Forensic Science and Juror Decision Making: Can Jurors Be Taught to Recognise Bias?

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Dissertation submitted for the Award of

Doctor of Philosophy

School of Psychology

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Submitted August, 2017

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Abstract

Forensic science plays a central role in the administration of judicial and legal processes, and crime scene investigations. Fingerprint, bite-mark, and DNA comparisons, as well as analyses of audio and video recordings, have proven invaluable to investigators and legal practitioners. Yet research has indicated that forensic science is not infallible, and that the strength and validity of forensic evidence is often overstated. Studies have found that a range of cognitive biases, including contextual and motivational biases, may substantially influence forensic procedure. Authors of the 2016 President's Council of Advisors on Science and Technology (PCAST) report on forensic comparison evidence argue that issues affecting forensic science are considerable, and will likely continue to influence forensic evidence admitted into courts. Technological advances have not served to reduce incidents of error attributable to bias as outcomes of analyses still rely on human judgement. Recommendations for strategies to reduce bias in forensic labs have been identified; however, researchers have stressed that implementing these may only gradually reduce instances of questionable forensic evidence entering courtrooms. Judges have been assigned a gatekeeper role in determining the admittance of forensic evidence into court; however, research has found that they are ill-equipped to reliably do so. This leaves jurors with the responsibility to identify and critique weak or flawed forensic evidence. However, studies have shown that jurors are prone to erroneous decision making. In light of this, it is troubling that literature has paid limited attention to the impact of forensic bias on court proceedings.

Jurors are often influenced by extraneous information such as demographic characteristics of a defendant and victim, and the nature of a crime. They have also been found to overestimate their comprehension of forensic evidence. Attempts to improve juror decision making have included the introduction of supplementary materials such as juror instructions and forensic reports. However, such tools have not been empirically supported. Found and Edmond

(2012) proposed a forensic report format to address the limitations of traditional forensic reports for effectively conveying information to jurors. Claims about the efficacy of their proposed format have not been substantiated, and cognitive psychology literature and current juror decision making research do not support Found and Edmond's (2012) conclusions.

The pervasive use of forensic evidence in court proceedings has implications for strategies to address the effects of cognitive biases on judicial outcomes. Unfortunately, current materials have not been shown to improve jurors' evaluations of evidence, pointing to a critical gap in literature on juror information processing and decision making. This thesis will therefore attempt to empirically evaluate Found and Edmond's (2012) proposed report format. It will also explore research on juror decision making in the context of forensic and other evidence. Differences between current juror information processing paradigms will be investigated in order to determine whether they effectively account for the complexities of juror behaviour. Furthermore this thesis will contribute new perspectives to the field of juror research by exploring alternative approaches to improving the accuracy and reliability of juror information processing and decision making outcomes.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

In addition, I certify that no part of this work will, in the future, be used in a submission for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying, subject to the provisions of the Copyright Act 1968. I also give permission for the digital version of my thesis to be made available on the web, via the University's digital research repository, the Library catalogue and also through web search engines, unless permission has been granted by the University to restrict access for a period of time.

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Alex Forndran

Acknowledgements

The process of earning a doctorate and writing a dissertation is long and arduous. It should come as no surprise that the number of direct and indirect contributors has been considerable; however, I have chosen to narrow my acknowledgements to those I most prominently associate with the successful completion of this thesis.

Firstly, I would like to acknowledge Dr. Carolyn Semmler. Carolyn took upon herself the unenviable task of supervising my candidature, and has played an integral role in guiding my immersion into the depths of forensic psychology research. I am confident that the skills that Carolyn has helped me to develop over the course of this journey will serve me well as I take the next step in my career.

I would also like to acknowledge the contributions of Dr. Rebecca Heyer. Rebecca has fulfilled the role of co-supervisor with infectious drive and enthusiasm. Her keen eye for detail helped to meaningfully improve the final result, and Rebecca's greatest contribution may very well have been her kind words, empathy, and emotional support.

Two close friends, Francisco Sadras and Dawson Hunt, have helped sustain my physical, mental, and emotional health and wellbeing through their tireless camaraderie and support. Over the course of my candidature, Francisco and Dawson have supported me personally and professionally, and I can only hope that I have made a similar contribution to their growth.

Last, but far from least, I would like to acknowledge my wife, Eleanor Forndran, whose love and encouragement have been a source of strength that has time and again brought out the best in me. Eleanor's support has not once wavered, and her reassurance throughout the editing process contributed clarity and confidence in the final stages of preparing the dissertation.

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Chapter 1.

Research Overview

Forensic science has become a fundamental component of the contemporary evidence-based legal process (Edmond, 2015; Giannelli, 2010). An increasingly broad range of scientific branches are currently consulted and employed in law enforcement, and over the course of legal procedures, including trials (Edmond et al., 2013; Giannelli, 2010; Goodman-Delahunty & Hewson, 2010). Forensic methods of evidence collection and analysis of fingerprint, CCTV image, DNA and other samples have proven invaluable in the provision of just legal services and outcomes (Edmond, 2015; McQuiston-Surrett & Saks, 2009). The growing reliance and confidence in forensic science has raised some concerns, as evidenced by the National Academy of Sciences (NAS) (2009) report, and more recently within the 2016 President's Council of Advisors on Science and Technology (PCAST) report on forensic comparison evidence.

1.1 Forensic Science and the Law

Forensic science refers to the objective collection and analysis of evidence for the purposes of aiding investigative and judicial branches of the law (Kassin et al., 2013; McQuiston-Surrett & Saks, 2009). Early forensic science involved fingerprint analysis, firearms examinations, and a range of pattern evidence examinations such as hair, bite-mark, and handwriting comparisons, modelled on scientific research protocols employed by academics and researchers in the natural sciences (Dror et al., 2006; Edmond et al., 2013; NAS, 2009). It has since come to include DNA analysis, fire and explosives analysis, and even digital evidence examinations (Dror et al., 2006; Kassin et al., 2013; NAS, 2009). Though forensic procedures mimic those used in research based on the natural sciences, forensic evidence examinations, including comparisons, generally involve a significant human component (Kassin et al., 2013; Wells et al., 2013). It has recently been proposed that human error plays a more prominent role in forensic evidence than previously thought (Kassin et al., 2013; NAS, 2009; Wells et al., 2013).

Since their inception, forensic science disciplines have been a trusted source of information and evidence, and have contributed to the successful conviction of criminals, and exoneration of innocent people (NAS, 2009; PCAST, 2016). Scientific and technological advances have ensured that the forensic sciences have continued to contribute to the provision of law enforcement (Dror & Mnookin, 2010; NAS, 2009; PCAST, 2016). Yet these same advances have also revealed that the forensic sciences have at times contributed to wrongful convictions (Dror & Mnookin, 2010; NAS, 2009; PCAST, 2016). Further investigations into the underlying causes for wrongful convictions resulting from flawed forensic evidence have shed light on a broad number of issues still facing the forensic sciences today (Dror et al., 2006; Dror & Mnookin, 2010; Kassin et al., 2013; NAS, 2009; PCAST, 2016). One such issue is that of the increasingly broad range of forensic science disciplines with implications for generalised validity and standardisation (Edmond et al., 2009; NAS, 2009; PCAST, 2016).

1.1.1 Current Issues Facing Forensic Science

Forensic science encompasses a plethora of scientific disciplines, each with their own distinct technologies, theoretical and practical frameworks, techniques, and practices (Edmond et al., 2009; NAS, 2009; PCAST, 2016). Most forensic experts also undertake highly specialised training. This creates distinctions between forensic scientists, and scientists without forensic specialisations, both of whom may be hired to assist in forensic investigations (Dror et al., 2006; Edmond, 2013; NAS, 2009). Despite such a broad range of disciplines, the forensic sciences have significant issues due to widely lacking standardised methods and practices across and within particular disciplines (Dror et al., 2006; Dror & Mnookin, 2010; NAS, 2009; PCAST, 2016). A general lack of mandatory certification and accreditation of forensic practitioners and laboratories has also meant that reliability and validity of forensic practices and evidence varies greatly across and within forensic disciplines (Edmond et al., 2009; Giannelli, 2007; NAS, 2009; PCAST, 2016). The lack of standardised methods and practices may also contribute to the risk

of human error in the provision of forensic science services. Literature has explored a number of implications regarding human error. (Dror et al., 2006; Giannelli, 2007; Kassin et al., 2013; PCAST, 2016; Saks et al., 2003).

1.1.2 Culture, Context, and Forensic Bias

Forensic scientists work within a broad framework of socio-cultural, economic, and political contexts, all of which may influence examiners' judgments when collecting, analysing, and presenting forensic evidence (Kassin et al., 2013; Page et al., 2012; Saks et al., 2003). Since the turn of the century, contextual influences and biases have had a greater influence over the provision of law enforcement and legal services, in part as a consequence of a global focus on preventing terrorism (Dror et al., 2006; Giannelli, 2010; Peacock et al., 2004). Psychology training of forensic experts and law enforcement has been proposed, though it has not been found to mitigate the effects of human error within forensic laboratories (Costanzo, 2013; Giannelli, 2007; Saks et al., 2003). The effects of such errors have been compounded by the growing complexity of forensic science and evidence, and the increasingly politicised and socio-culturally driven public scrutiny of the legal system and its proceedings (Dror et al., 2006; Giannelli, 2007; Giannelli, 2010; PCAST, 2016; Wells et al., 2013). Contrary to popular belief, the introduction of technology has not dramatically reduced the frequency or impact of human error (Dror & Mnookin, 2010). Although technological advancements have been beneficial to some forensic disciplines, examiners' judgments are still central to the outcome of pattern evidence comparisons (Dror & Mnookin, 2010; Peacock et al., 2004; Stavrianos et al., 2012). This is an issue in light of literature increasingly pointing to the effects of bias on human behaviour as a prominent source of error in forensic laboratories (Dror & Mnookin, 2010; Freitag & Found, 2017; Newman et al., 2011; Saks et al., 2003; Wells et al., 2013). To better understand the causes and consequences of these complexities, the 2009 NAS report on forensic science was devised,

representing a milestone with regard to efforts undertaken to identify the challenges facing forensic science.

1.1.2.1 The National Academy of Science Report (2009) on Forensic Science

The purpose of the 2009 NAS report was to identify the range of issues plaguing forensic science, and to provide recommendations for the purpose of overhauling forensic science research and practices to improve the validity and reliability of the forensic science community's contributions to law enforcement. Authors of the report attributed flawed forensic analyses and unreliable forensic evaluations to a range of factors (NAS, 2009). These included a growing number of forensic disciplines, a lack of oversight regarding certification, accreditation, and training, and a lack of scientific evidence through research to support methods used to conduct forensic comparisons and analyses (NAS, 2009). Authors also attributed a lack of standardised tools, methods, and measures to a significant lack of funding, and a lack of structure, motivation, and direction with regard to validating forensic science as a discipline (NAS, 2009). Although the report provided comprehensive recommendations, the recently published PCAST report on forensic science indicates that few of these recommendations were sufficiently implemented (PCAST, 2016).

1.1.2.2 The President's Council of Advisors on Science and Technology Report (2016)

The PCAST (2016) report sought to investigate the effectiveness of recommendations made in the NAS (2009) report. For investigators and legal professionals seeking to incorporate forensic science and evidence during fact-finding endeavours, the report aimed to identify specific barriers. Findings indicated that some areas of concern had grown in significance since publication of the NAS (2009) report, with authors identifying two critical gaps in current forensic science research and practice (PCAST, 2016). Authors cited "the need for clarity about

the scientific standards for the validity and reliability of forensic methods" and "the need to evaluate specific forensic methods to determine whether they have been scientifically established to be valid and reliable" as significant challenges facing current forensic science disciplines (PCAST, 2016, p. x). Despite the comprehensive nature of the report's review and recommendations, many of which echo findings of the NAS (2009) report, cognitive bias is only briefly addressed. Authors discounted the impact of cognitive bias, suggesting that the standardisation of tools and methods in forensic science would be sufficient (PCAST, 2016). Publication of the NAS (2009) report prompted renewed interest into examining the state of forensic science in Australia and New Zealand (Houck et al., 2011; Robertson, 2017; Ross, 2011, 2012).

