outcomes	Predicted Outcomes - Changed Verdict		
	No Change	Change	Percent Correct
No Change	87	0	100.0
Change	4	0	.0
Total Percentage Correct			95.6

Table 4, the Classification Table for Changed Verdict, cross tabulated actual change or not post-deliberation versus predicted change or not post-deliberation (Christensen, 1997). Prior to analysis, all jurors were predicted to be in the “No Change” category, as this is the modal category. Thus, Table 4 indicated that the 87 jurors who were initially predicted not to change their verdict post-deliberation, indeed did not change their verdict following jury deliberations, yielding a 100% accurate prediction. Conversely, there were four jurors who were predicted not to change their verdict post-deliberation, but actually changed their verdict following deliberations with other jurors. For these four jurors, this prediction was 0% accurate. If the voting behavior (change in verdict post-deliberation) of these four jurors could be correctly predicted, moving these jurors into the “Change” column, this would represent a good model for estimating juror

behavior and whether jurors changed their verdict or not post-deliberation. Overall, results showed that 95.6% of the jurors were correctly classified initially.

Table 5

*Binary Logistic Regression Analysis – Changed Verdict*

Predictor	B	S.E.	Wald	Df	Sig.	Exp(B)
Constant	-3.080	.511	36.269	1	.000	.046

Table 5 showed data indicating that when predictor variables were added, none of them were statistically significant in predicting change post-deliberation, which resulted in the rejection of the second hypothesis.

## Study Two

### Descriptive Statistics

Scores on DNA Beliefs in study two also fell in the midrange on this instrument, indicating most jurors held moderate beliefs about DNA evidence. However, DNA Beliefs scores in study two on average, were significantly higher than in study one ( $t = 5.60$ ,  $df = 161$ ,  $p < .0001$ ). Scores on Authoritarianism tended to be moderate to low. Moderate to low scores on this scale indicate egalitarian to low authoritarian attitudes. Authoritarianism scores in study two were on average, significantly lower than in study one ( $t = 7.03$ ,  $df = 161$ ,  $p < .0001$ ). Descriptive statistics for study two are presented in Table 6.

Table 6

*Descriptive Statistics for Study Two*

	DNA Beliefs Questionnaire	RWA Scale
Mean	35.38	127.44
Std. Deviation	4.22	40.60
Actual Range of Scores	26-43	32-214
Possible Range of Scores	10-50	30-270

Six juries were completed for the second data collection sequence. Seventy-two of each study survey (Juror-Qualifying Survey, DNA Beliefs Questionnaire, and Right-Wing Authoritarianism Scale) were utilized in the final data analysis, rendering an effective return rate of usable surveys of 100%.

A set of three hypotheses were proposed concerning the relationship between the predictor variables and juror verdicts. Separate binary logistic regression analyses were conducted for each hypothesis. The model contained five independent variables (DNA beliefs, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation).

The first hypothesis stated that beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation verdict. A logistic regression analysis was conducted to assess the predictive ability of the model on verdict outcomes. The logistic regression analysis revealed no statistically significant predictors of post-deliberation verdict. Based on this finding, the first stated hypothesis was rejected. Table 7 represents a cross

tabulation of jurors' predicted post-deliberation verdict outcomes (not guilty/guilty) and their actual post-deliberation verdict outcomes (not guilty/guilty). Table 8 presents the details of the logistic regression analysis.

Table 7

*Classification Table for Post-deliberation Verdict*

Predicted Outcomes- Post-deliberation Verdict			
Actual Outcomes	Not Guilty	Guilty	Percent Correct
Not Guilty	61	0	100.0
Guilty	11	0	.0
Total Percentage Correct		84.7	

Table 8

*Binary Logistic Regression Analysis Post-deliberation Verdict*

Predictor	B	S.E.	Wald	Df	Sig.	Exp(B)
Constant	-1.713	.328	27.346	1	.000	.180

The second hypothesis stated that beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation change in verdict. No statistically significant predictors of post-deliberation change in verdict were discovered. Based on this finding, the second

stated hypothesis was rejected. Table 9 shows the coordination between jurors' predicted change in verdict/no change in verdict outcomes as compared to their actual change in verdict/no change in verdict outcomes. Table 10 presents the details of the logistic regression analysis.

Table 9

*Classification Table for Changed Verdict*

Predicted Outcomes - Changed Verdict			
Actual Outcomes	No Change	Change	Percent Correct
No Change	52	0	100.0
Change	20	0	.0
<hr/>			
Total Percentage Correct	72.2		

Table 10

*Binary Logistic Regression Analysis – Changed Verdict*

Predictor	B	S.E.	Wald	Df	Sig.	Exp(B)
Constant	-.956	.263	13.188	1	.000	.385

The third hypothesis stated that beliefs about DNA evidence, authoritarianism, gender, and race/ethnicity would be significant predictors of post-deliberation verdict when no pre-deliberation verdict was obtained. All participants who were not requested

to provide a pre-deliberation verdict rendered not guilty verdicts following jury deliberations. Thus, this research question could not be tested because no variation in post-deliberation verdicts occurred among the participants.

### **Additional Findings**

Additional exploratory analyses were performed in an effort to identify a subset of potential predictors that could provide the best predictive power (Pallant, 2007). Analyses were conducted for post-deliberation verdict and for change in verdict.

### **Post-deliberation Verdict**

Direct enter method logistic regression of post-deliberation verdict onto all available predictors resulted in a statistically significant relationship of moderate strength overall ( $\chi^2 = 32.182, p < .01$ ). Majorities of actual verdict status were correctly predicted. All people having had a pre-deliberation verdict among all race groups except Asians were the most likely to vote guilty. The classification table showing a cross tabulation of jurors' predicted post-deliberation verdict outcomes and their actual post-deliberation outcomes on juries that rendered pre-deliberation verdicts appears in Table 11. The overall results of the analysis are depicted in Table 12.

Table 11

*Classification Table for Post-deliberation Verdict*

		Predicted Outcomes - Post-deliberation Verdict		
Actual Outcomes		Not Guilty	Guilty	Percent Correct
Not Guilty		59	2	96.7
Guilty		4	7	63.6
Total Percentage Correct		91.7		

Table 12

*Direct Enter Method Logistic Regression Analysis - Post-deliberation Verdict*

Predictor	B	S.E.	Wald	Df	Sig.	Exp(B)
Euro Am	26.566	227302.9	.000	1	1.000	3E+011
Afr Am	27.781	227302.9	.000	1	1.000	1E+012
Hispanic	27.022	227302.9	.000	1	1.000	5E+011
Had Pre-del Verd	4.432	1.710	6.715	1	.010	84.112
Constant	-21.670	227302.9	.000	1	1.000	.000

R<sup>2</sup>: Cox and Snell = .360; Nagelkerke = .627

NOTE: Euro Am = European American; Afr-Am = African American; Had Pre-del Verd = Had pre-deliberation verdict. No Asian jurors were in the pre-deliberation vote condition.

## Change in Verdict

Direct enter method logistic regression of change in verdict onto all available predictors resulted in a statistically significant relationship of moderate strength overall ( $\chi^2 = 43.312, p < .0005$ ). Majorities of actual verdict status were correctly predicted, with married, Catholic, Republicans with higher DNA beliefs being among the most likely to change verdicts. The classification table showing the coordination between jurors' predicted change in verdict outcomes (no change/change) as compared to their actual change in verdict outcomes (no change/change) appears in Table 13. The overall results of the analysis are depicted in Table 14.

Table 13

*Classification Table for Changed Verdict*

		Predicted Outcomes - Changed Verdict		
Actual Outcomes		No Change	Change	Percent Correct
No Change		48	4	92.3
Change		7	13	65.0
Total Percentage Correct				84.7

Table 14

*Direct Enter Method Logistic Regression Analysis - Changed Verdict*

Predictor	B	S.E.	Wald	Df	Sig.	Exp(B)
DNA Bel	.103	.105	.953	1	.329	1.108
Catholic	.044	2.710	.000	1	.987	1.045
Repub	.443	1.748	.064	1	.800	1.558
Married	2.234	1.378	2.628	1	.105	9.336
Constant	93.691	2E+007	.000	1	1.000	4.9E+040

R<sup>2</sup>: Cox and Snell = .452; Nagelkerke = .652

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Note: DNA Bel = DNA Beliefs Scale; Repub = Republican

## CHAPTER V

### DISCUSSION

Major results have been summarized and integrated with the previous literature. Implications for theory, research, training, and practice have been included. Limitations of the study have been noted prior to the conclusion.

#### **Summary of Findings and Integration with Literature**

##### **Study One**

The initial study sought to examine the relationship between the predictor variables and juror verdicts. It was hypothesized that (1) beliefs about deoxyribonucleic acid (DNA) evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation verdict; (2) beliefs about DNA evidence, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation would be significant predictors of post-deliberation change in verdict; and (3) beliefs about DNA evidence, authoritarianism, gender, and race/ethnicity would be significant predictors of post-deliberation verdict when no pre-deliberation verdict was obtained. Due to data analysis limitations, only the second stated hypothesis could be analyzed in study one. Results revealed no statistically significant predictors of post-deliberation change in verdict.

## **Study Two**

A second study was conducted using a newly modified trial stimulus in an effort to improve upon the initial study results and the ability to analyze the three original hypotheses. Results revealed that the predictor variables (DNA beliefs, authoritarianism, gender, race/ethnicity, and pre-deliberation/no pre-deliberation) were not significant predictors of post-deliberation verdict. In study two, results again failed to demonstrate a statistically significant relationship among these predictors on post-deliberation change in verdict. Finally, it was not possible to test the third hypothesis which posited that DNA beliefs, authoritarianism, gender, and race/ethnicity were significant predictors of post-deliberation verdict when no pre-deliberation verdict was obtained due to a lack of variation among participants' post-deliberation verdicts. Consequently, the second study findings suggested that jurors' beliefs about DNA evidence, their level of authoritarianism, their gender, their race/ethnicity, and whether or not they were required to provide a verdict prior to deliberating the case were inconsequential factors in influencing their verdict choice following deliberations as well as their inclination to change their verdict after deliberating the case. The results also failed to demonstrate that jurors' beliefs about DNA evidence, their level of authoritarianism, their gender and race/ethnicity influenced their verdict choice following jury deliberations when they were not required to provide an initial verdict prior to deliberating. Thus, on the whole, these predictor variables were not shown to influence verdict outcomes in one direction or the other.

The reasons why no relationship was found between any of the predictor variables and verdict outcomes remain unclear. The lack of a statistically significant relationship between DNA beliefs and juror outcomes in study two was unexpected; however, it may well have been that the DNA beliefs manipulation was simply too weak to test the hypotheses. The instrument utilized to measure jurors' beliefs about DNA evidence was created for this experiment; and therefore, it has not undergone a validity analysis to ensure its psychometric soundness as a measure. This measure appears to have sufficient face validity. However, since jurors' beliefs about DNA evidence is a rather new area of study, more research is needed to learn about the ways in which individuals conceptualize and interpret DNA information in general. Comparing these available data with the current measure could then be used to establish and strengthen the validity of the DNA beliefs instrument used in this study. Without this type of empirical evaluation, the efficacy of the DNA beliefs questionnaire in measuring jurors' beliefs about DNA evidence cannot be substantiated.

It is true that jurors in study two were found to hold more positive beliefs about DNA evidence as compared to research jurors in study one. However, this result did not make any difference in the one hypothesis that could be tested in both samples (hypothesis two). Among both samples of jurors, DNA beliefs showed no predictive power of juror change in verdict post-deliberation.

In view of the recent surge of public excitement surrounding forensics, the massive dissemination of information about DNA evidence through popular media

portrayals, and the resulting enhanced expectations about the presentation of forensic crime scene evidence at trial, jurors might be expected to place substantial value on DNA evidence presented in a case that links the accused to the crime. At the same time, jurors have historically faced challenges when asked to evaluate complex scientific and statistical evidence. For this reason, this study utilized the generally preferred methods of presenting DNA statistics to jurors in a single-target, frequency format (Cosmides & Tooby, 1996; Gigerenzer & Hoffrage, 1995; Koehler, 1996; Thompson & Schumann, 1987). Despite this methodology, results still revealed no link between jurors' beliefs about DNA evidence and juror outcomes (Cosmides & Tooby, 1996; Gigerenzer & Hoffrage, 1995; Koehler, 1996; Thompson & Schumann, 1987). One explanation for this finding could lie in jurors' inherent tendency to substantially undervalue statistical information related to forensic evidence (Kaye & Koehler, 1991; Schklar & Diamond, 1999; Smith et al., 1996). Based on previous research findings, jurors in study two may have given less weight to the DNA evidence presented, a factor that may have affected their decision making and final verdict outcomes.

Jurors' prior beliefs and attitudes in general and about DNA evidence in particular also may have affected this finding. In accordance with the Story Model, jurors in study two likely constructed stories about the case based on their personal knowledge, worldviews, and biases as well as the information presented at trial (Pennington & Hastie, 1992). Additionally, jurors may have held distorted beliefs and expectations about forensic evidence (particularly DNA evidence) based on prior exposure to forensic

science in the media. Since the impact of the CSI effect on juror decision making is not well-known, this factor may have unduly influenced jurors' attitudes and beliefs regarding DNA evidence.