1.1.3 Forensic Science in Australia and New Zealand

In response to the NAS (2009) report, Ross (2011, 2012) observed that forensic science in Australia and New Zealand has faced similar challenges to those present in the United States and the United Kingdom. Factors which were identified to support Ross' (2011, 2012) claims are Australia's lack of a national forensic science research strategy, fragmentation of resources resulting in a lack of funding, limited research scope and expertise, and difficulties with operationalising research outcomes. Interestingly, Houck et al. (2011) and Ross (2012) note that although this is concerning, close working relationships between Australian and New Zealand forensic science communities have enabled more effective and direct responses to some of the NAS (2009) report's recommendations. Houck et al. (2011) argued that the smaller, more focused research community has benefited the state of forensic science in Australia and New Zealand. They claim that this aligns with the NAS (2009) report's call for localised forensic science communities that are robust and developed in collaboration with the higher education sector (Houck et al., 2011). The subject of cognitive bias in Australian courts did not feature in these Australian responses to the NAS (2009) report. Responses to the PCAST (2016) report

have indicated that Australian researchers have begun to recognise that the effects of cognitive bias on forensic science cannot be so readily dismissed (Edmond, 2015; Edmond et al., 2016; Freitag & Found, 2017; Robertson, 2017). As a result, psychology and legal scholars have sought to develop a more robust understanding of cognitive bias in forensic science (Edmond et al., 2016; Freitag & Found, 2017; Giannelli, 2010; Hawkins & Scherr, 2017; Kassin et al., 2013; Mossiere & Maeder, 2016).

1.1.4 Forensic Science and Cognitive Bias

Cognition, and the use of cognitive processes, refers to internal mental states and processes employed by humans for everyday functioning (Tran et al., 2011). The questionable reliability of cognitive processes including memory, perception, and decision making, has been well documented (Dror et al., 2006; Page et al., 2012; Tran et al., 2011). Studies on cognition and behaviour have demonstrated that humans are prone to committing errors due to overconfidence, misconceptions regarding cognitive functions, and erroneous judgment strategies. Such human fallibility is commonly referred to as cognitive bias (Dror et al., 2006; Tran et al., 2011). Research has identified a number of cognitive biases impacting forensic procedures and outcomes, only briefly discussed in NAS (2009) and the PCAST (2016) reports. Cumulatively these biases, in the context of forensic science, are often referred to as forensic confirmation bias (Kassin et al., 2013). The two most commonly reported of these are motivational bias, and contextual bias (Dror et al., 2006; Giannelli, 2010; Kassin et al., 2013; Page et al., 2012; Wells et al., 2013).

Contextual bias is a frequently cited issue in forensic sciences, characterised by the impairment of a forensic expert's judgment due to contextual influences (Dror et al., 2006). A forensic examiner made aware of details concerning the crime or suspect, influenced by police or other parties involved with the case, or by socio-economic, cultural, or political factors, is

likely to conduct biased forensic evaluations and comparisons (Dror et al., 2006; Page et al., 2012). The extent of such effects has become increasingly well documented.

Dror et al. (2006) selected several fingerprint identification decisions made by experts over their respective investigations, all of which were deemed positive matches. The experts who originally conducted the identifications were recruited to repeat their comparisons, without being informed of their having previously matched the prints they were presented with. The experts were provided with extraneous information suggesting that the prints were a non-match, as a consequence of which four out of five experts made different identification decisions (Dror et al., 2006). Another frequently cited example of such an occurrence is the Madrid bomber case.

In 2004, the United States Federal Bureau of Investigation (FBI) positively, yet erroneously, identified the Madrid bomber to be an American Muslim named Brandon Mayfield (Dror et al., 2006; Kassin et al., 2013). This was done using a comparison of a latent fingerprint with that of the suspect (Dror et al., 2006; Kassin et al., 2013). Although the erroneous positive identification was supported by a number of experts working with the FBI, Spanish authorities identified the real culprit through their own investigation, relying on comparisons using the same latent print. This raised some alarming questions concerning the effects of contextual bias on forensic examinations and examiners, and subsequent judicial outcomes (Dror et al., 2006; Kassin et al., 2013). Publicised wrongful convictions have also occurred in cases of motivational bias, which bears many similarities, but also some key differences to contextual bias.

Motivational bias refers to instances where a forensic examination may be influenced by motivational factors. These may include social and cultural factors, pressures from police or other sources, and forensic examiners' misconceptions about their role within the legal process (Page et al., 2012; Wells et al., 2013). The case of Fred Zain has been used to highlight the flaws of contemporary forensic and legal procedures practices such as the handling, examination, and

presentation of evidence (Giannelli, 2010; Wells et al., 2013). When investigating misconduct at the West Virginia state crime laboratory, the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LA) revealed that in circumstances where evidence had been deemed inconclusive by other scientists, Fred Zain, who had been described by colleagues as "very pro-prosecution", would analyse the same evidence and present findings that conclusively tied the sample to the suspect (Giannelli, 2010; Wells et al., 2013). In another well documented case, a forensic expert named Joyce Gilchrist was found to have "repeatedly overstated test results, withheld evidence, and provided critical evidence for the prosecution" (Giannelli, 2010, p.61). Further investigations into Gilchrist found that she had in several instances knowingly presented evidence that implicated suspects, which she knew to be false and misleading in light of contrary evidence that had been withheld from the defence (Giannelli, 2010). Gilchrist's indiscretions were found to have consistently benefitted the prosecution (Fuhrman, 2003; Giannelli, 2010). The impact of motivational biases, such as the subtle influence of role effects on forensic expert decision making in cases of ambiguous or inconclusive evidence, are clear. Increasingly complex methods and the use of technology have been introduced in an attempt to identify causes and reduce incidents of bias.

One controversial introduction to forensic science has been anthropometry. Anthropometry is generally described as the comparative study of sizes and proportions of the human body, in forensic science predominantly focusing on facial proportions and measurements (Stavrianos et al., 2012; Stephan & Henneberg, 2006). The premise of anthropometry is that bone structure remains unchanged from a certain age, and that the high degree of variability and diversity of dimensions found from any one person to another ensures that anthropometry's accuracy and reliability is comparable to DNA and fingerprint comparisons (Kleinberg, 2008; Stephan & Henneberg, 2006). A number of recent studies examined and scrutinised methods and practical outcomes of anthropometric comparison.

Stephan and Henneberg (2006) investigated the effectiveness of anthropometric techniques in response to the failure of such techniques in a forensic setting relating to the identification of what turned out to be a victim of a serial killer in the 1990s. Results of the study indicated that participants were capable of accurately noting resemblances between facial approximations and target faces. However, success rates of target identification were found to be low, with participants who had first completed the resemblance task performing worse than participants who only completed the target identification task (Stephan & Henneberg, 2006). This finding reflects outcomes of a breadth of research on facial approximation, including the use of anthropometric techniques, suggesting that whilst visual observations and comparisons may serve to approximate a target individual's resemblance, human perception, even when aided by anthropometric tools, is not objective and accurate enough to reliably identify a target individual from a line-up, or via comparison using still or moving images (Jenkins & Burton, 2008; Peacock et al., 2004; Stavrianos et al., 2012). Similarly, whilst the introduction of technologies has been hailed as a significant milestone in legitimising forensic science, research has suggested that the interaction between such technologies and experts who employ them leaves notable room for error (Dror & Mnookin, 2010; Peacock et al., 2004). Forensic confirmation bias may influence outcomes of anthropometric techniques due to the significant degrees of human judgment that are still required (Dror & Mnookin, 2010; Peacock et al., 2004). In order to ameliorate the impact of such cognitive bias, studies such as Kassin et al. (2013) have proposed a number of recommendations regarding forensic analyses and comparisons.

In order to reduce bias in forensic crime laboratories Kassin et al. (2013) recommended key changes to forensic procedures. One proposed change was that forensic scientists work in a linear fashion, disseminating and analysing forensic evidence before comparing it against target samples (Kassin et al., 2013). Kassin et al. (2013) suggested that forensic examiners' access to information not directly relevant to the comparison process be prohibited, though authors

acknowledged the occasional need for extraneous information, such as the surface from which a fingerprint was pulled. A third party would in such instances serve as a provisional source of information relevant only to the analysis of forensic evidence. Kassin et al. (2013) also recommended caution regarding the use of technologies, as the emphasis on quantity of comparisons increases chances of false positive outcomes. Finally, Kassin et al. (2013) recommended that training in basic psychology, and education on the potential effects of cognitive biases should be a core component of law enforcement and forensic expert training. Edmond et al. (2016) sought to expand on this, outlining a comprehensive set of duties and responsibilities held by forensic and other expert witnesses.

Echoing findings of the NAS (2009) and PCAST (2016) reports, Edmond et al. (2016, p. 2) scrutinised factors which commonly interfere with dissemination of forensic evidence during legal proceedings, and focused on the importance of key aspects of evidence, including "validation, reliability, uncertainty, error rates, proficiency, and other human factors". Edmond et al. (2016) recommended forensic experts use mainstream scientific methods and norms to address many shortcomings commonly associated with forensic analyses (Dror et al., 2006; NAS, 2009; PCAST, 2016; Wells et al., 2013). Edmond et al. (2016) also proposed a number of procedural rules, including more stringent admissibility requirements, and a renewed focus on disclosure, transparency, impartiality and epistemic modesty on the part of forensic expert witnesses presenting evidence in court. Edmond et al. (2016) acknowledged the effects of cognitive bias, yet argued that proposed changes, if adopted, may address concerns related to the effects of cognitive bias on forensic sciences procedures. The PCAST (2016) report, and current literature highlighting the ongoing introduction of weak or compromised forensic evidence into courtrooms dismiss such unfounded claims (Gatowski et al., 2001; Howes & Kemp, 2017; Kovera & McAuliff, 2000).

It is clear that cognitive bias has been recognised as a notable source of error in forensic laboratories. Specifically, contextual and motivational biases have been shown to influence forensic experts (Dror et al., 2006; Kassin et al., 2013; Page et al., 2012; Wells et al., 2013). Although studies have explored possibilities for reducing the impact of cognitive bias relating to the provision of forensic science for criminal proceedings, other research has demonstrated the degree to which cognitive biases, in spite of attempts to mitigate or circumvent them, have continued to affect forensic evidence admitted to courts (Howes, 2015; Kassin et al., 2013; McAuliff et al., 2009; NAS, 2009; PCAST, 2016).

1.2 Issues of Forensic Science and Bias in the Courts

Research conducted by Wells et al. (2013) and Kassin et al. (2013) indicates that contextual biases are widespread, and likely inseparable from forensic science. The introduction of technologies, and socio-cultural developments, have led to an increasing overlap between law enforcement, forensic science, and the courts (Kassin et al., 2013; Wells et al., 2013). Although Kassin et al. (2013) proposed a number of changes to crime laboratory procedures to reduce the effects of contextual bias in forensic labs, Wells et al. (2013) highlight that contextual bias exacerbate other criticisms directed at forensic science, including concerns relating to the overstating of findings, at times questionable scientific basis for forensic methods and analyses, and the lack of accurate statistical error rates. In light of this, the effects of cognitive bias in courtrooms and the role of jurors in accurately administering justice have been under-examined, highlighting a critical knowledge gap concerning the role of bias in a broader legal context.

1.2.1 Cognitive Bias and the Courtroom

The issue of cognitive bias in courts is complex. The effects of cognitive bias on evidence analyses and comparisons may influence courtroom outcomes, as biased evidence and expert witness testimony may be presented during a trial (Dror et al., 2006; Kassin et al., 2013). Other

lines of investigation that ultimately result in charges being laid may also be tainted, as a falsely identified fingerprint may coerce an eyewitness into strengthening or otherwise giving false testimony (Kassin et al., 2013). Consequently, judges and juries may be presented with intentionally or unintentionally unreliable evidence and witness testimony.

Research has indicated that jurors overestimate their knowledge of forensic techniques, and greatly rely on the often subjective opinions of expert witnesses (McQuiston-Surret & Saks, 2009). This presents a significant dilemma for legal bodies and decision makers who aim to uphold the principles of fairness, accuracy, and objectivity associated with the law. Although reducing cognitive bias in forensic settings represents an important step in reducing bias throughout the legal process, an increasing emphasis has been placed on the role of judges and jurors with regard to unbiased and objective judicial outcomes.

In a criminal trial, the jury's role is to determine whether it has been proven that the accused is guilty "beyond reasonable doubt" on the basis of evidence, testimony, and rules set out by the legal framework (McAuliff et al., 2009; Ohtsubo et al., 2004; Pozzulo et al., 2010). It is inherently presumed that jurors evaluate pieces of evidence presented in court objectively, and independently of one another, unless otherwise stated (Daftary-Kapur et al., 2010; Magnussen et al., 2014; McQuiston-Surrett & Saks, 2009). Contrary to this, a growing emphasis on progressively complex forensic methods, reliance on experts to assess evidence for the supposed benefit of jurors, and presumptions regarding accuracy, validity, and reliability of forensic evidence have increasingly contributed to erroneous convictions (Daftary-Kapur et al., 2010; Dror et al., 2006; Giannelli, 2010; Kassin et al., 2013; McQuiston-Surret & Saks, 2009; Pozzulo et al., 2010). The idea that jurors may not be capable of discharging their duty to remain impartial and objective fact finders in the face of forensic evidence has, in light of this research, gained

significant traction. Judges have been assigned the role of gatekeepers in determining whether particular forensic evidence should be admitted into the court.

1.3 The Role of Supplementary Materials in the Courtroom

As a result of a number of publicised U.S. Supreme Court rulings concerning the admissibility of expert evidence, judges have been entrusted with the critical role of determining whether expert evidence is to be admitted on the basis of relevance and reliability (McAuliff et al., 2009; Woody, 2016). *Daubert v. Merrell Dow Pharmaceuticals Inc.*, 509 U.S. 579 (1993) particularly stood out in this regard, as it proposed that "even if judges admitted unreliable expert evidence in a trial, the procedural safeguards of cross-examination, opposing expert testimony, and judicial instruction on the standard of proof would help jurors identify flaws that exist in the evidence" (Kovera & Levett, 2015, p. 287; Risinger et al., 2002). Questions surrounding the validity and reliability of forensic evidence have led to the re-examination of how judges across different Commonwealth jurisdictions assess whether expert evidence should be presented to a jury (Freckleton et al., 2016).

Freckelton et al. (2016) conducted a comprehensive review of literature investigating factors influencing how judges evaluated expert evidence and testimony. Examining practices in six countries, Freckelton et al. (2016) found reasons for the admissibility of expert evidence to vary by country and expert witness domain. Clarity of explanation and experience as an expert were generally deemed to be of highest importance, while peer-review of evidence and the expert's educational qualifications were found to be of low importance to judges determining whether evidence should be presented before a jury (Freckelton et al., 2016). Judges were also surveyed on their views regarding the most significant issues with expert evidence, with those surveyed most commonly citing expert bias and complex technical and expert language to be problematic (Freckelton et al., 2016). Judges' preference for admission of clearly presented

expert evidence and testimony in conjunction with recognition of expert bias as a serious concern highlights serious flaws related to the use of juries in court cases involving complex evidence (Freckelton et al., 2016; Kassin et al., 2013; McAuliff et al., 2009). Further research has also indicated that though judges may be more reliable in their evaluations of evidence than jurors, they are still ill-equipped to reliably evaluate the relevance and reliability of expert evidence (Gatowski et al., 2001; Kovera & McAuliff, 2000; McAuliff et al., 2009). It is therefore unsurprising to find that unreliable expert and forensic evidence has continued to make it into courtrooms (Kassin et al., 2013; McAuliff et al., 2009). A number of approaches have been proposed to counteract unreliable juror interpretation of forensic evidence (Found & Edmond, 2012; McQuiston-Surrett & Saks, 2009; Simmonsen, 2012). One such approach has been the use of jury instructions.

1.3.1 Jury Instructions

Jury instructions, generally presented by the presiding judge, were partly introduced in an attempt to address juror's ability to accurately interpret increasingly complex information, legal jargon, and evidence encountered during modern criminal trials (Howes, 2015; Howes & Kemp, 2017; Magnussen et al., 2014; Simmonsen, 2012). Early studies indicated that jury instructions were initially too complex, and led to jurors frequently failing to comply with instructions, instead opting to rely on personal biases relating to characteristics of defendants, victims, and witnesses (Halverson et al., 1997; Shaw & Skolnick, 1995). Jury instructions have also been employed to educate jurors on the idea of guilt beyond a reasonable doubt, without much success (Dhami, 2008; Magnussen et al., 2014). Research has enabled legal bodies to adjust the timing, form, and content of juror instructions to more effectively accommodate lay jurors (Daftary-Kapur et al., 2010; Edmond, 2015; Simmonsen, 2012). Recent studies have however indicated that modern jury instructions do not adequately cover concepts, causes, and effects of cognitive biases, or questionable aspects of forensic methods (Howes & Kemp, 2017; Magnussen

et al., 2014; Simmonsen, 2012). An alternative approach that has garnered attention is the use of written forensic reports to aid jurors in discerning potential sources of bias (Found & Edmond, 2012; Smith et al., 2011).

1.3.2 Forensic Reports

Forensic reports are commonly introduced alongside courtroom presentations of forensic evidence to supplement and enhance the quality and clarity of information provided to jurors (Daftary-Kapur et al., 2010; Found & Edmond, 2012; NAS, 2009). Such written form and expression of forensic evidence has been the subject of much discussion across legal, scientific, and psychological communities (Found & Edmond, 2012; Daftary-Kapur et al., 2010; Kassin et al., 2013; NAS, 2009). The lack of standardisation concerning the expression of comparative forensic evidence, also referred to as pattern evidence, is an issue that has recently been raised (Found & Edmond, 2012; Howes & Kemp, 2017; NAS, 2009; PCAST, 2016). Found and Edmond (2012) observed that while methodological trends and similarities are found across a range of forensic disciplines, the same is not apparent in the presentation of forensic and pattern evidence. Furthermore, forensic reports generally differ from scientific and research reports written for the purposes of publication, in both style and format. Stringent publication guidelines and expectations enable academic peers and authorities to assess whether research, claims about findings (including the use of appropriate methodologies), and conclusions, are accurate and justified at a sufficiently high standard for publication (Found & Edmond, 2012). Thus Found and Edmond (2012) proposed a more standardised format akin to that of research papers prepared for publication to enable parties involved in the judicial process to more easily assess the relevance and quality of evidence, and discern sources of potential bias. However, the proposed format has raised further questions concerning the recognition of bias in forensic methods used to evaluate evidence presented in court.

1.3.2.1 The Found and Edmond (2012) Forensic Report Format

Found and Edmond (2012) offered their report format as one that improves clarity when evaluating forensic evidence by enabling readers to better distinguish between relevant and non-relevant information. No validation of Found and Edmond's (2012) proposed forensic report format has been conducted. The biggest concern in considering the implementation of Found and Edmond's (2012) report style, other than the lack of supporting evidence, relates to the authors' presumptions concerning their audiences' ability to recognise bias.

Firstly, Found and Edmond (2012) presume that parties likely to read the report will sufficiently understand the scientific methods and processes laid out in the forensic report. Research has suggested this to be untrue, and that individual differences, including education and professional experience, are more likely to predict the ability to accurately interpret forensic information (Daftary-Kapur et al., 2010; Goodman-Delahunty & Hewson, 2010; McAuliff et al., 2009). Found and Edmond (2012) also presume that their audience has the ability to recognise bias, and examines evidence systematically. However, such beliefs are not only unsupported, but contradicted by earlier literature (Daftary-Kapur et al., 2010; McAuliff & Kovera, 2008; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). The crux of the issue lies with the well documented role of contextual and motivational bias on the validity of forensic methods and evidence.

Research on recognition of cognitive bias has been extensive. In a study conducted by Pronin et al. (2002), participants unanimously believed themselves to be less susceptible to bias than the average population. This suggests that people overestimate their ability to recognise and overcome their own biases. It was also found that knowledge of biases did not prevent participants from being affected by bias, nor helped participants recognise that they had committed cognitive errors as a result of bias (Pronin et al., 2002). This phenomenon,

characterised by a person reporting more prevalent thinking biases in others than in themselves, has come to be known as the bias blind spot (Pronin et al., 2002). Ehrlinger et al. (2005) proposed that the bias blind spot occurs due to the use of introspection when evaluating bias in oneself, and the consulting of abstract theories of bias when assessing bias in others. Authors argued that introspection is unlikely to yield judgements of bias in oneself, ironically due to one's own biases. Across two experiments Ehrlinger et al. (2005) found support for previous findings indicating that people tend to see more bias in others than themselves, and that this was related to different strategies used to ascertain whether a judgement is biased (Pronin et al., 2002; 2004). Studies into the impact of cognitive ability on the perception of bias also found that greater cognitive ability rendered participants more vulnerable to committing errors as a result of cognitive bias. In two experiments conducted by West et al. (2012), 482 undergraduate students were presented with descriptions of several biases, followed by a number of classic problems which tested for cognitive bias. The findings across the two studies suggested that higher cognitive ability, as indicated by higher SAT scores, did not attenuate the cognitive blind spot, but rather increased the likelihood of committing cognitive bias (West et al., 2012). Collectively, these findings indicate that intelligence does not protect against erroneous thinking. They also indicate a need for a practical solution to address the shortcoming of Found and Edmond's (2012) assumption that readers of their report will be rational decision makers.

1.4 Improving Juror Information Processing and Decision Making: The Challenges

Pozzulo et al. (2010) asked jury-eligible participants to rate the credibility of a victim and defendant, whose gender and age were manipulated. Findings indicated that manipulating any of the variables influenced juror decision making, and that male and female jurors responded differently to changes in victim and defendant characteristics (Pozzulo et al., 2010). In a study looking at the effects of forensic evidence presentation, McQuiston-Surret and Saks (2009) presented 775 participants, including eligible jurors as well as 128 Arizona judges and judicial

officials, with one of two written summaries of a murder case. One case presented an expert's explicit conclusions concerning the source of a forensic sample, in contrast to a more objective analysis in the second case (McQuiston-Surret & Saks, 2009). Results showed that judges were more likely to associate the evidence with the defendant when presented with objective rather than subjective interpretations, while jurors more often gave a guilty verdict when the expert explicitly linked the evidence to the suspect, regardless of reported limitations of the forensic evidence (McQuiston-Surret & Saks, 2009). An individual's perception of biases in themselves and others is central to the discrepancy between jurors' evaluation of forensic evidence, and potentially contradictory behavioural outcomes (Ehrlinger et al., 2005; Lieberman, 2002; McQuiston-Surret & Saks, 2009). Despite the introduction of supplementary materials such as juror instructions and forensic reports to reduce bias, little research has been conducted on the interaction between juror decision making, supplementary materials, and forensic biases (Daftary-Kapur et al., 2010; Simmonsen, 2012).