No statistically significant finding among the predictor variable of authoritarianism and juror outcomes was particularly surprising considering the abundance of previous research that has supported authoritarianism as a reliable predictor of juror decision making (Bonazzoli, 1998; Couch & Sundre, 2001; Nadeau, 2006; Narby, Cutler & Moran, 1993; Shaffer & Wheatman, 2000). Prior research findings have suggested that highly authoritarian jurors were more likely to find a defendant guilty than jurors low in authoritarianism. Additionally, past research has indicated that jurors higher in authoritarianism are more likely to change their verdicts following deliberations (Lamberth, Krieger, & Shay, 1982; Nadeau, 2006). However, these findings were not replicated in this case.

Jurors in study two were found to have moderate to low authoritarianism scores as compared to research jurors in study one, but again, this finding did not make a difference in the one hypothesis that could be tested in both samples (hypothesis two). Among both samples of jurors, Authoritarianism was not found to be a predictor of post-deliberation verdict or change in verdict. The fact that almost all of the jurors in both studies held moderate to low authoritarian attitudes could have contributed to so many jurors voting to acquit the defendant, since jurors low in authoritarianism are more inclined to vote not guilty.

Another explanation for these results could be that the effect of authoritarianism on juror verdict preferences may have been mediated by jury deliberations. The process of deliberating with other jury members may have served to lessen the punitiveness and tendency to convict of the more highly authoritarian jurors as compared to jurors lower in authoritarianism (Kramer, Kerr, & Carroll, 1990; McGowen & King, 1982). Previous research has also shown that highly authoritarian jurors who were involved in jury deliberations tended to feel an increased need to identify and conform with the other jury members as compared to jurors who were low in authoritarianism (Lamberth et al., 1982). In this case, highly authoritarian jurors may have conformed with their less authoritarian fellow jury members and voted accordingly by rendering a not guilty verdict. It is also possible that neither of these possible scenarios explain the lack of replication of past jury research findings.

Less unexpected was the finding of no statistically significant relationship between gender and race/ethnicity and jury behavior and decision making. Prior studies have been conducted investigating the variable gender and its relation to juror verdicts. Research has yielded inconsistent findings with respect to establishing a link between juror gender and juror behavior and outcomes (Bonazzoli, 1998; Diamond, 1990; King, 1999). This study replicated findings by previous researchers that gender bore no significant relationship to juror verdicts. Results from study two also revealed that race/ethnicity was not found to be a statistically significant predictor of post-deliberation verdict or change in verdict for the three primary hypotheses. This finding is consistent

with previous research, which has suggested that race/ethnicity was weakly linked to juror behavior and decision making (Bonazzoli, 1998; Diamond, 1990; King, 1999).

## **Additional Findings**

Additional exploratory analyses were subsequently performed and revealed some intriguing findings. Results from a direct enter method logistic regression analysis of post-deliberation verdict showed a statistically significant relationship of moderate strength overall. A direct enter method logistic regression analysis of change in verdict also revealed a statistically significant relationship of moderate strength overall. These statistically significant relationships offer important data about juror decision making and jury outcomes. For this reason, these variables have been further explored below.

**Race/ethnicity, pre-deliberation, and post-deliberation verdict.** Contrary to results from study two, an additional analysis of post-deliberation juror verdict revealed a statistically significant relationship of moderate strength. All non-Asian participants who sat on juries that took pre-deliberation votes were more likely to vote guilty post-deliberation than those who had not taken a vote before deliberating the case. Here, non-Asian status in conjunction with providing a pre-deliberation vote increased the odds that jurors would vote guilty following deliberations.

This finding could be seen as particularly salient to jury selection when considering one of the most widely replicated jury research findings that has shown that 90% of the time, the initial verdict recommended by the majority of jurors prior to deliberations was selected post-deliberation (Kalven & Zeisel, 1966; MacCoun & Kerr,

1988; Sandys & Dillehay, 1995). However, more detailed data about the pre-deliberation voting tendencies of these jurors (whether they rendered a guilty or not guilty verdict) in relation to post-deliberation verdicts would be necessary to speculate further about this result. Therefore, additional empirical research would be essential to establish support for the relationship between these variables to make any relevant determinations about race/ethnicity or predicting pre-or post-deliberation verdict outcomes.

In this study, none of the Asian jurors sat on juries that took pre-deliberation votes; therefore, these jurors did not follow the same pattern of voting as compared to jurors of other ethnicities who took pre-deliberation votes. All Asian jurors rendered not guilty verdicts post-deliberation, but given that the majority of participants in all conditions did so made this result difficult to interpret. Additionally, there were only three Asian jurors in the study. Nevertheless, future researchers may wish to consider that Asian jurors represented a numerical minority on the juries in this study and are likely to be in a numerical minority on any jury. Along with their disproportional representation on the juries, Asians, like other visible minorities, belong to a relatively powerless social category in America (Li, 1994). Kanter (1977) found that individuals who represented the numerical minority in a group and belonged to a powerless social category were more passive, introverted, and withdrawn in the group. Furthermore, research by Li, Karakowsky, and Siegel (1999) indicated that Asians group members in the numerical minority in Caucasian-dominated decision making groups participated less, were less assertive, were less dramatic and expressive, and were more introverted and

passive compared to their counterparts in numerically dominant positions. Intrinsic or cultural differences in group members may have also played a role in the way Asian jurors approached group decision making (Hofstede, 1996; Ko, 2005; Menon, Sim, Fu, Chiu, & Hong, 2010; Peterson, Miranda, Smith, & Haskell, 2003). Thus, in this study, Asian jurors' numerical minority position on the jury, social category status, and cultural differences may have affected their intragroup behavior and group decision making activity, which influenced their verdict preference following deliberations.

While it is not possible to discern more meaningful predictions about the relationships between these variables, further speculations could be made by examining these data in the context of jury deliberations. Jury deliberations have proven to be an integral part of both the judicial process and jury research. Despite this well-known fact, many previous studies have chosen not to incorporate a deliberative phase into their research on jury decision making. Excluding this group decision making process from jury research investigations has led to reduced juror accountability, impartiality, and compliance (Lieberman & Sales, 1997; Shaffer & Wheatman, 2000). Jurors who did not participate in deliberations also appeared to be less capable of matching the evidence to alternative verdict options (McCoy, Nunez, & Dammeyer, 1999). Finally, jury members higher in the personality trait of authoritarianism tended to be more punitive toward defendants prior to deliberating with other jurors. For these reasons, including a deliberation phase in this study was imperative since the jury deliberation process can

have a moderating effect on jury decision making and verdict preference (Devine et al., 2001; Hans & Vidmar, 2004; Lamberth et al., 1982; Nadeau, 2006).

The jury's approach to deliberations has also been linked to jury outcomes. The present results replicated and extended previous research indicating that the deliberation style that jurors adopt when deliberating a case can also affect verdict outcomes. In American criminal trials, jurors have the option of utilizing a verdict-driven or an evidence-driven deliberation style (Davis, Kameda, Parks, Stasson, & Zimmerman, 1989; Davis, Stasson, Ono, & Zimmerman, 1988; Hastie et al., 1983; Kameda, 1991; Sandys & Dillehay, 1995). However, in this experiment, this was not the case. Half of the juries in study two were required to use a verdict-driven deliberation style in which jurors rendered a verdict pre-deliberation on which they based the direction of further deliberations (Hastie et al.). Conversely, the remaining juries utilized an evidence-driven deliberation style, in which jurors reviewed all of the evidence prior to rendering a verdict. Since an evidence-driven style of deliberation is preferred (Hastie et al.), asking some juries to employ a verdict-driven deliberation style may have had the unintentional effect of skewing juror verdicts.

In this case, additional analyses revealed that jurors who utilized a verdict-driven deliberation style were more likely to render a guilty verdict post-deliberation than those jurors who employed an evidence-driven approach to deliberating the case. Thus, jurors who immediately took a vote upon entering the jury room were more conviction prone than jurors who first reviewed all of the trial evidence before polling the jury. This

finding could be an influential factor in selecting a jury. From these data, one could theorize that in cases that require jurors to review detailed, complex information (such as DNA evidence), an evidence-driven deliberation style would work best. One could further argue that an evidence-driven deliberation style could promote more fair and impartial jury deliberations by its mandatory comprehensive review of the evidence.

Although legal counsel and consultants do not have control over what deliberation style the jury ultimately adopts, these data could be helpful in both voir dire and jury selection processes. Legal counsel and consultants may attempt to choose potential jurors who are more (or less) likely to incorporate an evidence-driven deliberation style (i.e., jurors who are logical, emotionally-controlled, have an external locus of control) based on the particular case. While being able to make predictions about jury behavior would be particularly beneficial to trial lawyers, it is important to remember that selecting a jury is case-specific and legal decision makers would need to consider this information along with all of the other factors presented (i.e., prosecution or defense case, type of crime).

**DNA beliefs and post-deliberation change in verdict.** Additional data analyses of change in verdict post-deliberation also uncovered a statistically significant relationship of moderate strength overall. This finding indicated that married, Catholic, Republicans with more positive DNA beliefs were among the most likely to change their verdicts following deliberations. In this case, being married, Catholic, Republican, and

having more positive beliefs in DNA evidence was predictive of increased odds that jurors would change their verdict after deliberating the case.

The ability to predict behavior based on certain group characteristics would seem to be a tremendous asset to legal counsel and consultants. With such a predictable model, prosecutors and defense counsel alike could theoretically identify the most desirable, sympathetic jurors, while detecting and excluding those jurors who held biases before impaneling a jury for a particular case. In this case, it is interesting that married jurors who identified as Republican and Catholic who had more positive beliefs about DNA evidence were more likely to change their verdict following deliberations as compared to non-married jurors of other religious and political affiliations. At first glance, one might assume these particular individuals would be more conservative than non-married people identifying with other political and religious affiliations. In fact, these demographic characteristics arguably have qualities similar to authoritarian individuals, who tend to be rigid, loyal to conventional values, and intensely reverent to authority (Adorno, Frenkel-Brunswick, Levinson, & Sanford, 1969). Intriguingly, past research has indicated that highly authoritarian jurors were more likely to change their verdict after deliberating a case than low authoritarian jurors (Lamberth et al., 1982; Nadeau, 2006). Similarly, this study suggested that being married, Catholic, and Republican, and having stronger DNA beliefs was more predictive of change in verdict post-deliberation as compared to other demographic characteristics and beliefs about DNA evidence. This finding is thought-provoking when considered independently and also when compared to authoritarianism

and its similar effect on post-deliberation change in verdict. Whereas the effects of juror demographic characteristics on verdict outcomes have been studied extensively in the research literature and, historically, have been shown to be weakly linked to juror behavior and verdicts (Bonazzoli, 1998; Diamond, 1990; King, 1999), the effects of demographic characteristics on change in verdict post-deliberation have not been previously studied. While noteworthy, the implications of this finding remain unclear, but appear to warrant further investigation.

An opposing interpretation of this finding is also possible. It could be that married, Catholic, Republican jurors who held stronger beliefs about DNA evidence were more likely to change their verdict after deliberations because these individuals were instead characteristically more flexible as compared to demographically different jurors. Moreover, flexibility could be seen as a fundamental quality of an ideal juror. These jurors may have been more likely to consider all the evidence and more willing to listen to other jurors' different perspectives and interpretations of the case presented. Thus, decision makers may be more inclined to seat these jurors on a jury to enhance the quality of jury decision making and the accuracy of trial outcomes.

This finding is noteworthy for another reason. In cases that specifically involve the presentation of DNA evidence, jurors who hold more positive beliefs about DNA evidence would seem to be better suited for those cases. Jurors' perceptions of the accuracy and importance of DNA evidence as well as the potential for error with this type of evidence would be paramount in criminal cases presenting DNA evidence. Thus,

jurors who have positive beliefs about DNA may be seen as more open and willing to hear and consider DNA evidence at trial. Conversely, if jurors are highly skeptical of the veracity of DNA evidence, those beliefs may lead them to prematurely reject the DNA evidence before considering it along with the other trial evidence. This is not to say that jurors should embrace the idea that DNA evidence is infallible; only that jurors selected to sit on a jury for criminal cases that include DNA trial evidence would ideally enter the trial with a willingness and commitment to consider impartially all of the evidence presented, including DNA evidence. Thus, this current result stands out as a novel finding because very limited research has been conducted that has investigated jurors' beliefs about DNA evidence and juror outcomes in criminal cases and the process by which juror attitudes influence jury verdicts (Devine et al., 2001).

In general, previous jury research on juror attitudes and values is too limited to make any clear cut inferences about how these variables influence jury verdicts (Devine et al., 2001). The current study represents only the second study that has examined jurors' beliefs and attitudes about DNA evidence and juror outcomes. A study by Lemieux (2008) found no relationship between juror beliefs about DNA and juror decision making. Further research is necessary before one can confidently claim that verdict outcomes in criminal trials are not sensitive to manipulations of juror DNA beliefs.