Simmonsen (2012) reviewed research concerning the effects of juror instructions on decision making, as well as studies on the effects of presumed knowledge of forensic procedures, and of how memory works with regard to eyewitness testimony, on juror behaviour. According to the literature, jurors overestimate their own knowledge and understanding of evidence and cognitive bias (Clark et al., 2011; Daftary-Kapur et al., 2010; Edmond, 2015; McAuliff et al., 2009; Simmonsen, 2012). Juror instructions were also found not to supplement or correct jurors' perceptions of forensic procedures and cognitive factors influencing eyewitness testimony and forensic investigations (Clark et al., 2011; Daftary-Kapur et al., 2010; Edmond, 2015; McAuliff et al., 2009; Simmonsen, 2012). Furthermore, literature suggests that eyewitness testimony and pattern evidence such as facial image comparisons, which predominantly rely on cognitive judgments, are often admitted to courts on the basis of jurors' presumed ability to accurately conduct cognitive appraisals of forensic pattern evidence such as image comparisons (Clark et

al., 2011; Kneller et al., 2001; Simmonsen, 2012). Such findings further indicate that jurors' decision making is influenced by a significant number of factors, and that the use of supplementary materials may not be sufficient to address jurors' inability to discern and accurately consider bias in their decision making. Studies that have been conducted on the subject of supplementary materials and juror decision making have also raised concerns with alarming implications (Daftary-Kapur et al., 2010; Edmond et al., 2013; Simmonsen, 2012; Smith et al., 2011).

Smith et al. (2011) conducted two studies to investigate whether jurors could correctly distinguish forensic evidence of varying strengths with and without case information and context. Participants could differentiate between strong and weak forensic evidence on the basis of investigative relevance, and the mobility of the sample (Smith et al., 2011). Investigative relevance referred to the relevance of forensic methods used given particular evidence, and mobility referred to how easily a forensic sample could be innocently transferred from one place to another, therefore rendering more mobile samples weaker (Smith et al., 2011). Participants succeeded in differentiating between strong and weak forensic evidence on the basis of these two variables when no context was provided. When supplementary information including case information and a trial summary were provided, participants rated weak and moderate forensic evidence significantly more highly. This supports other research indicating that jurors' evaluations of forensic evidence are affected not entirely objectively, as would be ideal. Instead, influences include heuristics related to the context in which the evidence is presented, and prior personal views and preconceptions about forensic evidence, and elements of the trial in question (Hope et al., 2004; Kleider et al., 2012; Lieberman, 2002). Smith et al. (2011) posit that jurors' ability to more reliably evaluate and rate strength of forensic evidence without context, the effects of context such as a criminal trial in which such evidence is generally presented are cause for concern. Contrary to previous studies, higher estimations of weak and moderate forensic

evidence's strength did not result in higher numbers of guilty verdicts, suggesting that unaccounted for factors may yet have had a greater effect on jurors' decision making (McAuliff & Kovera, 2008; McAuliff et al., 2009; Smith et al., 2011). These findings present a strong counterargument to Found and Edmond (2012), aided by the lack of research on the interaction between forensic reports and juror decision making (Daftary-Kapur et al., 2010; Simmonsen, 2012). One prominent issue that may account for the lack of relevant research on the subject is the challenge of accurately capturing jurors' detection of bias, and the effects of such detection on juror decision making (Daftary-Kapur et al., 2010; Edmond, 2015).

A common and widely accepted feature of research into courtroom procedure, including judge and juror behaviour, is the use of trial transcripts (Andrews, n.d.; Wiener et al., 2011). Trial transcripts have been used in studies examining a diverse range of constructs, including the interaction between victim as well as defendant characteristics and juror decision making (Pozzulo et al., 2010), the effects of testimonial presentation on jurors' interpretation of information (McQuiston-Surrett & Saks, 2009), the impact of expectancy effects on jurors' perception (Hart, 1995), and jurors' ability to recognise technical errors and cognitive bias associated with forensic evidence (McAuliff et al., 2009). Forgoing the use of a lengthy auditory and visual presentation resembling actual court proceedings reduces external validity; however, the use of trial transcripts is more financially viable, and ensures that participants retain more information than over the course of a lengthy mock trial (Andrews, n.d.; Wiener et al., 2011). Although testing participants individually does not replicate jury deliberations, research on group dynamics has indicated that juror biases and factors influencing decision making are exacerbated by group interaction in cases where a unanimous ruling is required. This suggests that testing of individual mock jurors allows for comparison to juror behaviour influenced by group interaction (Kerr & Tindale, 2004; Ohtsubo et al., 2004). It is evident that trial transcripts are an appropriate tool for investigating juror behaviour; however, few studies have attempted to look at jurors'

perception of cognitive and forensic biases associated with forensic evidence presented during a trial (McAuliff et al., 2009; Smith et al., 2011). Studies that have done so have also differed in their use of information processing and decision-making models (McAuliff et al., 2009; Smith et al., 2011). The most widely known of these is the story model (Pennington & Hastie, 1991, 1992, 1993).

1.5 Models of Juror Information Processing

1.5.1 The Story Model

The story model of decision making is an explanation-based model developed by Pennington and Hastie (1991, 1992, 1993). It dictates that the juror is "a sense-making information processor who strives to create a meaningful summary of the evidence available that explains what happened in the events depicted through witnesses, exhibits, and arguments at trial" (Pennington & Hastie, 1991, p. 519). Pennington & Hastie (1991) proposed that the cognitive process of constructing a story was central to juror information processing and decision making regarding verdict. Jurors use trial evidence, real world knowledge and experience of similar events, and an understanding of story structure and continuity to construct a narrative over the course of a trial (Pennington & Hastie, 1991). Further information results in narrative development, with jurors assessing quality, relevance, and consistency of evidence and information before it contributes to the jurors' "story" (Pennington & Hastie, 1991). Though well established and employed in the form of checklists, flow charts, and other materials, researchers have struggled to concretely demonstrate jurors' information processing in accordance with the story model (Pennington & Hastie, 1992; Smith et al., 2011; Wiener et al., 2002).

Pennington and Hastie (1992) tasked 414 participants with reading a stimulus case, and then completing a short questionnaire to report their verdicts and confidence in forensic evidence. Some participants were also required to recall as much of the evidence as they could, and record

it in the order presented to them. It was found that participants were far more likely to commit to a verdict when evidence was presented using *story* items in sequence, particularly in the low credibility condition, and that the order in which evidence presented had a significant effect on mock jurors' memory of evidence presented (Pennington & Hastie, 1992). These findings suggested that perceived strength of the evidence in favour of one verdict over another was a function of how readily a juror could develop a story, which depended on the sequence and types of evidence used (Pennington & Hastie, 1992). Though the story model unquestionably contributed to the development of research into juror information processing and decision making, more recent research has shied away from using the story model, in part due to its incomplete approach to complexities associated with information processing (Spottswood, 2014; Smith et al., 2011; Wiener et al., 2002). More recent adaptions of the Story Model have been proposed. One of these is Devine's (2012) Integrative Multi-Level Theory model.

1.5.2 The Integrative Multi-Level Theory Model

Devine (2012) proposes a model of juror information processing and decision making which integrates theories and ideas from several notable bodies of juror decision making literature. Central to this multi-level theory is Pennington and Hastie's (1991) Story Model. Devine (2012) seeks to build on the Story Model, incorporating cognitive psychology findings on the effects of individual differences, extraneous information, and jurors' use of mental models to evaluate alternative narrative threads and inform decision making in court. To this end, juror characteristics represent a separate level of the model, encompassing facets of individual differences between jurors, and how these interact with characteristics of other trial participants, including the defendant, attorneys, and judges (Devine, 2012). Furthermore, Devine (2012) proposes that the constructs of *legal system trust* and *defendant demeanour* are distinguishable and measurable aspects of juror behaviour, contributing to jurors' ongoing story construction in accordance with the overarching Story Model (Pennington & Hastie, 1991). The Integrative

Multi-Level Theory Model of juror information processing and decision making also attempts to account for literature on how legal professionals and jurors evaluate the strength and credibility of evidence, and the concept of *charge seriousness* (Devine, 2012). Yet the theory's dependence on the Story Model means that it suffers from the model's shortcomings, undoubtedly contributing to the fact that it has thus far not been used in published juror decision making research. An alternate explanation for jurors' information processing and decision making, first introduced into the legal domain in the 1970s and 80s, is Bayes' theorem (Faigman & Baglioni Jr., 1988; Finkelstein & Fairley, 1970; Goodman, 1992).

1.5.3 Bayes' Theorem

In response to a growing use of statistics and probabilities as legal evidence, legal scholars proposed the use of Bayes' theorem to help explain probabilistic evidence (Faigman & Baglioni Jr., 1988). Bayes' theorem stems from mathematics, and describes a process for estimating the probability of an event occurring based on knowledge of particular conditions. Researchers sought to determine if application of Bayes' theorem to clarify probabilistic evidence and to quantify nonstatistical evidence would aid jurors in their decision making, with mixed results (Faigman & Baglioni Jr., 1988; Finkelstein & Fairley, 1970). Goodman (1992) sought to evaluate mock jurors' comprehension and assessment of probabilistic evidence by determining whether mock jurors would convert statistical evidence into a probability estimate of the defendant's guilt. Findings indicated that mock jurors did not reason in a Bayesian fashion, and under- or misused statistical and scientific evidence (Goodman, 1992). Investigating the application of Bayes' theorem in juror decision making has provided notable insights into the effectiveness of different forms of evidence Faigman & Baglioni Jr., 1988; Finkelstein & Fairley, 1970; Goodman, 1992). However, the theorem lacks a sufficiently comprehensive construct to explain the underlying cognitive processes involved in jurors' information processing and decision making. Competing with these models, Chaiken's (1980) Heuristic-Systematic Model

offered an alternative, more cognition-based approach to juror behaviour, many elements of which have stayed relevant and gained traction despite developments in cognitive psychology, and juror decision making research (McAuliff et al., 2009; Todorov et al., 2002).

1.5.4 The Heuristic-Systematic Model

Chaiken (1980, 1987) proposed a dual-processing model involving concurrent systematic and heuristic information processing. Systematic reasoning refers to the use of "highly effortful cognitive activity aimed at the careful analysis of a persuasive message's content", with emphasis on rationality and logical accuracy (McAuliff et al., 2009, p. 248). In contrast, heuristic reasoning is "the use of mental shortcuts or decision-rules to evaluate a persuasive message", involving environmental and context-specific cues relative to values held by the receiver of a message when determining the accuracy and value of that message (McAuliff et al., 2009, p. 248). A number of authors have suggested that the use of one system of information processing over another is dependent on a number of factors, not least of which are referred to as the three general principles of knowledge use and activity (Higgins, 1996; Todorov et al., 2002).

Todorov et al. (2002) argued that systematic and heuristic modes of processing are similar yet distinct. Using systematic processing, individuals scrutinise information provided with relevance to the task or query at hand, with emphasis on the strength of persuasion of an argument or information relative to an individual's understanding and cognitive elaboration, while accounting for available cognitive resources (Todorov et al., 2002). In contrast, heuristic processing refers to the use of environmental cues and preconceived notions and generalisations, requiring fewer cognitive resources. Todorov et al. (2002) propose that the use of systematic and heuristic processing, and what heuristics are used, is strongly tied to the three general principles of knowledge use that are *availability, accessibility,* and *applicability* (Higgins, 1996; Todorov, 2000).

Availability refers to the storage of a relevant and applicable set of knowledges in memory, which may refer to specific knowledges which enable systematic processing of information, or heuristics including biases and preconceptions with regard to the message or the source of the message to be processed (Todorov et al., 2002). *Accessibility* refers to the requirement for a set of knowledges not only to be available but also accessible in order to be employed (Higgins, 1996; Todorov et al., 2002). Awareness of a set of knowledges such as the existence of empirical evidence to support forensic science may not be sufficient to provide the tools for systematic processing, yet lends itself to using heuristics. Environmental and cognitive factors such as the persuasive nature of an argument and the circumstances in which they are presented, as well as the level of cognitive ability, alertness, and attention of the message receiver may influence an individual's ability to recall specific and cognitively taxing information for use in systematic rather than heuristic information processing (Todorov et al., 2002). *Applicability* refers to how appropriate the receiver of the message deems the knowledge accessed, if available to them, to the outcome of the task or query associated with that message. A juror may have, and access knowledge of certain scientific procedures but not deem them sufficiently relevant to the forensic evidence presented during a trial, instead seeking out another systematic set of knowledges if available, accessible, and applicable. This may require further cognitive resources, or favour a less demanding heuristic tool via the same process of elimination (Higgins, 1996; Todorov et al., 2002). Chaiken (1980, 1987) suggested that while both systematic and heuristic modes are concurrently active, one is favoured over the other as a result of a number of environmental and cognitive factors most prominently related to motivation.

Information processing is often linked to motivation and cognitive ability (Lieberman, 2002; McAuliff & Kovera, 2008; See et al., 2009; Todorov et al., 2002; Van der Maas et al., 2011). The Heuristic-Systematic Model functions within that framework, proposing that people engage in either systematic or heuristic processing of information depending on motivation, and

cognitive resources (Lieberman, 2002; McAuliff & Kovera, 2008; See et al., 2009; Todorov et al., 2002; Van der Maas et al., 2011). One of the most critical and relevant findings associated with the Heuristic-Systematic Model of information processing relates to what elements of a message are more persuasive when using a particular mode of reasoning. Chaiken (1980, 1987) found that individuals using systematic processing focus on distinguishing strong and weak rational arguments, while remaining mostly unaffected by factors not relevant to the message content. In contrast, people processing information heuristically were found to be swayed significantly more by irrelevant information, and cues such as appeal of the message source, while neglecting to differentiate between strong and weak rational arguments contained within the message (Chaiken, 1980, 1987; Lieberman, 2002). A number of factors have been found to influence motivation and the use of cognitive resources when interpreting information.

Personal relevance, need for cognition, task importance, accountability for one's views, and message content have all been found to strongly influence motivation of a message receiver (Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009; See et al., 2009; Todorov et al., 2002; Van der Maas et al., 2011). Time pressures, mode of communication, prior knowledge, experience, expertise, message repetition, and distraction have been identified as components that impact the element of cognitive resources in relation to message comprehension (Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009). Although recent research using the Heuristic-Systematic Model suggests that the model is still relevant in contemporary research contexts, models have emerged adopting aspects of the Heuristic-Systematic Model in conjunction with components from other theories. Epstein's (1994) Cognitive Experiential Self-Theory shares a number of constructs and ideas with the Heuristic-Systematic Model, with some notable differences.

1.5.5 Cognitive Experiential Self-Theory

Cognitive Experiential Self-Theory asserts that individuals process information in two partially independent systems, those being rational and experiential (emotional) modes (Epstein, 1994, 2003; Epstein & Pacini, 1999). The theory has much in common with Heuristic-Systematic Model, as it proposes that experiential processing is strongly related to heuristic decision making, with emphasis on efficient and largely effortless processing prone to a range of biases, in contrast to rational information processing, entailing effortful and deliberate analytical processing mostly free of affect, and related biases (Epstein, 2003; Lieberman, 2002). In contrast to Heuristic-Systematic Model however, Cognitive Experiential Self-Theory posits that "behaviour varies along a continuum and is influenced by the relative contributions of these two systems" (Donovan & Epstein, 1997; Lieberman, 2002, p. 2527). A number of studies have investigated Cognitive Experiential Self-Theory and found empirical support for the occurrence and applicability of the rational-experiential distinction in people's information processing and subsequent behaviour across a range of social contexts (Brown & Bond, 2015; Dunlop et al., 2010; Epstein, 2003).

Some studies have found that Cognitive Experiential Self-Theory may serve to predict a person's interpretation of feedback based on the rational-experiential dichotomy, and other studies have indicated that motivation may prompt the use of rational information processing over relying on heuristics, and that the use of more rational processing leads to more accurate judgments (Brown & Bond, 2015; Dunlop et al., 2010; Epstein, 2003; Hample & Richards, 2014; Kemmelmeier, 2010; Lieberman, 2002). Cognitive Experiential Self-Theory has also been a focus of the legal system, particularly in the United States, where research by scientific and legal bodies on investigations of juror behaviour and decision making has become a lucrative business (LeGrande & Mierau, 2003; Strier 2001). The literature has suggested that plaintiffs predominantly benefit from emotional jurors, whereas defendants gain more from rational jurors,

based on the idea that greater empathy and sympathy in jurors favours the victim of a court proceeding (Bright & Goodman-Delahunty, 2011; Lieberman, 2002; Wiener et al., 2006). Bright and Goodman-Delahunty (2011) explored the effects of manipulating jurors to process information rationally or emotionally, exposing them to either gruesome or non-gruesome evidence, on their states of emotional arousal, their sympathy for the plaintiff, their anger at the defendant, and their ratings of negligence and liability. Findings indicated that those exposed to gruesome images were more emotionally arouse and rated the defendant significantly more negligent. Authors concluded that the use of emotionally arousing evidence may therefore strengthen a plaintiff's weak case in accordance with previous literature on the subject (Bright & Goodman-Delahunty, 2011; Lieberman, 2002; Wiener et al., 2006). Lieberman (2002) argues that extralegal factors can therefore not be ignored within the context of Cognitive Experiential Self-Theory.

1.5.6 The Role of Extralegal Factors

Extralegal factors refer to factors and heuristic cues specific to a court case that may strongly influence jurors' decision making (Hart, 1995; Daftary-Kapur et al., 2010; Lieberman, 2002; Pozzulo et al., 2010). The most common of these include features of the victim or the defendant such as race, age, gender, attractiveness, and similarity to jurors, all of which have been shown to influence jurors, particularly in the case of attractiveness, as attractive defendants have repeatedly been found to receive more lenient treatment than unattractive ones (Hart, 1995; Daftary-Kapur et al., 2010; Lieberman, 2002; Pozzulo et al., 2010). Lieberman (2002) hypothesised that extralegal factors such as defendant attractiveness would have a more prominent effect in jurors processing trial testimony in an experiential mode, and significantly less of an impact on jurors using a rational mode. To show this, Lieberman (2002) tasked 93 participants with reading a trial transcript and evaluating a number of exhibits such as a photograph of the accident scene related to the trial, and a photograph of the defendant, before

completing a form asking participants to record their opinions concerning the defendant's liability, negligence, confidence in their verdict and amount of damages to be awarded. Participants were then tasked with rating the defendant on a number of scales including attractiveness, perceived intelligence, and similarity to the juror, and asked to answer several questions to determine the processing mode used (Lieberman, 2002). Findings indicated that jurors awarded overall greater damages to the plaintiff when the defendant was unattractive, and that amongst jurors, those who had been coerced into using experiential information processing were more likely to award greater damages than those using rational processing (Lieberman, 2002). The difference between rational and experiential mode participants was not significant, raising some concerns regarding the hypothesis that jurors using different forms of processing draw drastically different conclusions. Other studies investigating the potential applications for Cognitive Experiential Self-Theory in and outside of the legal sphere support the notion that the use of Cognitive Experiential Self-Theory to examine and potentially influence juror information processing to enable better decision making has merit (Epstein, 2003; Hample & Richards, 2014; Kemmelmeier, 2010; Lieberman, 2002). One such study, reviewed below, explored interactions between jurors' emotional and rational processing, recognition of bias, and decision making, (McAuliff et al., 2009).

McAuliff et al. (2009) sought to determine whether potential jurors, in the form of 248 jury-eligible members of the community, could detect flaws in experimental procedure, including missing control groups, and experimenter bias, which would dramatically reduce validity of evidence associated with it. Results suggested that potential jurors were not likely to recognise factors which would reduce or otherwise invalidate an experimental design associated with relevant forensic evidence (McAuliff et al., 2009). Instead, jurors' verdicts were found to be positively correlated with perceived expert evidence quality, and plaintiff credibility, suggesting that jurors' personal biases, and how the forensic expert presented and elaborated on forensic

evidence, had a significant effect on the trial's outcome (McAuliff et al., 2009). To capture participants' forensic confidence ratings, McAuliff et al. (2009) employed a measure of self-perceived expert evidence quality, made up of thirteen 5-point Likert scale questions with answers ranging from *Strongly Disagree* to *Strongly Agree*. Using this, McAuliff et al. (2009) found a positive correlation between ratings of expert evidence quality and plaintiff credibility, and hypothesised that this was more prominent in jurors who failed to identify flaws in the forensic evidence, suggesting a link between heuristic and systematic processing, jurors' evaluations of forensic evidence, and verdict outcomes. McAuliff et al.'s (2009) study and recent research employing similar methods have illustrated the validity of a dual processing approach in interpreting juror information processing and decision making in future research (Epstein, 20003; Evans, 2008; Krauss et al., 2004; Lieberman, 2002).

1.6 Summary

Forensic science plays a key role in contemporary legal practice, and has an increasingly pronounced and well-documented effect on judicial outcomes in Australian and other common law jurisdictions (Edmond, 2015; Howes & Kemp, 2017; Kassin et al., 2013; NAS, 2009; PCAST, 2016). This is in spite of research demonstrating that the reliability of forensic science and forensic evidence testimony is generally overestimated (Dror et al., 2006; Edmond et al., 2016; Edmond et al., 2013; Giannelli, 2010; Kassin et al., 2013; Wells et al., 2013). Some have taken note of this. Investigations culminating in the NAS (2009) report on forensic science, and the PCAST (2016) review of forensic evidence in criminal courts have been scathing of how poorly the forensic science industry has been controlled and regulated despite its rapid growth and impact. Investigators have also been highly critical of how ineffective the implementation of proposed changes and measures to procedures have been in reducing incidents of poor forensic analyses, and presentations of weak or unreliable forensic evidence in court (Edmond et al., 2016; NAS, 2009; PCAST, 2016; Wells et al., 2013). Judges have not been found to reliably fulfil the

role of gatekeepers, and flawed forensic evidence and testimony is in many instances presented to a group of jurors whose interpretation of that evidence will inform life changing decisions (Gatowski et al., 2001; Kovera & McAuliff, 2000; McAuliff et al., 2009). Therein lies the problem.

The NAS (2009) report and PCAST (2016) review of forensic science stress the plethora of concerns regarding the reliability and validity of forensic evidence due to the unregulated nature of certification, little to no standardisation across the forensic science industry, and a lack of standardised measures and tools that are commonplace, and indeed expected in the general sciences. Yet these publications fail to address jurors' critical role in interpreting and identifying forensic evidence and testimony of varying strength and reliability. The aim of improving the quality of forensic science introduced in court room hinges on the idea that jurors will be able to reliably and appropriately interpret forensic evidence, and as a result be able to make accurate judgements and render strong verdicts (Edmond, 2015; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009; PCAST, 2016). This is not supported by current research.

The literature on juror decision making proposes that juror decision making is complex, yet predominantly influenced by jurors' perceptions of defendant, victim, witness, and expert credibility and characteristics, as well as judges' opinions (Hart, 1995; McQuiston-Surret & Saks, 2009; Pozzulo et al., 2008). Research has also demonstrated that jury instructions and written forensic reports are too complex, and therefore of little consequence to juror decision making (Simmonsen, 2012). Despite research suggesting that simpler jury instructions reduce the role of jurors' non-verbal expectations on jurors' verdicts, increasingly complex and comprehensive jury instructions are used in today's courtrooms (Daftary-Kapur et al., 2010; Simmonsen, 2012). It has also been shown that jurors not only overestimate their grasp of forensic methods, but also fail to comprehend crucial differences between forensic comparison types, which form a central

part of forensic science (Kneller et al., 2001, 2008; McQuiston-Surret & Saks, 2009; Pozzulo et al., 2008). Such findings raise serious doubts regarding the perceived value of Found and Edmond's (2012) report format. There remains a need for further research into the interaction between juror decision making, forensic evidence, and bias (Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009; Smith et al., 2011).