## **Implications for Theory**

Several theories have been developed and studied over the years that have examined juror decision making. In response to more traditional decision models, the Story Model was conceived and has become the preferred juror decision making model (Devine et al., 2001; Hastie, 1993; Hastie, Penrod, & Pennington, 1983). The Story Model posits that jurors create one or more stories to explain the evidence introduced at trial based on the information and evidence presented combined with their own personal worldviews (Pennington & Hastie, 1988).

Findings from the present study indicated that non-Asian jurors who rendered pre-deliberation verdicts were more likely to vote for conviction post-deliberation. Although additional speculation about this result is difficult due to limited information regarding these jurors' pre-deliberation verdict preferences, it is likely that these jurors acted in accordance with the Story Model in using the trial evidence presented in combination with their personal beliefs and worldviews to conceptualize and construct plausible stories of the case. Other results from the current study showed that married, Catholic, Republican jurors with higher DNA beliefs were found to be more likely to change their verdict after deliberating with other jury members. When applied to these results, the Story Model suggests that the married, Catholic, Republican jurors with higher DNA beliefs developed their theory of the criminal case based upon the evidence presented at trial along with their personal worldviews, including their political and religious views and any prior beliefs and attitudes about DNA evidence. While both study results appear

to be consistent with the Story Model, the finding indicating that married, Catholic, Republican jurors with more positive beliefs about DNA evidence were more likely to change their verdict preference following deliberations appears particularly relevant to this theoretical model. These jurors' theory of the case continued to develop and evolve because they placed higher importance on the deliberations process, as evidenced by their tendency to be more influenced by jury deliberations and consequently more likely to change their verdict following deliberating the case with the other jury members.

Another implication for theory could involve an expansion of the Story Model. While this model explains the process of how jurors approach and execute judicial decisions, additional theories focusing on the complex interactions that occur within juries and between jurors might lead to enhanced understanding of the jury decision making process. Alternate theories that center on factors related to culture, interpersonal relations, and psychological mindedness of jurors may help to explain the more complex interactions that occur among jurors while deliberating a case. New theories that expand beyond the Story Model could also result in a more comprehensive understanding of how jurors' stories are created.

### **Implications for Research**

More research on pre- and post-deliberation verdict prediction needs to be conducted to determine a good model for estimating juror verdict preferences. Study results showed that non-Asian jurors who provided an initial verdict preference before deliberating the case were more likely to find the defendant guilty post-deliberation.

Alone, this result may not provide important distinctions about pre- and post-deliberation juror verdicts. However, another data point complicating this finding revealed that while none of the Asian jurors rendered pre-deliberation verdicts in this study, all Asian jurors found the defendant not guilty following jury deliberations. This indirect finding arguably could have implications for future research. While research has been conducted investigating Asians and group decision making (Li et al., 1999; Kanter, 1977), more precise study of Asian jurors and their verdict preferences could be conducted to learn more about Asian jurors' decision making in criminal cases. Research examining Asian jurors' pre- and post-deliberation verdicts to uncover their tendency to change their verdict choice following deliberations would also be informative. While the present study only included three Asian jurors, future studies would necessitate recruiting increased numbers of Asian participants in order to effectively study this phenomenon.

Continued research on juror decision making also needs to be conducted to increase understanding of the public's beliefs and attitudes about DNA trial evidence and to determine how those beliefs translate into verdict outcomes. The finding that married, Catholic, Republican jurors with positive beliefs about DNA evidence are more likely to change their verdict after deliberating has important implications for future research. Accordingly, future investigations of change in verdict post-deliberation could control for relationship status, religion, political affiliation, and DNA beliefs in an effort to describe these characteristics of research jurors.

These results also suggest that some of the research methodology used in the present study should be included in future research. Although jury deliberations are fundamental to juror decision making; amazingly, only one other study (Modin, 2007) examining scientific evidence and juror decision making used deliberations in their methodology and none of the studies investigating jurors' beliefs about DNA evidence and verdict outcomes had jurors deliberate a case. However, empirical support for including a deliberations phase in future jury research was replicated here.

While results from study two failed to find DNA beliefs to be a statistically significant predictor of jurors' tendency to change their verdict after deliberating a case, additional analysis yielded data indicating that positive DNA beliefs in combination with these other demographic characteristics resulted in a moderately significant finding. Since this is only the second study conducted that examined jurors' beliefs about DNA evidence in a mock jury setting, these results suggest that additional research in this area may be warranted.

Additionally, clues to how or why juror shifts occurred might be gleaned from the actual transcripts of the deliberations. While this type of qualitative content-analytic approach can be time-consuming, it is often fruitful when studying complex interactions in a new domain of inquiry (Patton, 2002).

### **Implications for Forensic Training**

The current study's findings created valuable implications for training. Significant advances in forensic science along with continuous exposure to forensic

related news reports and television programming have prompted a deep curiosity in forensics by the public. Intense student interest has led to the integration of forensic courses in high school curriculums and to the development of undergraduate and graduate training programs in forensic science and forensic psychology (Almirall, 2005). Findings from the current study could make important contributions to forensic psychology educational programs. Students, researchers and practitioners alike could benefit from research on psychological issues that impact the legal system. Since research on jurors' beliefs about DNA evidence is a new field of study, educating student researchers and practitioners about the effects of jurors' beliefs about DNA on a criminal case and final verdict outcomes might be particularly relevant to both research and applied settings. Similarly, empirical findings shedding light on how jury deliberation styles can influence juror verdicts might also be extremely applicable to future research and clinical practice.

### **Implications for Forensic Practice**

Both additional findings from the current study have relevance for forensic practice. The finding that non-Asian jurors who rendered pre-deliberation votes were more inclined to find the defendant guilty following deliberating the case with fellow jurors is relevant because this result indicates that juries that use a verdict-driven deliberation style tend to be more conviction-prone than juries that utilize an evidence-driven style of deliberations. Thus, an evidence-driven deliberation style might lead to more fair and impartial jury deliberations and may be more appropriate for cases involving complex evidence, such as DNA. This finding is also material to judicial

decision making because it could influence the way judges give the jury guidance about evidence-driven deliberations.

The second additional finding also has several important implications with respect to forensic practice. The idea that married, Catholic, Republican jurors with positive beliefs about DNA evidence would be more likely to change their verdict after deliberating a case with other jury members was found to be true in the current study. Despite their initial theory of the case and thoughts about verdict upon entering the jury room, these jurors tended to change their verdict after group discussion with fellow jurors.

This result highlights the impact of group deliberations on jurors within the legal system. As intergroup contact can be an effective way of reducing prejudicial attitudes (Durkin, 1995), the importance of including a jury deliberations process in future jury research like the one used in this study is critical to gaining a better understanding of the mindset and decision making process of prospective jurors. Further, research has shown the importance of group dynamics in juror decision making and that jury deliberations have a moderating effect on individual juror verdicts (McGowen & King, 1982; Narby et al., 1993; Shaffer & Wheatman, 2000). Although jurors take into account their personal worldviews and biases when constructing their initial story and thoughts about a verdict, the deliberation process may also play a role in these jurors' final decisions regarding the defendant's guilt or innocence. Therefore, the current study results further emphasize the

importance of looking beyond individual juror verdicts and focusing on post-deliberation juror decisions.

This outcome may be particularly significant when applied to real-world courtroom proceedings. Determining whether jurors hold more skeptical or positive beliefs about DNA evidence when choosing jurors for criminal cases that present DNA evidence would be particularly helpful. The ability to predict which jurors will engage fully in the jury deliberations process would also be tremendously advantageous in jury selection. Juror exposure to and participation in deliberations promotes greater accuracy in jury decision making. Therefore, this information would assist legal counsel and jury consultants in being able to make decisions on whether to strike certain potential jurors from the jury pool. When advising legal counsel, jury consultants need to be able to make a definitive decision on whether to keep or strike a potential juror.

Based on results from the present study, individuals who identified as married, Catholic, and Republican, and held positive DNA beliefs were less likely to vote independently when rendering their verdicts following jury deliberations. Naturally, jurors are more accountable for their opinions and their verdicts when required to deliberate the case with other jurors (Shaffer & Wheatman, 2000). However, in this case, these particular jurors appeared more flexible and actually had a tendency to change their verdict following jury discussions. Consequently, these jurors may have been more inclined than other jury members to submit to the group decision. Equally, these

individuals may be less likely to become holdout jurors when deciding cases on actual juries.

The current findings may also present additional challenges for the complex and rather unscientific practice of jury selection. Paradoxically, these types of individuals may not represent the ideal, fair and impartial juror, yet prosecution and defense attorneys alike may still desire to select these individuals as potential jury members. Assembling a jury who can decide the case without partiality or prejudice is a primary concern of the attorneys and the Court during jury selection (American Bar Association, 2005; Deverman, 1995; Rose & Diamond, 2008; Schniederjans & Hollcroft, 2005). From the lawyers' perspective, the goal of jury selection is to excuse those from the jury pool who (1) hold the strongest biases and (2) appear less favorable to their particular side; i.e., hold anti-defendant bias or bias against prosecutors or law enforcement (Bonazzoli, 1998; Hurney & Sellers, 2008; Mize & Hannaford-Agor, 2008; Rose & Diamond, 2008; Schniederjans & Hollcroft, 2005). The type of defendant (i.e., member of an out-group) and the crime itself (i.e., white-collar crime vs. violent crime) also plays a major role in what types of individuals attorneys select as jurors. Thus, for most juries, the final jury verdict may depend on multiple factors, only some of which include jury-defendant similarity, the level of authoritarianism of jurors, and the strength of the evidence presented at trial.

Legal professionals' assessment of potential jurors specifically for their beliefs about DNA evidence for cases involving forensic DNA evidence may also serve as a

safeguard against electing prejudiced jurors to the jury. A first step in addressing this challenge may require attorneys to conduct a more thorough assessment of these characteristics of potential jurors during voir dire. Mandating extended voir dire proceedings in jurisdictions that do not currently employ extended juror interviewing would be another way to avoid impaneling potentially biased jurors. Additionally, integrating measures of jurors' DNA beliefs into pre-submission jury questionnaires, like the one used in this study, may also prove useful.

### **Limitations**

This study has several limitations. The first potential limitation rests with the design of the study. In this experiment, half of the juries were asked to report their pre-deliberation verdicts of guilty or not guilty after entering the virtual jury chatroom. During this initial polling of the jurors, some jurors rendered verdicts of undecided before and also during the deliberation process. Upon conclusion of jury deliberations, all jurors gave a verdict of guilty or not guilty with regard to the case. Consequently, all verdicts of undecided were considered not guilty verdicts by the researcher. Thus, this alteration may have unduly influenced the research findings. It is also possible that this change had no effect on the study's results, as a juror who is undecided about a defendant's guilt beyond a reasonable doubt in a real criminal case is ultimately compelled to render a not guilty verdict (Garner, 2004).

Another related limitation of the present study was the time restriction placed on jury deliberations. In the original study design, jury deliberations were limited to

approximately one hour depending on the flow and activity of jury discussions. Jury deliberations for the six juries conducted in this experiment lasted an average of 44 minutes (ranging between 32 and 61 minutes). All juries took between two and four votes, including pre-deliberation votes and final votes. After rendering their final verdicts, jurors were asked by the foreperson if additional time would likely make a difference in their verdict. This response was used to make a determination if further deliberations were necessary. Thus, time constraints on the jury deliberations in the present study could have reasonably affected jurors' final verdicts. With this in mind, the current study's findings must be interpreted with caution.

The trial stimulus utilized may have also represented a limitation in the present study. To date, the existing research has not confirmed the efficacy of written or audio taped versus videotaped or mock trial stimuli. While some studies have found that experiments utilizing more realistic presentation media were associated with higher interest by jurors (Narby et al., 1993), other research has indicated that the inherent restrictions of these trial presentation modes did not affect juror verdicts (Kramer & Kerr, 1989; MacCoun & Kerr, 1988; Stasser, Kerr, & Bray, 1982). Given the mixed results, it is possible that the trial stimulus may have unfairly influenced the nature of the current study's results.

The population sampled could represent another study limitation. The participant sample was limited to students enrolled in undergraduate courses offered at a large public university. This sample population consisted of highly educated, mostly female

participants, with the majority being between 25 and 34 years of age. A non-student population might be more representative of the diversity found among potential jurors in the general population. It is also possible that if the present study had utilized a non-student population, beliefs about DNA evidence may have differed significantly from those held by the current study participants. Another complication related to the participant sample was the relatively low number of male participants in the study. Obtaining a more even male to female sample ratio would increase male participation in the deliberative phase which could influence verdict outcomes. These factors may have limited generalizability to other populations and produced selection and maturation threats to internal validity. As such, utilizing a mostly female, student population may have greatly influenced jury deliberations and post-deliberation verdicts.

The sample size could be viewed as a potential limitation in this study. Eight 12-person juries were assembled for the initial study. Due to the aforementioned complications with the analysis of those data, it was decided that a second round of data collection would be conducted. Due to time constraints related to collecting the data during a summer semester (approximately four weeks), the second sequence of data collection included six 12-person juries. While a design of six 12-person juries was large enough to yield adequate statistical power for the study, ideally, additional juries may have contributed to a greater variability in guilty and not guilty verdicts. Thus, additional time for data collection would have allowed for higher participant recruitment and more juries. Additional juries may have rendered different and/or statistically significant

results. Conversely, it is also possible that a larger sample size was immaterial in that, due to the nature of the jury trial, most trials do not yield even splits of guilty and not guilty verdicts.