This research will aim to investigate whether mock jurors, with the aid of a supplementary material in the form of the Found and Edmond (2012) proposed forensic report, will be able to more effectively discern potential forensic bias than if not provided with such material. A further aim is to establish if such recognition will influence jurors' decision making outcomes. Juror information processing within a dual information processing context will also be investigated, in order to contribute to the growing body of literature on how jurors make decisions (Daftary-Kapur et al., 2010; Lieberman, 2002; McAuliff et al., 2009; Smith et al., 2011). This research will seek to demonstrate whether information processing style may be reliably manipulated, and if manipulating mock jurors to process information either emotionally or rationally will affect jurors' ability to recognise flawed forensic evidence, as well as their willingness to act on that recognition (Lieberman, 2002; Wiener et al., 2006). Finally, this research will explore the effects of cognitive effort on jurors' information processing strategies, to determine if greater cognitive effort and fatigue are more likely to result in the use of emotional and heuristic processing of information, and influence decision making. This research should significantly contribute to an underdeveloped body of research pertaining to juror information processing and decision making in the face of forensic evidence. Findings may also come to provide valuable information for legal scholars and practitioners who seek to better understand processes involved in juror information processing and decision making. It is hoped that this research will ultimately contribute to ongoing efforts to bolster jurors' comprehension of increasingly complex evidence, and ability to distinguish between strong and weak forensic evidence in a courtroom setting. Such

efforts, and the research on which these efforts are based, are critical to improving not only juror

information processing and decision making, but confidence in the legal system as a whole.

Chapter 2.

Study 1. Forensic Evidence and Juror Decision Making: Can Jurors Recognise Bias in Forensic Reports?

Forensic and cognitive bias can influence jurors, and undermine validity of forensic experts and the evidence they present. Found and Edmond (2012) proposed that restructuring forensic reports would allow jurors to more readily recognise forensic bias, and better scrutinise forensic evidence presented in court, to make more accurate decisions. The aim of this study was to evaluate the effects of Found and Edmond's (2012) forensic report format on jurors' decision making. One hundred and twenty jury eligible participants read a trial transcript of a criminal proceeding; followed by a supplementary forensic report, based on the experimental condition they had been assigned. Participants then completed a questionnaire which asked for a verdict, the degree of guilt, and questions assessing participants' confidence in the forensic examiner and evidence. Participants failed to identify bias, and forensic reports did not show a significant effect on their decision making. In addition, participants' verdict and degree of guilt scores were correlated with forensic expert confidence. Given failure to recognise forensic and cognitive bias, and excessive reliance on forensic expertise, reliability of juror decision making is called into question. Implications and possible avenues for future research into the potential role of forensic reports on jurors' decision making are discussed.

Keywords: Forensic science, cognitive bias, juror decision making

2.2 Introduction

Forensic science is characterised by the use of scientific methods to collect and analyse evidence for the purposes of aiding investigative and judicial branches of the law (Edmond, 2015; McQuiston-Surrett & Saks, 2009). It has become a critical component of the contemporary evidence-based legal process, with jurors more likely to encounter science-based evidence than ever before (Edmond et al., 2013; Giannelli, 2010; Goodman-Delahunty & Hewson, 2010). This is in spite of well-documented and increasingly publicised shortcomings of forensic evidence, some of which have led to wrongful convictions (Dror et al., 2006; NAS, 2009; PCAST, 2016).

In 2004, Brandon Mayfield was erroneously identified as the mastermind behind several coordinated train bombings in Madrid (Dror et al., 2006). Forensic experts working for the FBI identified Mayfield using a set of latent fingerprints (Dror et al., 2006). These were later used by Spanish authorities to identify the real culprit (Dror et al., 2006). This and other cases of erroneous identifications have highlighted the contextually-laden environment within which examiners collect and analyse evidence (Dror et al., 2006; Giannelli, 2007; Giannelli, 2010; Wells et al., 2013). This raises the issue of how cognitive biases and contextual effects factor into forensic analyses.

Forensic scientists practice within a range of socio-cultural, economic, and political contexts, all of which impact examiners' judgments in handling, testing and presenting forensic evidence (Kassin et al., 2013; Page et al., 2012; Saks et al., 2003). The prevalence of contextual influences and biases throughout the provision of law enforcement and legal services has become more visible in light of a renewed global focus on terrorism prevention (Dror et al., 2006; Giannelli, 2010; Peacock et al., 2004). Technological advancements have also contributed to the rise of forensic science, yet have not reduced the frequency or impact of human error (Dror & Mnookin, 2010). Training in psychology to reduce the effects of human error within forensic

laboratories has been proposed, but not yet been adopted by many forensic laboratories and law enforcement agencies (Costanzo, 2013; Giannelli, 2007; NAS, 2009; PCAST, 2016; Saks et al., 2003). Further changes to address issues of cognitive bias in forensic laboratories have been proposed.

Kassin et al. (2013) argue that forensic analyses be conducted in a linear fashion, to avoid biasing effects of comparing forensic evidence against target samples before samples collected from a crime scene are entirely analysed and documented independent of extraneous information or suggestion. However, Kassin et al. (2013) also note the potential value of extraneous information, such as the surface from which a sample was collected, suggesting a third party serve as a provisional source of information relevant potentially relevant to the analysis of forensic evidence. Training in psychology, and education on the potential effects of cognitive biases as a core component of law enforcement and forensic expert training has also been increasingly recommended (Costanzo, 2013; Kassin et al., 2013). Contextual and motivational biases have been acknowledged as a source of error in forensic science, and forensic laboratories (Dror et al., 2006; Kassin et al., 2013; NAS, 2009; PCAST, 2016). The ever-expanding body of literature on the subject has ensured that changes to mitigate the causes and effects of cognitive bias in labs are introduced (Dror et al., 2006; Kassin et al., 2013; Saks et al., 2003). Yet some flawed forensic evidence continues to be introduced into courtrooms (Daftary-Kapur et al., 2010; Dror et al., 2006; McAuliff & Kovera, 2008; McAuliff et al., 2009; PCAST, 2016). This is a notable issue in light of the limited scope of current research looking at the impact of flawed forensic science and evidence on judges and jurors (McQuiston-Surrett & Saks, 2009; NAS, 2009; PCAST, 2016; Smith et al., 2011).

2.3 Cognitive Bias in the Courtroom

The vulnerable position of judges and jurors within the judicial process greatly contributes to the effects of forensic and cognitive bias on verdict outcomes (Found & Edmond, 2012; Kovera & McAuliff, 2000; McAuliff & Kovera, 2008; McAuliff et al., 2009). Judges have been assigned a gatekeeping role, and are expected to determine admissibility of forensic evidence based on its accuracy and reliability (Gatwoski et al., 2001; McAuliff et al., 2009). Many judges are however ill-equipped for such a role, resulting in the introduction of weak or invalid forensic evidence into trials (Gatowski et al., 2001; Kovera & McAuliff, 2000). This presents a problem as the responsibility to distinguish strong from weak evidence consequently falls on jurors not prepared for such a task.

A jury's role in a criminal trial is to determine whether it has been proven through testimony, forensic evidence, and in the context of the law, that a defendant is guilty beyond reasonable doubt (McAuliff et al., 2009; Ohtsubo et al., 2004; Pozzulo et al., 2010). It is presumed that jurors consider all evidence objectively to reach the most rational conclusion. Yet research shows that jurors are prone to irrational decision making (Magnussen et al., 2014; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009; Tran et al., 2011). Mock jurors are influenced by extraneous information such as demographic characteristics of the victim and the defendant, and descriptions of the crime and crime scene (Kleider et al., 2012; Lieberman, 2002). Jurors also overestimate their comprehension of forensic evidence, and have shown an inability to recognise flaws in forensic procedure when present (Goodman-Delahunty & Hewson, 2010; McAuliff & Kovera, 2008; McQuiston-Surrett & Saks, 2009). In attempting to mitigate these factors, supplementary materials have been designed and employed in a number of studies looking to reduce the effects of jurors' own biases, and to improve understanding of forensic evidence (Found & Edmond, 2012; Halverson et al., 1997; Simmonsen, 2012).

2.4 The Role of Supplementary Materials

Jury instructions, generally presented by the presiding judge, inform jurors on the subjects of legal jargon, forensic evidence, and jurors' responsibilities (Halverson et al., 1997; Shaw & Skolnick, 1995; Simmonsen, 2012). The use of jury instructions has become standard in many western legal systems (Daftary-Kapur et al., 2010; Simmonsen, 2012). However, jury instructions were found to be inadequate at addressing cognitive and forensic bias (Daftary-Kapur et al., 2010; Halverson et al., 1997; Simmonsen, 2012). Daftary-Kapur et al. (2010) found that jurors' comprehension of jury instructions is reported to generally be very low, and that instructions fail to address the effects of cognitive and forensic biases. In response to the ineffectiveness of jury instructions at reducing forensic bias, alternative approaches to clarifying information, such as forensic reports, have been developed.

Forensic reports are introduced alongside forensic evidence with the aim of enhancing the quality and clarity of information provided to jurors (Found & Edmond, 2012). However, studies have found that forensic reports do not improve jurors' understanding of the evidence, as they are not simple enough for a lay person to comprehend (Daftary-Kapur et al., 2010; Found & Edmond, 2012). Howes and Kemp (2017) expanded upon this, arguing that low scientific literacy in the western world has greatly contributed to concerns about jurors' interpretation of verbal and written expressions of forensic evidence. According to Howes and Kemp (2017), a great deal of contention relating to language used in reports to express findings stems from attempts to communicate scientifically accurate information to non-scientists without compromising objectivity. Such communication issues are particularly likely in the presentation of pattern-comparison evidence, where forensic experts have been found to frequently overstate the strength of findings (Howes & Kemp, 2017; NAS, 2009; PCAST, 2016). A number of changes to the written communication of such evidence have been proposed (Howes, 2015; Found & Edmond, 2012).

Howes and Kemp (2017) proposed that scientific literacy be more comprehensively taught and integrated across a range of disciplines and academic domains that traditionally may not have included courses exploring effective science communication. Howes and Kemp (2017) also stress the importance of clarity and transparency when presenting information in written form, as previously noted in the NAS (2009) and PCAST (2016) reports. Howes (2015) categorised common causes for, and sources of miscommunication present in the written presentation of information and evidence, including the level of lexical density, and issues concerning the communication of uncertainty. Howes (2015) provides a guide for how to prepare written reports appropriate for a range of likely audiences, generally emphasising the need for less complexity in communicating information, without sacrificing depth. Found and Edmond (2012) also proposed that simplifying and reformatting forensic reports may enable lay jurors to more accurately interpret and evaluate the strength and reliability of complex forensic evidence (Found & Edmond, 2012; Kassin et al., 2013).

2.4.1 The Found and Edmond (2012) Forensic Report

Found and Edmond (2012) observed that while methodological trends can be found across forensic disciplines, the same is untrue for the presentation of forensic evidence, including through forensic reports. Furthermore, forensic reports are rarely altered in preparation for presentation to jurors. In contrast, scientific practical reports produced for the purposes of publication in academic journals have been largely standardised, and structured in order to enable readers and peer reviewers to effectively disseminate, interpret, and validate the contents of such reports. Found and Edmond (2012) proposed a format for forensic reports to improve structure, content quality, and clarity, and enable a standardised format across forensic disciplines. Proposed changes to forensic reports would enable jurors to more effectively discern relevant from non-relevant information, identify potential sources of cognitive and forensic bias, and draw more objective and accurate conclusions (Found & Edmond, 2012). No research has been

conducted to validate claims made by Howes (2015), Howes and Kemp (2017), or Found and Edmond (2012), and studies on human cognition as well as juror behaviour do not support Found and Edmond's (2012) conclusions.

Found and Edmond (2012) assume that jurors are rational decision makers, and that the complexity of information provided during a trial is the primary obstacle in enabling jurors to make better decisions. Yet research indicating that forensic experts can be influenced by cognitive bias suggests that even those knowledgeable in forensic disciplines are easily biased, emphasising the vulnerable position of jurors (Dror et al., 2006; Giannelli, 2010; Wells et al., 2013). One notable example of this is jurors' inability to recognise their own biases, known commonly as the bias blind spot (Ehrlinger et al., 2005; McAuliff et al., 2009; Pronin et al., 2002).

The bias blind spot is characterised by a person's inability to recognise their own biases, and studies have indicated that jurors in particular are often susceptible to the bias blind spot (Ehrlinger et al., 2005; McAuliff & Kovera, 2008; McAuliff et al., 2009; Pronin et al., 2002). Jurors' decision making may be compromised as they discount the possibility of personal bias when evaluating evidence, and what effect this may have on verdict outcomes. West et al. (2012) found that cognitive ability and problem-solving approaches did not attenuate the bias blind spot. Puzzulo et al. (2010) found that victim and defendant gender, age, and appearance can have just as significant an effect on juror decision making as forensic evidence, highlighting the multifaceted issue of cognitive bias in juror decision making.

Studies have proposed that increasing empirical evidence and supplementary materials is sufficient to curb cognitive bias effects (Daftary-Kapur et al., 2010). Others have argued that supplementary materials have little to no effect, and that qualitative evidence has a significantly greater impact on juror decision making than empirical evidence and scientific jargon (Halverson

et al., 1997; McAuliff et al., 2009; Simmonsen, 2012). Information processing strategy has also been linked to the interpreter's motivation and ability to generally comprehend a message (Chaiken et al., 1989; Cacioppo et al., 1996; McAuliff et al., 2009). McAuliff et al. (2009) proposed that factors such as stress, emotional involvement, education, and motivation predict jurors' use of logic in evaluating evidence, and that clarity and simplicity of information reduces the effects of cognitive biases; however, research in support of this is scarce. A study to investigate the effects of Found and Edmond's (2012) report format on jurors' ability to recognise flaws in forensic evidence has not yet been conducted. Therefore this study aimed to evaluate the application of Found and Edmond's (2012) report format to improve jurors' recognition of flawed forensic evidence, and whether recognising flawed evidence would influence verdict outcomes.

2.5 Summary

Forensic science is a common component of many criminal trials (McQuiston-Surrett & Saks, 2009). Yet cognitive and contextual biases in forensic experts have been well documented, leaving the responsibility of determining reliability to judges and jurors (Giannelli, 2010; Wells et al., 2013). Can jurors in fact recognise such biases in forensic evidence to inform decision making? This has been the subject of research over a number of years (Found & Edmond, 2012; Magnussen et al., 2014; McQuiston-Surrett & Saks, 2009; Wilson & Dunn, 2004). Specifically, mock jurors were found to be influenced by manipulation of the defendant's and victim's gender, age, and supposed crime (Pozzulo et al., 2008; Pozzulo et al., 2010). Research has also indicated that jurors overestimate their understanding of forensic evidence, and rely on explicit associations between evidence and defendants by forensic experts or judges (Howes & Kemp, 2017; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009; Simmonsen, 2012). McAuliff et al. (2009) found that mock jurors were unlikely to recognise flaws in experimental design and forensic evidence, and that recognition of such flaws did not significantly influence their verdicts. Found and

Edmond (2012) proposed that several changes to the presentation of forensic reports could improve juror comprehension, and decision making. These claims have not been substantiated, and are questionable in light of previous findings concerning juror decision making and cognitive bias (McAuliff et al., 2009; Pozzulo et al., 2010; West et al., 2012). This study sought to determine if Found and Edmond's (2012) claims could be empirically validated. Results could potentially provide a concrete foundation for future research looking to identify cognitive processes guiding juror information processing and decision making outcomes.

To do this, a trial stimulus partly derived from Goodman-Delahunty and Hewson (2010) (Appendix A) was developed. According to Bieneck (2009), trial stimuli, sometimes referred to as vignettes, have become particularly relevant in the conducting and applying of social cognitive research and its outcomes to the legal system, citing the ability to systematically manipulate elements of a vignette or trial transcript as a significant advantage over other methods for jury simulation research. Participants were randomly assigned to one of three conditions. Those in the 'trial transcript only' condition read the trial transcript without supplementary materials. Those in the 'biased report' condition read the trial transcript, and were then provided with a forensic report using Found and Edmond's (2012) report format (Appendix B), the content strongly indicating that the forensic expert had likely been biased. Participants in the 'unbiased report' condition read the trial transcript, and were then provided with a report using Found and Edmond's (2012) report format, the report not indicating that the expert had been biased. Participants were tasked with rendering a verdict, and provided a likelihood of guilt estimate on a scale from 0 to 100. The use of likelihood of guilt estimates is common in juror decision making literature, and has been effective in offering an alternative way of interpreting differences in juror behaviour (Dhami, 2008; McAuliff et al., 2009). All participants then completed the Forensic Confidence Scale (McAuliff et al., 2009) (Appendix C).

The Forensic Confidence Scale was derived from a measure of self-perceived expert evidence quality employed in McAuliff et al. (2009), used to evaluate mock jurors' perceptions of forensic evidence quality and credibility. McAuliff et al. (2009) found a positive correlation between forensic evidence and mock jurors' verdicts. The use of the Forensic Confidence Scale should provide further clarity on whether Found and Edmond's (2012) forensic report would have an effect on jurors' forensic confidence, ability to detect forensic bias, and verdict.

The first hypothesis was that forensic confidence scores would be positively correlated with verdict, and likelihood of guilt (McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). It was also hypothesised that participants supplied with a forensic report would record greater confidence in the forensic evidence, even when the forensic report indicated that the expert had been biased (Smith et al., 2011). The third hypothesis was that participants who received a supplementary forensic report, regardless of content, would, as a result of greater confidence in the forensic evidence, be more likely to find the defendant guilty, and that there would not be a significant difference between participants receiving reports indicating bias or a lack of bias (McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009; Smith et al., 2011).

2.6 Method

2.6.1 Participants

One hundred and thirty participants (51 male, 79 female) were recruited via the University of Adelaide's Sona systems Research Participation System (RPS), and online advertising. Written informed consent was obtained immediately prior to participation in the study. Participants were excluded if not between the ages of 17 and 80, not an Australian citizen, or had a law degree, to address jury eligibility. This study was approved by the University of Adelaide's School of Psychology Human Research Ethics Sub Committee (code number: 13/86).

2.6.2 Measures

2.6.2.1 Stimulus Materials

2.6.2.1.1 Trial Transcript. Participants were presented with a seven-page summary of a simulated criminal case (Appendix A) in which the state alleges that the defendant intentionally attacked and caused the death of someone known to them, in a public place. The transcript was partly derived from Goodman-Delahunty and Hewson (2010). Certain facts were modified to prevent the possibility that participants may recognise the case from prior exposure through research or other means. The type of forensic evidence was also modified to reflect the research aims of investigating jurors' perception of questionable forensic evidence. The transcript consisted of opening statements, summaries of five cross-examined witness testimonies, two of which were eyewitness testimony, an introduction to pattern evidence and image comparison by a forensic expert, cross-examination of the forensic expert, and final judge's remarks.

The eyewitness testimony used in this trial transcript revealed, under cross-examination, that eyewitnesses maintained a high degree of uncertainty. This ensured that the forensic evidence, a still image from CCTV footage recovered from a camera located close to the incident, was the critical factor in establishing the defendant's guilt beyond a reasonable doubt. The examination of the evidence was preceded by information on pattern evidence examination by the forensic expert, outlining some strengths and shortcomings of the image comparison procedure, as well as technical aspects of image comparison, and how the analysis had come to conclude that the image matched the suspect. This was followed by a cross-examination, during which the forensic expert admitted that image comparison was not fool-proof, and that she was aware of details concerning the investigation.

The cross-examination of the forensic expert was followed by two defence witness summaries, one of the defendant, and one of the defendant's fiancée. Both admitted under cross-examination to have forgotten minor details regarding their exact whereabouts and passage of time relative to the victim's proposed murder. The trial transcript was concluded by the judge's closing statements, and basic judicial instructions.

2.6.2.2 Found and Edmond (2012) Format Forensic Report

Some of the participants were also presented with a forensic report, using a South Australian forensic report template as recommended by Forensic Science South Australia (FSSA) (Appendix B). The forensic report template was modified to adopt Found and Edmond's (2012) proposed report format. As outlined by Found and Edmond (2012), the structure of the forensic report was as follows:

- Title

- Executive Summary

- List of exhibits submitted (CCTV footage)

- Statement as to origin of evidence

- Statement of chain of custody of exhibit

- Statement of domain irrelevant information the examiner was provided with

- Statement as to qualifications of examiner

- Methods and materials

- Procedure

- Results

- Conclusions

2.6.2.2.1 Forensic Report Manipulation

2.6.2.2.1.1 Section - Information that the examiner was provided with:

The unbiased forensic report indicated that the forensic examiner was provided with details concerning the forensic sample, specifically the time, date, location, and source of the evidence. The forensic report containing bias provided the same information, as well as stating that the forensic expert was informed that a suspect was already in custody, and that there had been an eyewitness.

2.6.2.2.1.2 Section - Conclusions:

Both forensic reports contained an identical summary of the forensic evidence, how it was processed, and conclusions drawn about the comparison, and the effects of moderate to low image quality with regard to conclusions drawn and further interpretations of the forensic evidence. The biased forensic report also states that the forensic expert was aware of details relating to the case not directly relevant to the analysis, and that a biasing effect could not be discounted.

2.6.2.3 Participant Questionnaire

Participants were tasked with completing a four-page questionnaire (Appendix D). The questionnaire was partly derived from McAuliff et al. (2009) and Goodman-Delahunty and Hewson (2010). The questionnaire consisted of several sections. The trial question section contained one question asking jurors to present a verdict, and a question requesting participants to rate likelihood of guilt on a scale from 0 to 100.

2.6.2.3.1 Forensic Confidence Scale. Participants then completed the 13-item Forensic Confidence Scale. The scale measures jurors' confidence in the forensic expert and evidence. Participants were asked to respond to questions using 5-point Likert scales, with answers ranging from Strongly Disagree to Strongly Agree. Example items included 'The Expert's

research was based on good scientific principles' and 'The Expert did not use valid methods of image identification comparison'. Two of the items were negatively worded for the purposes of manipulation checks.

The general knowledge section asked participants a number of questions relating to perceived prior knowledge of forensic evidence, as well as testing whether mock jurors could recall information relating to pattern evidence comparison presented in the trial transcript. One question related to participants' understanding of statistics. The questionnaire concluded with a demographic section, and asked participants to report whether they spoke English as their first language, or had past jury duty experience.

2.6.3 Design

An experimental between-groups design was employed for the purposes of this study. Study group was the independent variable with three levels, those being group A (transcript without forensic report), group B (transcript and forensic report suggesting bias), and group C (transcript and forensic report not suggesting bias). Dependent variables were verdict, as well as reliance and confidence in forensic evidence as determined by the questionnaire, using 5-point Likert scales.

2.6.4 Procedure

Participants were first tasked with reading the trial stimulus, with two competing eye witness testimonies, and forensic evidence presented by an appropriate expert witness. Participants in the 'trial stimulus only' condition received the trial stimulus without supplementary materials. Participants in the 'biased report' condition read the trial stimulus, followed by a forensic report indicating the expert had been biased. Participants in the 'unbiased report' group read the trial stimulus, and then read a forensic report not indicating that the expert had been biased. Participants then completed the Forensic Confidence Scale (McAuliff et al.,

2009). Data from questionnaires were recorded in a Microsoft Excel file in preparation for analysis.

2.6.5 Data Screening

Data for 130 participants were entered into SPSS Version 20 and screened for normality. Data from 10 participants who were not Australian citizens, therefore not meeting the conditions of inclusion, were removed. The final data set, after removal of incomplete data and errors, consisted of 120 participants.