Use of the DNA Beliefs Questionnaire could also be considered a potential study limitation. It should be noted that at the time of data collection, an empirically derived measure had not been constructed for the scientific study of beliefs about DNA evidence (Lemieux, 2008). The measure utilized in the current study was developed specifically for this research by combining three questions taken from a previous study questionnaire measuring beliefs about DNA (Lemieux, 2008) with seven additional questions about DNA beliefs in an effort to assess individuals' primary beliefs about DNA evidence. Since this study involved the first implementation of this instrument in empirical research, it is not known whether the questionnaire measured, as purported, jurors' true beliefs and attitudes about DNA evidence or if the questions elicited jurors' basic knowledge about DNA. In addition, this instrument was a self-report measure and, as such, bias and errors in the participants' responses were an inherent and uncontrollable limitation.

Another potential methodological limitation to the present study could be the use of a mock jury. Utilizing a mock jury in jury research may result in findings less generalizable to actual juries. Participants in this study were aware that this was a simulation of a criminal case and not a real murder trial and; therefore, jurors knew there would be no consequences for changing their mind about the verdict. Further

complicating this point is that this study used virtual mock jury deliberations. No data on research utilizing virtual mock jury deliberations is available at this time. Thus, the juror anonymity inherent with mock jurors deliberating in a virtual jury chatroom could have also influenced how jury members interacted with fellow jurors during deliberations and influenced their final verdicts. At the same time, transcripts from jury deliberations indicated that jurors appeared vested in their role as jury members and seemed to take jury deliberations seriously. It is noteworthy that past research has shown that mock juries tend to emulate actual juries in any given case (Bornstein, 1999; Devine et al., 2001; Saks, 1997).

### **Future Directions**

The current study presents a unique contribution to the existing literature on jurors' beliefs about DNA evidence and juror decision making. As previously mentioned, this study was conducted using the Internet as the communications medium. Moreover, a new research methodology (a virtual jury room) was introduced to facilitate jury deliberations and record juror verdicts. Future studies utilizing the World Wide Web and the Internet to examine jury dynamics are recommended. This platform for conducting research offers increased flexibility for research designs for future jury studies. The potential for access to a much larger and geographically diverse sample population and the ability to present real-time content represent two significant benefits of implementing this method for studying juries.

More extensive research on the relationship between jurors' DNA beliefs and juror decision making may also be conducted using a more realistic trial presentation mode. Future studies could continue to utilize advanced methodologies for trial delivery and deliberations while introducing a more realistic trial stimulus, such as streaming video, into the mix. Research using this design could examine whether streaming video would better replicate a true court case over written stimuli in a virtual setting. This proposed medium of trial presentation would provide research jurors with a means to observe the body language of the witnesses, the defendant, and the legal advocates in the case. Findings from such an experiment would likely provide further data on jurors' assessment and decision process of a criminal case.

The results and limitations of the current study also present the need for future research in this area. One suggestion for expansion of the present study would be to conduct a more in-depth analysis of jurors' beliefs about DNA evidence and their relationship to changing verdicts. Learning more about pre- to post-deliberation verdict change with respect to DNA beliefs would be of particular interest, as no other research has been conducted on this phenomenon. Another related area for future research would be the examination of how jury deliberation styles can potentially influence juror verdicts in criminal cases that present DNA evidence.

While the current findings may reflect influences from social learning theory and group relations (Bandura, 1977; Jones & Roelofsma, 2000), it is unclear their effect on the direction of the verdict. More research regarding the social and cognitive processes

that occur in groups would be particularly salient with respect to the fair and effectual execution of the jury process. Equally, these results may or may not be explained by the moderating effect associated with the process that occurs among a deliberating jury. Or could some other variable be responsible for this phenomenon? Further investigation into this question is needed before definitive conclusions can be made.

It is also important for future jury research to consider other possible improvements to the present study. One methodological innovation would be to develop a reliable and valid way of measuring jurors' beliefs about DNA evidence. An empirically validated instrument could be used in future research to more accurately assess how jurors' beliefs and attitudes about DNA evidence impact their verdicts in criminal cases. Another limitation of the current study that could be addressed in future research is the use of a student sample population. Therefore, utilizing a non-student sample of research jurors might provide a more ecologically valid context for future jury research. Recruiting additional juries may also make a difference in the ability to determine statistically significant predictors of verdict outcomes and change in verdict post-deliberation, as studying more juries may result in a more even final verdict split. Limitations to data analysis occurred in this study due to a greater number of not guilty verdicts than guilty verdicts post-deliberation. Conversely, due to the nature of the jury trial, it could also be true that most juries do not yield even splits of guilty and not guilty verdicts. Thus, it is unclear if increasing the sample size would make a significant difference in the jurors' final verdicts.

## **Conclusion**

The United States legal system stands out among the industrialized countries as one of the best systems of justice in the world. In recent years, the American criminal justice system has undergone a substantial transformation due to significant technological advances in forensic DNA identification techniques and the resulting introduction of DNA evidence into criminal trials (Giannelli, 1997; Kaye, 1995; Murphy, 2007; National Research Council, 1996; Thompson, 1993). At the same time, the American public has been inundated with information about DNA proliferated by the mass media. Thus, significant technological innovations and the public's mass exposure to forensics have hastened the need to learn more about the impact of forensic DNA evidence presented at trial on juror behavior and decision making. Investigations into jurors' beliefs about DNA evidence and their resulting influence on jurors' conceptions of the case and verdict preferences are necessary in order to learn more about how to better understand juror decision making, reduce bias, improve jury selection techniques, and increase the accuracy and reliability of the criminal justice system. The constitutional commitment to providing every citizen with the opportunity for a fair and just legal process continues to be a principal goal for judicial institutions and legal advocates. The justice system and society in general will continue to benefit by filling the gaps in existing research on jury behavior. Further analysis of the complex question of how juries decide cases will likely contribute to both improvements and advancements within the legal system.

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## APPENDIX A

### Juror-Qualifying Survey

## Juror-Qualifying Survey

Please complete the following five minute survey to participate as a research juror in the upcoming case. The trial will be conducted via the Internet and research jurors will deliberate via a virtual jury chatroom. Your participation as a juror is very important. Your thoughts, feelings, beliefs, and decisions about the upcoming case and the issues presented will help to identify important juror attitudes relating to juror decision making and further research in the area of juror verdicts and selection.

All fields are required. Please type your answer or click on an option where appropriate. All of your information will be kept confidential. Thank you.

1) Name (Last, First, MI or Maiden)

2) Date of Birth (mm/dd/yy)

3) Age

4) Street Address

City

State

Zip

5) Home Phone (area code and number)

6) Work Phone (area code and number)

7) Cell Phone (area code and number)

8) Email Address

9) How do you access the internet? (Please indicate which best applies)

Dial up/ISP

DSL

Cable

Mobile/Wireless

10) Please indicate which web browser you use:

Internet Explorer

Mozilla Firefox

Thunderbird

Safari

11) Are you a U.S. citizen?  Yes  No

12) Are you a registered voter?  Yes  No

13) Political Affiliation  Democrat  Republican  Independent  Other

14) Do you have a current valid state driver's license?  Yes  No

State Issued:

15) Gender  Male  Female

16) Relationship Status

Single  Married  Separated  Divorced  Widowed

Living with someone

17) Please indicate how many children you have?

18) Do you supervise minor children at your home?  Yes  No

19) Your Occupation (if retired or unemployed, list last occupation)

20) Your Employer (if retired or unemployed, list last employer)

21) Your Spouse/Domestic Partner's Occupation

22) What is the highest level of education you have attained?

23) Degree in (if applicable)

24) Ethnicity

25) Religion (if applicable)

26) Have you ever been convicted of a felony?  Yes  No

27) Do you currently have a jury summons?  Yes  No

Please click on “Submit”

**Submit**

APPENDIX B  
DNA Beliefs Questionnaire

## DNA Beliefs Questionnaire

**IMPORTANT:** Enter your Juror # (Required so you can receive credit)

Age

Gender  Male  Female

Ethnic Origin

Language you are most comfortable speaking:

Have you ever served on a jury in the United States?  Yes  No

If yes, when?

This questionnaire is designed to examine your knowledge about common types of evidence in criminal hearings in American courts. Please select the answer or number that best corresponds to what you think. You may not know an exact answer to a particular question, but please give your opinion on all items.

1. How important is DNA evidence in determining the guilt of an accused criminal?

Not at all  A little  Somewhat  Very  Extremely  
important      important      important      important      important

2. How accurate is DNA evidence?

Not at all  A little  Somewhat  Very  Extremely  
accurate      accurate      accurate      accurate      accurate

3. How often do forensic scientists make mistakes about DNA evidence (i.e., that they are wrong when they report a DNA match with the accused)?

Never  Seldom  Sometimes  Often  Always

4. What is the possibility of forensic scientists making laboratory errors (human errors in the DNA lab)?

Never      Seldom      Sometimes      Often      Always

5. What is the possibility that a DNA match could have been declared between the defendant and some crime scene evidence due to intentional tampering by the police, prosecutor, or criminalist?

Never      Seldom      Sometimes      Often      Always

6. How likely is it that a DNA match report could have resulted from random chance?

Not at all      A little      Somewhat      Very      Extremely  
likely      likely      likely      likely      likely

7. How often do crime scene investigators under-utilize DNA as evidence in criminal cases (e.g., DNA not collected or tested as often as it should be)?

Never      Seldom      Sometimes      Often      Always

8. How important is it that DNA evidence is adequately collected and stored over time?

Not at all      A little      Somewhat      Very      Extremely  
important      important      important      important      important

9. If DNA test results indicate strong evidence that DNA did NOT come from a particular suspect, it means that suspect is innocent of the crime.

Never      Seldom      Sometimes      Often      Always

10. If DNA test results indicate strong evidence that the DNA came from a particular suspect, it means that suspect is guilty of the crime.

Never      Seldom      Sometimes      Often      Always

Please click on "Submit"

**Submit**

## APPENDIX C

### Right-Wing Authoritarianism Scale

## Right-Wing Authoritarianism Scale

\* **IMPORTANT:** Enter your Juror # (Required so you can receive credit)

This scale is part of an investigation of general public opinion concerning a variety of social issues. You will probably find that you *agree* with some of the statements, and *disagree* with others, to varying extents. Please indicate your reaction to each statement by rating your response according to the following scale:

- 4 if you *very strongly disagree* with the statement.
- 3 if you *strongly disagree* with the statement.
- 2 if you *moderately disagree* with the statement.
- 1 if you *slightly disagree* with the statement.
- 0 if you feel precisely *neutral* about the statement.
- +1 if you feel *slightly agree* with the statement.
- +2 if you *moderately agree* with the statement.
- +3 if you *strongly agree* with the statement.
- +4 if you *very strongly agree* with the statement.

You may find that you sometimes have different reactions to different parts of a statement. For example, you might very strongly disagree (“-4”) with one idea in a statement, but slightly agree (“+1”) with another idea in the same item. When this happens, please combine your reactions, and write down how you feel “on balance” (i.e., a “-3” in this example).

1. Life imprisonment is justified for certain crimes.

<input type="radio"/> -4 very strongly disagree	<input type="radio"/> -3 strongly disagree	<input type="radio"/> -2 moderately disagree
<input type="radio"/> -1 slightly disagree	<input type="radio"/> 0 feel precisely neutral	<input type="radio"/> +1 slightly agree
<input type="radio"/> +2 moderately agree	<input type="radio"/> +3 strongly agree	<input type="radio"/> +4 very strongly agree

2. Women should have to promise to obey their husbands when they get married.

<input type="radio"/> -4 very strongly disagree	<input type="radio"/> -3 strongly disagree	<input type="radio"/> -2 moderately disagree
<input type="radio"/> -1 slightly disagree	<input type="radio"/> 0 feel precisely neutral	<input type="radio"/> +1 slightly agree
<input type="radio"/> +2 moderately agree	<input type="radio"/> +3 strongly agree	<input type="radio"/> +4 very strongly agree

3. The established authorities in our country are usually smarter, better informed, and more competent than others are, and the people can rely upon them.

<input type="radio"/> -4 very strongly disagree	<input type="radio"/> -3 strongly disagree	<input type="radio"/> -2 moderately disagree
---	--	--

-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

4. It is important to protect the rights of radicals and deviants in all ways.
- 4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree
5. Our country desperately needs a mighty leader who will do what has to be done to destroy the radical new ways and sinfulness that are ruining us.
- 4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree
6. Gays and lesbians are just as healthy and moral as anybody else.
- 4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree
7. Our country will be great if we honor the ways of our forefathers, do what the authorities tell us to do, and get rid of the “rotten apples” who are ruining everything.
- 4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree
8. Atheists and others who have rebelled against the established religions are no doubt every bit as good and virtuous as those who attend church regularly.
- 4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree
9. The *real* keys to the “good life” are obedience, discipline, and sticking to the straight and narrow.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

10. A lot of our rules regarding modesty and sexual behavior are just customs which are not necessarily any better or holier than those which other people follow.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

11. There are many radical, immoral people in our country today, who are trying to ruin it for their own godless purposes, whom the authorities should put out of action.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

12. It is always better to trust the judgment of the proper authorities in government and religion than to listen to the noisy rabble-rousers in our society who are trying to create doubt in people's minds.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

13. There is absolutely nothing wrong with nudist camps.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

14. There is no "ONE right way" to live life; everybody has to create their *own* way.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

15. Our country will be destroyed someday if we do not smash the perversions eating away at our moral fiber and traditional beliefs.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

16. Homosexuals and feminists should be praised for being brave enough to defy “traditional family values.”

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

17. The situation in our country is getting so serious, the strongest methods would be justified if they eliminated the troublemakers and got us back to our true path.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

18. It may be considered old fashioned by some, but having a normal, proper appearance is still the mark of a gentleman and, especially, a lady.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

19. Everyone should have their own lifestyle, religious beliefs, and sexual preferences, even if it makes them different from everyone else.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

20. A “woman’s place” should be wherever she wants to be. The days when women are submissive to their husbands and social conventions belong strictly in the past.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree

+2 moderately agree

+3 strongly agree

+4 very strongly agree

21. What our country really needs is a strong, determined leader who will crush evil, and take us back to our true path.

-4 very strongly disagree

-3 strongly disagree

-2 moderately disagree

-1 slightly disagree

0 feel precisely neutral

+1 slightly agree

+2 moderately agree

+3 strongly agree

+4 very strongly agree

22. People should pay less attention to the Bible and the other old traditional forms of religious guidance, and instead develop their own personal standards of what is moral and immoral.

-4 very strongly disagree

-3 strongly disagree

-2 moderately disagree

-1 slightly disagree

0 feel precisely neutral

+1 slightly agree

+2 moderately agree

+3 strongly agree

+4 very strongly agree

23. The only way our country can get through the crisis ahead is to get back to our traditional values, put some tough leaders in power, and silence the troublemakers spreading bad ideas.

-4 very strongly disagree

-3 strongly disagree

-2 moderately disagree

-1 slightly disagree

0 feel precisely neutral

+1 slightly agree

+2 moderately agree

+3 strongly agree

+4 very strongly agree

24. Our country *needs* free thinkers who will have the courage to defy traditional ways, even if this upsets many people.

-4 very strongly disagree

-3 strongly disagree

-2 moderately disagree

-1 slightly disagree

0 feel precisely neutral

+1 slightly agree

+2 moderately agree

+3 strongly agree

+4 very strongly agree

25. There is nothing wrong with premarital sexual intercourse.

-4 very strongly disagree

-3 strongly disagree

-2 moderately disagree

-1 slightly disagree

0 feel precisely neutral

+1 slightly agree

+2 moderately agree

+3 strongly agree

+4 very strongly agree

26. It would be best for everyone if the proper authorities censored magazines so that people could not get their hands on trashy and disgusting material.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

27. It is wonderful that young people today have greater freedom to protest against things they don't like, and to make their own "rules" to govern their behavior.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

28. What our country *really* needs, instead of more "civil rights", is a good stiff dose of law and order.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

29. Some of the best people in our country are those who are challenging our government, criticizing religion, and ignoring the "normal way" things are supposed to be done.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

30. Obedience and respect for authority are the most important virtues children should learn.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

31. Nobody should "stick to the straight and narrow." Instead, people should break loose and try out lots of different ideas and experiences.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree

-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

32. Once our government leaders give us the “go ahead,” it will be the duty of every patriotic citizen to help stomp out the rot that is poisoning our country from within.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

33. We should treat protestors and radicals with open arms and open minds, since new ideas are the lifeblood of progressive change.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

34. The facts on crime, sexual immorality, and the recent public disorders all show we have to crack down harder on deviant groups and troublemakers if we are going to save our moral standards and preserve law and order.

-4 very strongly disagree      -3 strongly disagree      -2 moderately disagree  
-1 slightly disagree      0 feel precisely neutral      +1 slightly agree  
+2 moderately agree      +3 strongly agree      +4 very strongly agree

## Thank You

For your participation in this study

## APPENDIX D

### Written Trial Summary

## **Written Trial Summary**

*Note.* The following stimulus trial was developed by: Lemieux, J. M. T. (2008). The relationship between beliefs, strength of evidence, statistical presentation, and expert testimony on jury decision-making in DNA cases. (Doctoral dissertation: Carleton University, 2008). *Dissertation Abstracts International*, 68(10-B), 7007. It has been slightly modified for this experiment.

Thank you for agreeing to take part in this research.

On the following pages is a summary of the trial transcript in the case of New York v. Anton. Please read the transcript and try to image yourself as a juror faced with this evidence. Once you have read through the trial, you will be asked to deliberate the case and arrive at a verdict.

Please treat this as an independent exercise. We are interested in your opinions and therefore it is very important for the purposes of the research that you refrain from discussing the case with other people who may be participating in this study.

### **Judge's Instructions**

Jim Anton has been charged with the crime of murder in the first degree. The State has the burden of proving that charge beyond a reasonable doubt. It is your duty to read all of the evidence, to decide the facts, and then to apply the law that I give you at the end of the trial.

The case will begin with opening statements from the prosecution and the defense attorneys. Each will tell you what they expect to prove. These statements are not evidence, they are only a summary to help you follow the case.

The prosecution will then call witnesses for the State. After the prosecution has finished questioning a witness, counsel for the accused will be allowed to question the same witness. After all the witnesses for the prosecution have been heard, the accused's attorney may choose to present witnesses on the accused's behalf.

### **Prosecution's Opening Statement**

Darren Williams (deceased) and Jim Anton (accused) were friends aged 31 and 34 years old, respectively who lived in the city of Buffalo. They met several years ago when they were both studying together at the University of Buffalo.

Witnesses will testify regarding the events that transpired the evening of the killing. On this night, Jim, Darren, and two other male friends played cards at Jim's house. The men decided to place monetary bets on their card games, and by the end of the evening,

Darren owed Jim one thousand dollars. Jim asked to collect the money that Darren owed him, but Darren refused to pay. Darren went to leave Jim's house, and Jim followed him outside where an argument over the money ensued between the two men. The two men walked away from each other after the argument and Jim was still extremely angry. About a half hour after they walked away from each other, the victim, Darren Williams, was found dead on the side of the road.

Witnesses will testify that Jim had been heard not only making death threats towards Darren, but that Jim has a history of verbal and physical violence towards others. Two witnesses will testify that on the night of the murder, Jim said to Darren, "If you don't pay up, I'm going to kill you."

Forensic examinations revealed that Darren Williams was killed by multiple stab wounds to the chest inflicted by a machete. Blood samples were found on Darren William's body near his stab wounds and you'll hear from an expert witness that the DNA in those blood samples matched the DNA in blood samples provided by Jim Anton. Our evidence will show that in a fit of rage over the card game, Jim Anton returned and killed Darren Williams after their argument. As such, it is your duty to find him guilty of murder.

### **Defense's Opening Statement**

Jim Anton did not kill his old time friend, Darren Williams. Not only were the two men best friends, they were like brothers. And like brothers sometimes do, Jim and Darren got mad at each other over a card game bet.

Witnesses, including Jim Anton himself, will testify regarding how close Jim and Darren were and how they often got into verbal arguments but were quick to forgive each other and move on. You will also hear from another witness who will testify that on the night of the murder and in the same neighborhood where it occurred, she was out walking her dog and was approached by a strange man asking if she had any change.

Indeed, Darren was killed by the stab wounds he suffered to the chest and yes, some blood samples were found near the wounds. Even if the DNA in these blood samples did match Jim Anton's DNA, this is not enough evidence to conclude that Jim committed the murder. You will hear from a second expert witness that during the analysis of the blood, contamination of the samples may have taken place and that the State's results may not be accurate. In fact, given that Darren was over at Jim's place that evening and that he had a nosebleed, it is not surprising that Jim's blood was found on Darren. This does not make Jim Anton a murderer, only someone who happened to shed blood due to a nosebleed. You will also hear that the murder weapon was never found and that Jim Anton never owned a machete.

Darren Williams' murder is beyond doubt a tragedy. What is even more tragic is that the true perpetrator of the crime is still somewhere out there, perhaps waiting to strike again. The prosecution will not be able to demonstrate that Jim Anton was responsible for his best friend's death. Therefore, you must find Jim Anton not guilty of murder.

### **State's First Witness: Constable Dirk McHugh**

On Direct Examination by the State, Constable McHugh testified that:

- on the night of November 29, 2004, he and Sergeant Kealy took pictures of the crime scene and of Jim Anton's house
- the crime scene was located approximately 1.5 miles from Jim Anton's house and that the estimated time of the murder was approximately 8:20 p.m.

STATE AND McHUGH GO THROUGH PICTURES AND EXHIBITS:

- photographs show Jim Anton's dining room table with empty soda cans, a deck of cards, and two of four chairs knocked over
- photograph of Jim's front hallway shows a door knob impression in the wall and a splintered door hinge
- photograph of Jim's front yard shows scuffle marks in the grass and spit on the driveway
- photograph of Darren Williams' body with blood stains and 4 stab wounds to the chest
- photograph showing positioning of the body and the condition of the deceased's fingernails as consistent with the victim struggling with his assailant before being stabbed in the chest

Exhibit 1: - photograph of two blood samples obtained from the crime scene NOT belonging to the victim himself

Exhibit 2: - photograph of two blood samples obtained from Jim Anton

Exhibit 3: - close-up photograph of the victim's stab wounds  
- entry marks consistent with marks left by a machete knife

When Cross Examined by the Defense, Constable McHugh testified that:

- it was unclear whether or not the door knob impression and splintered door hinge had occurred the night of the murder
- there were blood stains at the bottom of Jim Anton's front steps
- that Jim Anton was somewhat reluctant to give a sample of his blood, but ultimately ended up doing so
- the machete knife used in the stabbing has not been located

### **State's Second Witness: Rosa Scove**

On Direct Examination by the State, Rosa Scove testified that:

- she is Jim Anton's next door neighbor and has been for the past 6 years
- on the evening of November 29, 2004 at about 7:30 p.m., she heard a commotion coming from inside Jim's house. It sounded as though two men were screaming at each other
- she heard a banging that sounded like Jim's front door and from her living room window she saw Jim and two other men exit Jim's house
- she opened her window slightly to hear what was going on and she heard Jim and one of the other men arguing over money
- she heard Jim say to the man, "If you don't pay me, I'm going to kill you" and the two men were getting into each other's faces
- she saw the third man get between the two who were fighting in order to break them up
- she saw the eventual victim walk away from the house and head down the street while Jim and the man who tried to break Jim and Darren up went back into Jim's house
- she had on two separate occasions witnessed Jim punch another man on his front lawn after an argument

When Cross Examined by the Defense, Rosa Scove testified that:

- on one of the occasions when she witnessed Jim punch another man, the man had hit Jim first
- she was not wearing her eyeglasses when she watched through her window

- she has on several occasions asked Jim to watch her house for her while she has been away on vacation

### **State's Third Witness: Ronald Fillmore**

On Direct Examination by the State, Ronald Fillmore testified that:

- he had been friends with both Jim and Darren for over 10 years
- he had been playing cards at Jim's house the night of the murder
- he, Jim, Darren, and a fourth friend had been playing poker and betting on the games
- Jim was having a lucky night and winning a lot of the games
- Darren kept thinking he would win and kept betting on new games until he owed Jim one thousand dollars
- Jim asked Darren to write him a check for the one thousand dollars
- Darren said he would not write the check and that he had no intention of ever paying Jim
- Jim jumped out of his chair, knocking it over, and went right up to Darren's face and started screaming at him to pay up
- Darren told Jim he was out of control and said he was leaving
- Jim followed Darren out of the house, yelling and swearing at him and spitting on the ground. As he walked out, Jim tripped on the stairs, fell down, and his nose began to bleed. He said to Darren, "If you don't pay me, I'm going to kill you"
- Jim and Darren were getting in each other's faces, so he stepped between the two of them to break up the fight
- Darren walked away by himself down the street
- he and Jim went back into Jim's house
- he told Jim he was out of line with how he reacted and what he said to Darren

- he left Jim's house at about 7:50 p.m., about 10 minutes after Darren had walked away

When Cross Examined by the Defense, Ronald Fillmore testified that:

- in the past, Jim had threatened to kill him when he got really mad but had never followed through on the threats
- after Darren had left and he (Ronald) and Jim went back into Jim's house, Jim acknowledged that he had been inappropriate with Darren and said he would call him first thing in the morning to apologize
- Jim said he was going to call it an early night and go to bed

State's Fourth Witness: Dr. Eileen Schumann

On Direct Examination by the State, Dr. Schumann testified that:

- she is a forensic scientist who specializes in DNA evidence with publications in numerous journals and presentations at several professional conferences
- she is the lead forensic scientist at the Avery DNA laboratory located in Ottawa, Ontario, and has been working there for over 15 years
- she has been qualified as an expert witness in DNA analysis and population genetics by other courts over 20 times
- forensic DNA science is a branch of science concerned with the identification of individuals who match DNA profiles found at a particular place such as a crime scene
- population genetics is the branch of science in which statistics that explain the frequency with which a particular DNA pattern appears in a given population are studied and analyzed
- the guidelines for proper collection of DNA evidence include:
  - o proper training to specialized forensic police officers in the areas of collection, preservation, and packaging of DNA evidence

- officers taking precautions such as wearing gloves and face masks to minimize their exposure to infectious agents, as well as to preclude transfer of their own DNA to evidence
  - separate packaging of samples from different crime scenes as well as crime scene samples and comparison samples from persons of interest
  - where relevant, items should be handled and packaged in a manner that preserves trace evidence such as hair, fiber, paint, soil, or gunshot residue
  - for every evidence item collected, the officer should note who collected the item, the date, the location, and a brief item description
  - item packaging should be properly labeled and closed to protect the items from extraneous substances, as well as from unauthorized access
  - it is vitally important to protect evidence from exposure to heat and moisture, both of which have deleterious effects on DNA
  - wet items require passive air-drying prior to packaging
  - to maintain continuity of evidence items and therefore admissibility in court, items should be uniquely labeled, properly packaged, and each transfer of the item should be documented
- she was asked to examine DNA evidence in the form of blood samples that were found on Darren Williams' body the night he was murdered along with blood samples obtained with some reluctance from the defendant, Jim Anton
  - to her knowledge, all the proper guidelines and procedures for the collection and analysis of DNA evidence had been followed
  - the DNA test results showed a match between Jim Anton's blood samples and those found on the victim's body

On Cross Examination by the Defense, Dr. Schumann testified that:

- there are two types of errors (false positives) that can occur with DNA evidence
- a Random Match Error is the probability of a match being declared due to random chance
- a Lab Error Rate is the probability that a match report was declared due to a human error that occurred in the DNA lab
- the probability of either a Random Match or Lab Error for the current DNA evidence was about 1 in one billion
- except for the blood samples, no other DNA evidence was submitted for analysis

## End of State's Case

### Defense's First Witness: Jim Anton

On Direct Examination by the Defense, Jim Anton testified that:

- he and Darren Williams had been best friends since they met at college 12 years ago and that Darren was like a brother to him
- he had invited Darren and two other friends to play cards at his place on the night of November 29, 2004
- everyone was betting for money on the poker games they played
- Darren lost one thousand dollars to him but that when he went to collect the money, Darren refused to pay
- he got angry and started yelling at Darren to get him to pay up
- that the argument continued in his front yard and that he got so angry at Darren that he said to him, "If you don't pay me, I'm going to kill you" but that he said this without thinking and that he had no intention of following through on the threat
- that on his way into the front yard, he tripped and fell and as a result, his nose started to bleed
- after Darren walked away and he (Jim) had calmed down, he felt extremely bad about what he had said and how he had acted toward Darren and that he planned to call Darren in the morning to apologize
- he did not currently own nor had he ever owned a machete
- he did not kill Darren Williams

When Cross Examined by the State, Jim Anton testified that:

- at approximately 8:00 p.m. on the night of the murder, he left his house to go to the corner store to get some milk
- the store he went to was in the opposite direction from where Darren's body was found

- he had the tendency to “blow up” easily when he was mad about something
- he had on 2-3 occasions in the past five years been so angry that he got into a fist fight with various male friends

### **Defense's Second Witness: Elliot Sampson**

On Direct Examination by the Defense, Elliot Sampson testified that:

- he was the fourth person who had been playing cards at Jim Anton’s house the night of the murder
- he had been friends with both Jim and Darren for over 10 years
- on the night of the murder, he had left Jim’s house at approximately 6:45 p.m. before Jim and Darren had started fighting
- when he left, Jim and Darren were laughing and talking about the last poker hand they had played
- he had witnessed Jim and Darren get into many fights and arguments over the years but that they always forgave each other and stayed best friends
- in the context of these past fights and arguments, he had heard Jim and Darren say things such as “I’m going to kill you” to each other but that neither had ever followed through on the threats
- to his knowledge, Jim had never owned a knife or any kind of weapon

When Cross Examined by the State, Elliot Sampson testified that:

- Jim had once told him that he would love to get a machete one day
- Jim had recently told him that he was afraid he would not have enough money to pay his mortgage that month and that this would be the second month in a row
- Jim said the bank had allowed him to pay late last month but warned him not to let it happen again
- Jim said he would do anything to get his hands on some extra money

## **Defense's Third Witness: Anna Goldstein**

On Direct Examination by the Defense, Anna Goldstein testified that:

- that she lived a block away from where Darren's body was found
- she did not know Jim Anton personally, but that she had seen him around the neighborhood on different occasions
- that she was out walking her dog between 7:00 and 7:30 p.m. on the night of the murder
- that during her walk, a strange man whom she had never seen before approached her and asked if she had any money to spare
- that the man seemed nervous and kept looking around and that he was probably in his mid-40's, about 5'11" tall, weighing approximately 175 lbs, with brown hair and brown eyes
- that she told the man she had no money for him
- that after she told him this, he frowned and looked as though he was going to take a step closer to her
- that her dog barked and growled as the man started to move and that he immediately backed up and walked away
- that this incident was somewhat frightening to her and that she considered calling the police right away but decided not to because she thought maybe she was overreacting
- that after she heard about Darren's murder the next day, she immediately thought of the strange man and decided at that point to call the police

When Cross Examined by the State, Anna Goldstein testified that:

- the man could have been someone who lived in the neighborhood who she had never seen before
- the man never verbally threatened her in any way
- that the man did not give any indication that he was carrying a weapon on him

- that she could not tell where the man was headed after her encounter with him

### **Defense's Fourth Witness: Dr. Jane Covington**

On Direct Examination by the Defense, Dr. Covington testified that:

- she is a forensic scientist who specializes in DNA evidence with publications in numerous journals and presentations at several professional conferences
- she is the lead forensic scientist at Genetica DNA laboratories, located in Cincinnati, Ohio, and has been working there for approximately 18 years
- she has been qualified as an expert witness in DNA analysis and population genetics by other courts over 25 times
- she was asked on behalf of the defense to be present while the blood samples found on Darren William's body and those obtained from Jim Anton were analyzed by Dr. Schumann and her team
- she observed one of the lab technicians sneeze while handling the blood samples and that she believed the DNA evidence may have been contaminated as a result
- given this possibility of contamination, the probability of either a Random Match or Lab Error for the current DNA evidence was about 1 in 50

On Cross Examination by the Defense, Dr. Covington testified that:

- the lab technician did attempt to turn away from his work when he sneezed
- the technician was wearing a face mask when he sneezed but that the mask was loose enough that mucous from the sneeze could have escaped

### **End of Defense's Case**

### **Judge's Instructions**

Members of the jury, I will now instruct you as to the laws that apply to this case. The law is intended to be helpful to you in reaching a just and proper verdict in the case; however, it is not binding upon you as members of the jury and you may accept or reject it as you feel is appropriate to the case at hand.

The charge against Jim Anton is murder in the first degree. When dealing with a charge you must be satisfied that each element of the verdict has been proven by the State. For a finding of murder in the first degree, the intent to cause the death or bodily harm likely to cause death had to have been planned and deliberate by the accused. The presumption of innocence is in the accused's favor and the burden of proving him guilty beyond a reasonable doubt is on the State. You must decide whether Jim Anton is guilty or not guilty of murder in the first degree.

While you must give respectful attention to the laws, you have the final authority to decide whether or not to apply a given law to the acts of the defendant on trial. You, the jurors, represent the community and it is appropriate to bring into your decision, both the feelings of the community, and your own feelings based on your conscience. Despite your respect for the law, nothing would bar you from acquitting the defendant if you feel that the law, as applied to the situation before you, would produce an inequitable or unjust verdict.

Based on the information you read, please indicate whether you find the defendant, Jim Anton, **guilty** or **not guilty** of one count of murder in the first degree.

Once logged onto the private jury chatroom, you **may** be asked to provide your pre-deliberation verdict of guilty or not guilty.

APPENDIX E  
Recruitment Flyer

## Recruitment Flyer

The following flyer will be distributed by the principle investigator in undergraduate psychology classes at Texas Woman's University to solicit potential participants:

### **CHANCE TO EARN \$50 AND RECEIVE RESEARCH OR EXTRA CREDIT TOO! (4 Stamps)**

#### **PARTICIPATE AS A RESEARCH JUROR AND DELIBERATE A CRIMINAL CASE ONLINE FROM THE COMFORT OF YOUR OWN HOME**

**Title of Study:** Deconstructing the Minds of Jurors: Beliefs About DNA Evidence and Their Relation to Guilty Verdicts

- ✓ LEARN MORE ABOUT THE AMERICAN JUDICIAL SYSTEM
- ✓ GAIN KNOWLEDGE ABOUT IMPORTANT LEGAL ISSUES
- ✓ EARN EXTRA CREDIT      ✓ CHANCE TO WIN CASH!

Participation will take between 1.5 - 2 hours.

Juries will run in March and April, 2010

Go to: <http://www.deliber8thecase.com>  
Click on "Register"  
Enter survey #####  
Enter password: 12citizens

**FOR ADDITIONAL INFORMATION  
CALL:**

*Michelle Nadeau @ 972-965-0768  
Approved by Texas Woman's University*

Participation is voluntary and can be discontinued at anytime

**APPENDIX F**  
**Informed Consent Form**

## Informed Consent Form

### TEXAS WOMAN'S UNIVERSITY CONSENT TO PARTICIPANT IN RESEARCH

Title: Deconstructing the Minds of Jurors: Beliefs About DNA Evidence and Their Relation to Guilty Verdicts

Investigator: Michelle L. Nadeau, M.S., M.A.....[juryresearch@deliber8thecase.com](mailto:juryresearch@deliber8thecase.com)  
972-965-0768

Advisor: Sally D. Stabb, Ph.D.....[SStabb@twu.edu](mailto:SStabb@twu.edu) 940-898-2149

#### Explanation and Purpose of the Research

You are invited to participate in a research study for Mrs. Nadeau's dissertation at Texas Woman's University. The purpose of this research is to investigate the ways in which juror beliefs and attitudes about DNA evidence impact juror decision making and jury verdicts. You have been asked to participate in this study because you are currently enrolled in a freshman-level Introductory to Psychology or Developmental Psychology course at TWU.

#### Description of Procedures

As a participant in this study, you will be asked to spend 1.5-2 hours of your time as a "research juror" and deliberate a criminal case via the Internet. Upon accessing the study website, you will be asked to complete a Juror-Qualifying Survey. If you meet the juror-qualifying criteria, you will be asked to read a written trial summary of a criminal case and scheduled for an online jury deliberations session. On your scheduled day of jury deliberations, you will log on to the private jury chatroom for jury deliberations. You may be asked to electronically enter your initial individual verdict of guilty or not guilty prior to deliberating the case. Upon conclusion of jury deliberations, you will be instructed to electronically enter your post-deliberation verdict of guilty or not guilty. Following jury deliberations, you will be asked to complete two online surveys: the DNA Beliefs Questionnaire and The Right-Wing Authoritarianism Scale. In order to participate in this study, you must be at least 18 years of age or older and be a citizen of the United States.

#### Potential Risks

Potential risks related to your participation in this study include fatigue and physical or emotional discomfort that you may experience during the completion of the juror-qualifying survey or your online deliberations with others. To avoid fatigue, you may

take break(s) as needed. If you feel as though you need to discuss any physical or emotional discomfort with a professional, the researcher will provide you with a referral list of names and phone numbers that you may use. You will also receive via email tips for coping with potential symptoms of distress after jury duty as a means of debriefing following jury deliberations.

Another risk of participating in this study includes loss of time. To reduce this risk, all participants have the option of withdrawing at any time and can take breaks as needed during completion of the survey, questionnaire, scale, or jury deliberations.

Another risk in this study is loss of confidentiality. Confidentiality will be protected to the extent that is allowed by law. The only place that you will be asked to provide any identifying data (i.e., name, phone number, etc.) will be on the online juror-qualifying survey that you complete prior to beginning the study and when you log into the website for jury deliberations (name only). All surveys and the private jury chatroom in this study are password protected. A code name, not your real name, will be used during jury deliberations. No one but the researcher will know your real name. The results of the study will be reported in scientific magazines or journals, but your name or any other identifying information will not be included. All study data will be kept confidential and stored securely in a locked filing cabinet in the researcher's office. Only the researcher and her advisor will have access to this data. All experimental documents, including computer diskettes containing data files, will be shredded and/or destroyed within 5 years after the study is completed. There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions.

Coercion (via research/extracredit and financial remuneration) is also a possible risk of this study. To minimize this risk, participation is completely voluntary and participants can discontinue their participation in the study at any time without penalty. Participants' grades or class standing will not be affected in any way should they decide to withdraw from the study. There are multiple opportunities for extra credit from other sources throughout the semester, so participation in this particular study is not necessary for any student.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

### Participation and Benefits

Your participation in this study is completely voluntary and you may withdraw from the study at any time without penalty. Following the completion of the study, you will

receive research/extracredit (4 stamps) and will automatically be registered for a \$50 prize drawing. You have a 1 in 96 chance to win the \$50 prize. Your participation in this research study will serve to further the current knowledge base of the relationship between juror's beliefs about DNA evidence and juror verdicts within the literature and contribute to future research in the field.

### Questions Regarding the Study

In order to participate in this research study, it is necessary that you give your informed consent. By agreeing to this informed consent form, you are indicating that you understand the nature of the research study and your role in that research and that you agree to participate in the research. If you have any questions about the research study, you should ask the researchers; their phone numbers are at the top of this form. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via email at IRB@twu.edu.

If you would like to know the results of this study, please email the researcher at juryresearch@deliber8thecase.com and this information will be provided to you.

If you agree with these statements and consent to participate, please click on the 'Continue' button below:

**Continue**

APPENDIX G  
Login Instructions for Jury Deliberations

## Login Instructions for Jury Deliberations

To: Research juror participants

Re: Instructions for logging onto jury deliberation website and chatroom

These procedures should be followed for participation in jury deliberations. You will be participating on (date). We highly recommend that you TEST these procedures ahead of time in case there are any problems.

Please sign in some time before \_\_\_ PM Central Standard Time (CST). We will start promptly at (time) PM CST.

The password is **12citizens** (all one word, all lowercase)

With your computer on and after logging onto the internet –

1. Go to the website: **www.deliber8thecase.com**.
2. Click on “**Enter**” to access the welcome screen.
3. Click on “**Juror Log In**.”
4. You will see a screen with a box for your name. Type your first name and last name (**please do not use an Internet “nickname”**). You will see a screen with a box for your **Screen Name**. **Enter a name which will identify you to the other participants during the session**. Then click on “**Login**.”
5. You will see a message which says, “**This room requires a password in order to enter**.” **Enter the password** (above) and click “**OK**.” You are now in the chatroom
6. To type to the other participants in the chatroom, please **enter your text in the Input field, located below the Main Chat Window**. When you are done typing, **press “Enter”**.

If you have any problems logging on, please call 972-965-0768 for assistance.

Thank you so much. See you in the jury room!

Michelle Nadeau, Principle Investigator

Email: [juryresearch@deliber8thecase.com](mailto:juryresearch@deliber8thecase.com)

APPENDIX H  
Telephone Script

## Telephone Script

Hello Participant X,

My name is Michelle Nadeau and I'm a doctoral student at Texas Woman's University. I am conducting an investigation on juror decision making and I'm calling because you recently completed an online questionnaire to participate as a research juror. I would like to confirm that you are still interested in and available to participate as a mock juror in my study.

This study will examine juror attitudes relating to jurors' beliefs about DNA evidence and juror decision making in a criminal case.

It will involve you reviewing a summary of a criminal trial prior to your deliberating the case. You will then be asked to log on to the jury deliberation website and chatroom at the specified date and time to participate in juror deliberations. Also, you may be asked to provide your individual verdict as a research juror prior to jury deliberations. I will send you a reminder email prior to the online juror deliberations with logon instructions. Following deliberations, you will be asked to provide your post-deliberation verdict of the case. You will then be asked to complete a brief questionnaire about DNA evidence and a short personality scale.

That's basically it! After you complete the study requirements, you will receive research or extra credit and automatically be registered for a drawing for a \$50 prize.

[If participant accepts offer]. Ok, I will email you the link to the study website which further explains the research experiment and instructions on how to participate. My contact information is included on the cover letter in case you have any questions for me. Please feel free to call me. Do you have any questions for me right now?

Also, I just wanted to emphasize that your participation is voluntary and you can discontinue the study at any time without penalty.

Well, thank you so much for your time Participant X.

## APPENDIX I

### Tips for Coping after Jury Duty

## **Tips for Coping after Jury Duty**

### ***The Jury Duty Experience:***

Thank you for participating as a research juror in this study. Being on a jury is a rewarding experience which in some cases may be quite demanding. You were asked to read a written case summary and examine facts and evidence. Coming to decisions is often not easy, but your participation is appreciated.

Serving on a jury is not a common experience and may cause some jurors to have temporary symptoms of distress.

Not everyone feels anxiety or increased stress after jury duty. However, it may be helpful to be aware of the symptoms if they arise.

Some temporary signs of distress following jury duty include: anxiety, sleep or appetite changes, moodiness, physical problems (e.g. headaches, stomach aches, no energy, and the like), second guessing your verdict, feeling guilty, fear, trouble dealing with issues or topics related to the case, a desire to be by yourself, or decreased concentration or memory problems.

Symptoms may come and go, but will eventually go away. To help yourself, it is important to admit any symptoms you may have and deal with any unpleasant reactions.

### ***Coping Techniques After Serving On A Jury:***

- Talk to family members and friends. One of the best ways to put your jury duty experience in perspective is to discuss your feelings and reactions with loved ones and friends. You may also want to talk with your family physician or a member of the clergy.
- Stick to your normal, daily routines. It is important to return to your normal schedule. Don't isolate yourself.
- Remember that you are having normal responses to an unusual experience.
- You can deal with signs of distress by cutting down on alcohol, caffeine, and nicotine. These substances can increase anxiety, fatigue and make sleep problems worse.
- Relax with deep breathing.  
Breathe in slowly through your nose.  
Breathe out through your mouth.  
Slow your thoughts down and think about a relaxing scene.  
Continue deep breathing until you feel more relaxed.

- Cope with sleep problems.  
Increase your daily exercise, but ~~do~~ not exercise just before bedtime.  
Decrease your caffeine consumption, especially in the afternoon or evening.  
Do "boring" activities before bedtime.  
Listen to relaxation tapes or relaxing music before bedtime.

***Final Thoughts:***

- Remember that jury service is the responsibility ~~of~~ good citizens.
- Resist negative thoughts about verdict.
- No matter what others think about the verdict, your ~~opinion~~ is the only one that matters.
- You don't have to prove yourself to anyone.

If signs of distress persist for two weeks after the jury service has ended, you may want to consider contacting your physician.

APPENDIX J  
Revised Written Trial Summary

## **Revised Written Trial Summary**

Note. The following trial stimulus was developed by: Lemieux, J. M. T. (2008). The relationship between beliefs, strength of evidence, statistical presentation, and expert testimony on jury decision-making in DNA cases. (Doctoral dissertation: Carleton University, 2008). Dissertation Abstracts International, 68(10-B), 7007. This trial summary has been modified for this experiment.

Thank you for agreeing to take part in this research.

On the following pages is a summary of the trial transcript in the case of New York v. Anton. Please read the transcript and try to imagine yourself as a juror faced with this evidence. Once you have read through the trial, you will be asked to deliberate the case and arrive at a verdict.

Please treat this as an independent exercise. We are interested in your opinions and therefore it is very important for the purposes of the research that you refrain from discussing the case with other people who may be participating in this study.

### **Judge's Instructions**

Jim Anton has been charged with the crime of murder in the second degree. Second degree murder is a non-premeditated killing, resulting from an assault in which death of the victim was a distinct possibility. The State has the burden of proving that charge beyond a reasonable doubt. It is your duty to consider all of the evidence, to decide the facts, and then to apply the law that I give you at the end of the trial.

The case will begin with opening statements from the prosecution and the defense attorneys. Each will tell you what they expect to prove. These statements are not evidence; they are only a summary to help you follow the case.

The prosecution will then call witnesses for the State. After the prosecution has finished questioning a witness, counsel for the accused will be allowed to question the same witness. After all the witnesses for the prosecution have been heard, the accused's attorney may choose to present witnesses on the accused's behalf.

### **Prosecution's Opening Statement**

Darren Williams (deceased) and Jim Anton (accused) were friends aged 31 and 34 years old, respectively who lived in the city of Buffalo. They met over 10 years ago when they were both studying together at the University of Buffalo.

Witnesses will testify regarding the events that transpired the evening of the killing. On this night, Jim, Darren, and two other male friends played cards at Jim's house. The men decided to place monetary bets on their card games, and by the end of the evening, Darren owed Jim one thousand dollars. Jim asked to collect the money that Darren owed

him, but Darren refused to pay. Darren went to leave Jim's house, and Jim followed him outside where a verbal argument over the money ensued between the two men. Jim shoved Darren and then a friend intervened before it escalated further. The two men walked away from each other after the altercation and Jim was still extremely angry. Within the hour after they walked away from each other, the victim, Darren Williams, was found dead on the side of the road.

We will prove that the defendant had the motive, means, and opportunity to commit this crime. Witnesses will testify that Jim had been heard not only making death threats towards Darren, but that Jim has a history of being verbally aggressive and physically violent towards others. Two witnesses will testify that on the night of the murder, Jim said to Darren, "If you don't pay up, I'm going to kill you." Another witness will testify that Jim left home in his car shortly after Darren and the others had left. There will also be testimony that Jim was in considerable financial straits and was desperate for money. Finally, we will show that there is nothing to support Jim's purported alibi.

Forensic examinations revealed that Darren Williams was killed by multiple stab wounds to the chest inflicted by a hunting knife. Blood samples were found on Darren Williams' body near his stab wounds and you'll hear from an expert witness that the DNA in those blood samples matched the DNA in blood samples provided by Jim Anton. Our evidence will show that in a fit of rage over the card game, Jim Anton returned and killed Darren Williams after their argument. As such, it is your duty to find him guilty of murder.

### Defense's Opening Statement

Jim Anton did not kill his old time friend, Darren Williams. Not only were the two men best friends, they were like brothers. And like brothers sometimes do, Jim and Darren got mad at each other over a card game bet.

Witnesses, including Jim Anton himself, will testify regarding how close Jim and Darren were and how they often got into arguments but were quick to forgive each other and move on. You will also hear from another witness who will testify that on the night of the murder and in the same neighborhood where it occurred, she was out walking her dog and was approached by a man asking if she had any change.

Indeed, Darren was killed by the stab wounds he suffered to the chest and yes, some blood samples were found near the wounds. Even if the DNA in these blood samples does match Jim Anton's DNA, this is not enough evidence to conclude that Jim committed the murder. You will hear from a second expert witness that during the analysis of the blood, contamination of the samples could have taken place and that the State's results may not be accurate. In fact, given that Darren was over at Jim's place that evening and Jim was in a confrontation with Darren, it is not surprising that Jim's blood was found on Darren. This does not make Jim Anton a murderer, only someone who may have shed blood during a confrontation with his friend. You will also hear that the murder

weapon was never found and that there was no proof that Jim Anton ever owned a hunting knife.

Darren Williams' murder is beyond doubt a tragedy. What is even more tragic is that the true perpetrator of the crime is still somewhere out there, perhaps waiting to strike again. The prosecution will not be able to demonstrate that Jim Anton was responsible for his best friend's death. Therefore, you must find Jim Anton not guilty of murder.

### **State's First Witness: Constable Dirk McHugh**

On Direct Examination by the State, Constable McHugh testified that:

- on the night of November 29, 2004, he and Sergeant Kealy took pictures of the crime scene and of Jim Anton's house
- the crime scene was located approximately 1.5 miles from Jim Anton's house and that the estimated time of the murder was approximately 8:20 p.m.
- they recovered the video surveillance tapes from the convenience store that Jim Anton claimed to have gone to the night of the murder
- there was no evidence that Jim Anton was at the store on the night in question, as he does not appear anywhere on the tapes
- when investigators spoke to Jim Anton the morning following the murder, they requested and received Jim's clothing from the night before
- Jim Anton stated that he had laundered his clothes and that they were in the dryer
- Mr. Anton initially refused to give a blood sample; therefore, the blood samples had to be obtained through court order

### **STATE AND McHUGH GO THROUGH PICTURES AND EXHIBITS:**

- photographs show Jim Anton's dining room table with empty beer cans, a deck of cards, and two of four chairs knocked over
- photograph of Jim's front hallway shows a door knob impression in the wall and a splintered door hinge
- photograph of Jim's front yard shows scuffle marks in the grass and spit on the driveway
- photograph of Darren Williams' body with blood stains and 4 stab wounds to the chest

- photograph showing positioning of the body and the condition of the deceased's fingernails as consistent with the victim struggling with his assailant before being stabbed in the chest

Exhibit 1: - photograph of two blood samples obtained from the crime scene NOT belonging to the victim himself

Exhibit 2: - photograph of two blood samples obtained from Jim Anton

Exhibit 3: - close-up photograph of the victim's stab wounds and entry marks consistent with marks left by a hunting knife

Exhibit 4: - video surveillance tapes from the convenience store that Jim Anton used as his alibi

When Cross Examined by the Defense, Constable McHugh testified that:

- it was unclear whether or not the door knob impression and splintered door hinge had occurred the night of the murder
- the hunting knife used in the stabbing has not been located
- no eyewitnesses to the stabbing have come forward

### State's Second Witness: Rosa Scove

On Direct Examination by the State, Rosa Scove testified that:

- she is Jim Anton's next door neighbor and has been for the past 6 years
- on the evening of November 29, 2004 at about 7:30 p.m., she heard a commotion coming from inside Jim's house. It sounded as though two men were screaming at each other
- she heard a banging that sounded like Jim's front door and from her living room window she saw Jim and two other men exit Jim's house
- she opened her window slightly to hear what was going on and she heard Jim and one of the other men arguing over money
- she heard Jim say to the man, "If you don't pay me, I'm going to kill you" and the two men were getting into each other's faces.
- she saw the third man get between the two who were engaged in a confrontation in order to break them up

- she saw the eventual victim walk away from the house and head down the street while Jim and the man who tried to break Jim and Darren up went back into Jim's house
- just before 8:00 p.m. and after his remaining friend left, she saw Jim exit his house, open his car door, and throw something onto his passenger's seat before speeding away
- she was sure about the time, as she was making a cup of tea before sitting down to watch her favorite TV program which begins at 8:00 p.m.
- she had on two separate occasions witnessed Jim punch another man on his front lawn after an argument
- her hearing was fine

When Cross Examined by the Defense, Rosa Scove testified that:

- on one of the occasions when she witnessed Jim punch another man, the man had hit Jim first
- she was not wearing her eyeglasses when she watched through her window
- she could not tell what Jim threw onto the passenger's seat of his car
- she has on several occasions asked Jim to watch her house for her while she has been away on vacation

### State's Third Witness: Ronald Fillmore

On Direct Examination by the State, Ronald Fillmore testified that:

- he had been friends with both Jim and Darren for over 10 years
- he had been playing cards at Jim's house the night of the murder
- he, Jim, Darren, and a fourth friend had been playing poker and betting on the games
- Jim was having a lucky night and winning a lot of the games
- Darren kept thinking he would win and kept betting on new games until he owed Jim one thousand dollars
- Jim asked Darren to write him a check for the one thousand dollars

- Darren said he would not write the check and that he had no intention of ever paying Jim
- Jim jumped out of his chair, knocking it over, and went right up to Darren's face and started screaming at him to pay up
- Darren told Jim he was out of control and said he was leaving
- Jim followed Darren out of the house, yelling and swearing at him and spitting on the ground. Once outside, Jim pushed Darren hard and said, "If you don't pay me, I'm going to kill you."
- Jim and Darren were getting in each other's faces and began to shove each other, so he stepped in between the two to separate them
- Darren walked away by himself down the street
- he and Jim went back into Jim's house
- he told Jim he was out of line with how he reacted and what he said to Darren
- he left Jim's house at about 7:50 p.m., about 10 minutes after Darren had walked away
- he didn't notice any blood on Jim or Darren following their confrontation

When Cross Examined by the Defense, Ronald Fillmore testified that:

- in the past, Jim had threatened to kill him when he got really mad but had never followed through on the threats
- after Darren had left, he (Ronald) and Jim went back into Jim's house
- Jim said he was going to call it an early night and go to bed

**State's Fourth Witness: Dr. Eileen Schumann**

On Direct Examination by the State, Dr. Schumann testified that:

- she is a forensic scientist who specializes in DNA evidence with publications in numerous journals and presentations at several professional conferences
- she is the lead forensic scientist at the Avery DNA laboratory located in Ottawa, Ontario, and has been working there for over 15 years
- she has been qualified as an expert witness in DNA analysis and population genetics by other courts over 20 times

- forensic DNA science is a branch of science concerned with the identification of individuals who match DNA profiles found at a particular place such as a crime scene
- population genetics is the branch of science in which statistics that explain the frequency with which a particular DNA pattern appears in a given population are studied and analyzed
- the guidelines for proper collection of DNA evidence include:
  - o proper training to specialized forensic police officers in the areas of collection, preservation, and packaging of DNA evidence
  - o officers taking precautions such as wearing gloves and face masks to minimize their exposure to infectious agents, as well as to preclude transfer of their own DNA to evidence
  - o separate packaging of samples from different crime scenes as well as crime scene samples and comparison samples from persons of interest
  - o where relevant, items should be handled and packaged in a manner that preserves trace evidence such as hair, fiber, paint, soil, or gunshot residue
  - o for every evidence item collected, the officer should note who collected the item, the date, the location, and a brief item description
  - o item packaging should be properly labeled and closed to protect the items from extraneous substances, as well as from unauthorized access
  - o it is vitally important to protect evidence from exposure to heat and moisture, both of which have deleterious effects on DNA
  - o wet items require passive air-drying prior to packaging
  - o to maintain continuity of evidence items and therefore admissibility in court, items should be uniquely labeled, properly packaged, and each transfer of the item should be documented
- she was asked to examine DNA evidence in the form of blood samples that were found on Darren Williams' body the night he was murdered along with blood samples obtained from the defendant, Jim Anton
- to her knowledge, all the proper guidelines and procedures for the collection and analysis of DNA evidence had been followed

- the DNA test results showed a match between Jim Anton's blood samples and those found on the victim's body

On Cross Examination by the Defense, Dr. Schumann testified that:

- there are two types of errors (false positives) that can occur with DNA evidence
- a Random Match Error is the probability of a match being declared due to random chance
- a Lab Error Rate is the probability that a match report was declared due to a human error that occurred in the DNA lab
- the probability of either a Random Match or Lab Error for the current DNA evidence was about 1 in one billion
- except for the blood samples, no other DNA evidence was submitted for analysis

### End of State's Case

### Defense's First Witness: Jim Anton

On Direct Examination by the Defense, Jim Anton testified that:

- he and Darren Williams had been best friends since they met at college 12 years ago and that Darren was like a brother to him
- he had invited Darren and two other friends to play cards at his place on the night of November 29, 2004
- everyone was betting for money on the poker games they played
- Darren lost one thousand dollars to him but that when he went to collect the money, Darren refused to pay
- he got angry and started yelling at Darren to get him to pay up
- their argument continued in his front yard and got "a little" physical and that he got so angry at Darren that he said to him, "If you don't pay me, I'm going to kill you" but that he said this without thinking and that he had no intention of following through on the threat
- after Darren walked away and he (Jim) had calmed down, he felt extremely bad about what he had said and how he had acted toward Darren and that he planned to call Darren in the morning to apologize
- he did not currently own nor had he ever owned a hunting knife

- he did not kill Darren Williams

When Cross Examined by the State, Jim Anton testified that:

- at approximately 8:00 p.m. on the night of the murder, he left his house to go to the corner store to get some milk
- the store he went to was in the opposite direction from where Darren's body was found
- after being informed by police of his good friend's murder, he was very upset and not thinking clearly about his whereabouts the night before
- he was not on the corner store video surveillance tapes because he later remembered that when he got into his car, he noticed he was low on gas and decided to stop and get some milk at the gas station convenience store
- he did not recall carrying anything with him except for maybe his cell phone when he left his house
- he had a tendency to "blow up" easily when he was mad about something
- he had on 2-3 occasions in the past five years been so angry that he got into a fist fight with various male friends
- he washed his clothes because something had spilled on them the night before during the confrontation at his home

**Defense's Second Witness: Elliot Sampson**

On Direct Examination by the Defense, Elliot Sampson testified that:

- he was the fourth person who had been playing cards at Jim Anton's house the night of the murder
- he had been friends with both Jim and Darren for over 10 years
- on the night of the murder, he had left Jim's house at approximately 6:45 p.m. before Jim and Darren had started fighting
- when he left, Jim and Darren were laughing and talking about the last poker hand they had played
- he had witnessed Jim and Darren get into many fights and arguments over the years but that they always forgave each other and stayed best friends

- in the context of these past fights and arguments, he had heard Jim and Darren say things such as “I’m going to kill you” to each other but that neither had ever followed through on the threats
- to his knowledge, Jim had never owned a hunting knife or any kind of weapon

When Cross Examined by the State, Elliot Sampson testified that:

- Jim had once told him that he would love to get a hunting knife one day
- Jim had recently told him that he was afraid he would not have enough money to pay his mortgage that month and that this would be the second month in a row
- Jim said the bank had allowed him to pay late last month but warned him not to let it happen again
- Jim said he would do anything to get his hands on some extra money

**Defense’s Third Witness: Anna Goldstein**

On Direct Examination by the Defense, Anna Goldstein testified that:

- she lived a block away from where Darren’s body was found
- she did not know Jim Anton personally, but that she had seen him around the neighborhood on different occasions
- she was out walking her dog between 7:00 and 7:30 p.m. on the night of the murder
- during her walk, a man whom she had never seen before approached her and asked if she had any money to spare
- the man was probably in his mid-40’s, about 5’11” tall, weighing approximately 175 lbs, with brown hair and brown eyes
- she told the man she had no money for him
- her dog barked and growled and he immediately backed up and walked away
- this incident was somewhat frightening to her and that she considered calling the police right away but decided not to because she thought maybe she was overreacting
- after she heard about Darren’s murder the next day, she immediately thought of the man and decided at that point to call the police

When Cross Examined by the State, Anna Goldstein testified that:

- the man could have been someone who lived in the neighborhood who she had never seen before
- the man never verbally threatened her in any way
- the man did not give any indication that he was carrying a weapon on him
- she could not tell where the man was headed after her encounter with him

**Defense's Fourth Witness: Dr. Jane Covington**

On Direct Examination by the Defense, Dr. Covington testified that:

- she is a forensic scientist who specializes in DNA evidence with publications in numerous journals and presentations at several professional conferences
- she is the lead forensic scientist at Genetica DNA laboratories, located in Cincinnati, Ohio, and has been working there for approximately 18 years
- she has been qualified as an expert witness in DNA analysis and population genetics by other courts over 25 times
- she was asked on behalf of the defense to be present while the blood samples found on Darren William's body and those obtained from Jim Anton were analyzed by Dr. Schumann and her team
- she heard one of the lab technicians sneeze

On Cross Examination by the State, Dr. Covington testified that:

- she did not see which lab technician sneezed
- Indeed, all of the lab technicians were wearing face masks, but the masks alone did not necessarily mean that there was no contamination.
- the proper DNA data collection and analysis procedures were generally followed.

**End of Defense's Case**

**Judge's Instructions**

Members of the jury, I will now instruct you as to the laws that apply to this case. The law is intended to be helpful to you in reaching a just and proper verdict in the case;

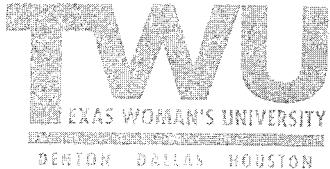
however, it is not binding upon you as members of the jury and you may accept or reject it as you feel is appropriate to the case at hand.

The charge against Jim Anton is murder in the second degree. When dealing with a charge you must be satisfied that each element of the verdict has been proven by the State. A person is guilty of murder in the second degree when, with intent to cause the death of another person, he causes the death of such person or of a third person. The presumption of innocence is in the accused's favor and the burden of proving him guilty beyond a reasonable doubt is on the State. You must decide whether Jim Anton is guilty or not guilty of murder in the second degree.

While you must give respectful attention to the laws, you have the final authority to decide whether or not to apply a given law to the acts of the defendant on trial. You, the jurors, represent the community and it is appropriate to bring into your decision, both the feelings of the community and your own feelings based on your conscience.

Based on the information you read, please indicate whether you find the defendant, Jim Anton, guilty, not guilty, or you are currently undecided of one count of murder in the second degree. You may be asked to provide your pre-deliberation verdict upon entering the jury chat room.

APPENDIX K  
IRB Approval Letters



**Institutional Review Board**  
Office of Research and Sponsored Programs  
P.O. Box 425619, Denton, TX 76204-5619  
940-898-3378 Fax 940-898-3416  
e-mail: IRB@twu.edu

March 15, 2010

Ms. Michelle Nadeau

Dear Ms. Nadeau:

*Re: Deconstructing the Minds of Jurors: Beliefs About DNA Evidence and Their Relation to Guilty Verdicts*

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and appears to meet our requirements for the protection of individuals' rights.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. A copy of the annual/final report is enclosed. A final report must be filed with the Institutional Review Board at the completion of the study. Because you do not utilize a signed consent form for your study, the filing of signatures of subjects with the IRB is not required.

This approval is valid one year from March 5, 2010. According to regulations from the Department of Health and Human Services, another review by the IRB is required if your project changes in any way, and the IRB must be notified immediately regarding any adverse events. If you have any questions, feel free to call the TWU Institutional Review Board.

Sincerely,

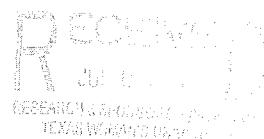
A handwritten signature in black ink, appearing to read "Kathy DeOrnellas, Chair".

Dr. Kathy DeOrnellas, Chair  
Institutional Review Board - Denton

enc.

cc. Dr. Dan Miller, Department of Psychology & Philosophy  
Dr. Sally D. Stabb, Department of Psychology & Philosophy  
Graduate School

Michelle L. Nadeau



July 6, 2010

Texas Woman's University  
Institutional Review Board  
Office of Research and Sponsored Programs  
P.O. Box 425619  
Denton, Texas 76204  
Attn: Dr. Kathy DeOrnellas, Chair

R/F: Request to continue data collection

Dear Dr. DeOrnellas,

I am writing to request permission to continue to collect data for my study entitled *Deconstructing the Minds of Jurors: Beliefs about DNA Evidence and Their Relation to Guilty Verdicts* that was previously approved by the IRB in March, 2010. My methodology and procedures for the study would remain the same; I would just be collecting more data using a modified written trial summary (murder case). It is the same written trial summary I used before, I have just made some modifications to it. I have included a copy of the revised written trial summary for your review.

I greatly appreciate your consideration of this request and your time and attention to this matter.

Kindest personal regards,

Michelle L. Nadeau, M.S., M.A.  
Doctoral Candidate  
Counseling Psychology  
Texas Woman's University  
Denton, Texas