2.7 Results

2.7.1 Manipulation Checks

Participant age group was non-normally distributed, with skewness of 1.42 ($SE = 0.22$) due to the sample primarily consisting of undergraduate psychology students recruited from the University of Adelaide. Females greatly outnumbered male participants, as is common in studies involving voluntary participation (Lobato et al., 2014). No statistically significant differences in reported motivation or prior knowledge of forensic methods were found within or between participant groups and conditions. See Table 1 for participant characteristics.

2.7.1.1 Forensic Confidence

An Analysis of Variance (ANOVA) was conducted to determine whether participants in different conditions differed in their reported forensic confidence. It was not significant, $F(2,117) = 0.98$, $p = .377$, $\eta^2 = .02$.

Table 1. *Participant Characteristics*

Measures		1st Condition	2nd Condition	3rd Condition	Total
Age	18-24	24	26	25	75
	25-34	5	4	9	18
	35-44	4	4	2	10
	45-54	3	4	2	9
	55-64	4	2	2	8
Gender	Male	16	14	17	47
	Female	24	26	23	73
Verdict	Guilty	13	22	23	58
	Not Guilty	27	18	17	62
Guilt %		60	67	70	66
		(27)	(25)	(21)	(24)
Forensic Confidence		5.7	6.6	7.2	6.5
		(4.9)	(5.5)	(4.1)	(4.9)
Total		40	40	40	120

2.7.1.2 Expert Bias

One question on the Forensic Confidence Scale asked participants to estimate the likelihood of the forensic expert to have been unbiased and objective. An ANOVA was conducted to determine if participants in different conditions would differ in their estimation. It was significant, $F(2,117) = 3.3$, $p = .04$, $\eta^2 = .05$.

Participants who read the trial transcript and then received a forensic report indicating bias recorded a lower likelihood of the expert being unbiased and objective ($M = 0.05$, $SD = 1.00$, 95% CI [-0.27, 0.37]) than participants who received no forensic report ($M = 0.63$, $SD = 1.00$, 95% CI [0.30, 0.95]) and participants who received a report not indicating bias ($M = 0.4$, $SD = 1.01$, 95% CI [0.08, 0.72]).

2.7.1.3 Expert Study's Validity

Another question on the Forensic Confidence Scale asked participants to rate the expert study's validity. An ANOVA was conducted to determine if participants in different conditions would differ in their ratings. It was significant, $F(2,117) = 3.6$, $p = .03$, $\eta^2 = .06$.

Those who read the trial transcript but did not receive a forensic report were more likely to report a lower estimation of the expert study's validity ($M = 0.55$, $SD = 0.88$, 95% CI [0.27, 0.83]) than participants who received a forensic report indicating bias ($M = 0.9$, $SD = 0.93$, 95% CI [0.60, 1.20]), or one containing no bias ($M = 1.03$, $SD = 0.62$, 95% CI [0.83, 1.22]).

One of the main questions raised in this study was whether jurors' decision making would differ if provided with a Found and Edmond (2012) style forensic report.

2.7.2 Verdict

A Chi Square Test was conducted to determine whether participants assigned to different conditions would differ in their verdicts. Participant condition had a significant effect on verdict, $\chi^2(2, 120) = 6.07$, $p < .05$ (two-tailed).

Participants who did not receive a forensic report were more likely to give verdicts of not guilty ($N = 27$) than participants who received a forensic report containing bias ($N = 18$) or a forensic report containing no bias ($N = 17$). Post hoc tests however showed no significant differences between verdicts of any two participant conditions. Whether a participant received a forensic report, and what the forensic report entailed, had some effect on juror decision making; however, factors that were not accounted for likely had a greater total effect on juror behaviour.

2.7.3 Likelihood of Guilt

An ANOVA was also conducted to determine whether participants assigned to different conditions would report different likelihoods of guilt. Participant condition did not have a significant effect on likelihood of guilt, $F(2,117) = 1.8$, $p = .169$, $\eta^2 = .03$.

2.7.4 Forensic Confidence

A third ANOVA was conducted to determine whether participant condition would affect forensic confidence scores. The ANOVA was not significant, $F(2,117) = 1.0$, $p = .377$, $\eta^2 = .02$.

2.7.5 Detection of Forensic Bias

A Multivariate Analysis of Variance (MANOVA) was conducted to examine whether participants in different conditions would differ in their responses across items on the Forensic Confidence Scale. Participant condition had a significant main effect on whether jurors believed that the expert's research was based on good scientific principles, $F(2,117) = 3.08$, $p = .05$, $\eta^2 = .05$. It also had a significant main effect on whether jurors believed the expert to be unbiased and objective, $F(2,117) = 3.3$, $p = .04$, $\eta^2 = .05$, and on whether they believed the expert's study to be scientifically valid, $F(2,117) = 3.62$, $p = < .05$, $\eta^2 = .06$.

LSD Post hoc comparisons revealed that participants who did not receive a forensic report recorded a significantly lower confidence in the idea that the expert's research was based on good scientific principles ($M = 0.90$, $SD = 0.74$, 95% CI [0.66, 1.14]) than participants who received a forensic report without bias ($M = 1.28$, $SD = 0.55$, 95% CI [1.10, 1.45]). The findings suggest that participants who received a forensic report, regardless of content, believed that the forensic expert's study was more reliable than participants who didn't receive a forensic report after the transcript.

An LSD Post hoc comparison of jurors' estimation of the expert's bias and objectivity showed that participants receiving a forensic report indicating bias recorded a significantly lower likelihood of the expert being unbiased and objective ($M = 0.05$, $SD = 1.00$, 95% CI [-0.27, 0.37]) than participants who received no forensic report ($M = 0.63$, $SD = 1.00$, 95% CI [0.30, 0.95]) or participants who received a report not indicating bias ($M = 0.4$, $SD = 1.01$, 95% CI [0.08, 0.72]). This suggests that the use of the forensic report may have allowed jurors to accurately discern bias.

LSD Post hoc tests also indicated that participants who did not receive a forensic report recorded a significantly lower confidence in the expert study's scientific validity ($M = 0.55$, $SD = 0.88$, 95% CI [0.27, 0.83]) compared to those with a forensic report containing no bias ($M = 1.03$, $SD = 0.62$, 95% CI [0.83, 1.22]).

2.8 Discussion

The aim of the present study was to examine the effects of supplementary forensic reports in the format proposed by Found and Edmond (2012) on jurors' evaluations of forensic evidence, and by extension, verdict. Verdicts differed significantly across experimental conditions, with jurors provided with a supplementary forensic report, regardless of content, more likely to find the defendant guilty than participants who received no report. One explanation for this is that the forensic report may have prompted greater confidence in the forensic evidence, while participants without a report may not have attempted to understand and interpret forensic science 'jargon'.

Likelihood of guilt was directly linked to jurors' confidence in the forensic evidence. Jurors' confidence in the forensic evidence was only significantly correlated with verdict when comparing participants with no forensic report to those presented with a report containing no bias.

Although participants in different conditions differed in their forensic confidence scores, differences were not statistically significant. This may have been due to low participant numbers reducing the power of comparisons. A post hoc power analysis found an observed power of 0.22, indicating a high probability of a Type II error (Cohen, 1992). A larger sample size may have resulted in statistically significant differences between participants in different conditions. Though forensic confidence did not significantly differ, results indicated a significant difference between participants' reported confidence in the expert study's validity.

Participants reported a significantly lower confidence in the validity of the forensic expert's study when given a forensic report indicating bias than one indicating no bias, or no forensic report. These findings suggest that forensic reports may have enabled jurors to recognise bias, without sufficiently acting on it. Research into the role of forensic reports on juror decision making is quite limited; however, some of the present study's findings are consistent with past research outcomes relating to juror decision making (McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009).

McQuiston-Surrett and Saks (2009) found that judges and jurors were more prone to rating likelihood of guilt higher when confidence in expert testimony was high, though higher likelihood of guilt did not directly translate to more guilty verdicts. In addition, McQuiston-Surrett and Saks (2009) found that jurors rated their understanding, and the complexity of forensic evidence higher than judges, highlighting one of the vulnerabilities related to the use of forensic evidence in court rooms. McQuiston-Surrett and Saks (2009) also discovered that judges and jurors lent more credence to qualitative evidence than quantitative and statistical evidence, suggesting that the greater complexity associated with quantitative evidence, may inhibit accuracy of jurors' decision making.

McAuliff et al. (2009) examined jurors' ability to detect flaws in scientific procedure and experimenter bias related at trial. McAuliff et al. (2009) employed Cacioppo and Petty (1982)'s Need for Cognition Scale to assess whether jurors did or did not enjoy effortful cognitive endeavours, to gauge jurors' likely use of heuristic or rational processing. It was found that most jurors recognised one threat to internal validity, but not others, and variations in construct validity did not impact jurors' verdict or confidence in the expert witness or forensic evidence. McAuliff et al. (2009) concluded that internal validity threats such as experimenter bias and confounds were too complex for lay jurors to interpret rationally. McAuliff et al. (2009) argued that heuristic reasoning plays a crucial part and far more prominent role in most jurors' decision making than rational reasoning. McQuiston-Surrett and Saks' (2009) and McAuliff et al.'s (2009) findings support the idea that jurors rely on broader arguments and qualitative statements rather than statistical and scientific analyses. Jurors may therefore benefit from supplementary material such as simplified forensic reports to account for diverse jurors' decision making strategies. Further research is crucial if these are to be developed and adopted in real courtrooms.

2.9 Limitations of the Study and Considerations for Future Research

A number of factors not accounted for may have influenced this study's findings, and limit generalisability of results. Jurors were presented with a written transcript, rather than participating in a re-enactment of the mock trial, and did not participate in group deliberations as would generally occur. Participants may have been less motivated than if they had been part of a real court case, where more auditory and visual stimuli could have influenced participants' decision making. The sacrifice of external validity for internal validity does not extend to participants' individual rendering of a verdict, as research has indicated that pre- and post-deliberation verdicts rarely differ (Kerr & Tindale, 2004; McAuliff et al., 2009; Ohtsubo et al., 2004). Participants were recruited via the University of Adelaide, likely to have resulted in a participant sample predominantly made up of students with some tertiary education. Thus

participants likely had a greater ability to identify flawed research methods, and may have been more critical than an actual lay juror sample. There has been some debate regarding the generalizability of jury simulation research using student samples (Bornstein et al., 2017). However, a recent review of literature found guilty verdicts, culpability ratings, and damage awards not to differ between student and non-student samples, indicating that student samples are appropriate for jury simulation research involving mock jurors (Bornstein et al., 2017). Participants across conditions were also presented with different quantities of evidence, as some were shown forensic evidence repeatedly due to receiving a forensic report. This may have contributed to participants' overestimation of the evidence's strength and importance regardless of content. The use of a forensic report not using Found and Edmond's (2012) suggested format was excluded, limiting conclusions drawn concerning the report format used in this study relative to other forensic reports. The relevance of this shortcoming is however mitigated by the fact that forensic reports are not standardised. Comparisons between the Found and Edmond (2012) style forensic report and report formats employed by different agencies would likely yield drastically different results, re-emphasising one of the issues associated with inconsistent forensic report formats (Found & Edmond, 2012; Howes & Kemp, 2017). The study did not employ a direct measure of whether jurors recognised bias, aside from one Likert scale question. A greater number of measures concerning bias, including jurors' perception of their own biases, is recommended for any future studies modelled on this one. Differences in content between the biased and unbiased forensic reports were minor, and potentially too subtle for lay jurors to pick up on. These concerns are however mitigated by findings suggesting that the forensic report had a notable effect on jurors' detection of bias.

Despite these limitations, the findings of this study contribute to the growing body of literature concerning forensic bias and juror decision making. The present study's findings are consistent with the results of past research indicating that jurors' perceptions of forensic evidence

and forensic expert testimony are positively correlated with verdict and degree of guilt (McQuiston-Surrett & Saks, 2009; McAuliff & Kovera, 2008; McAuliff et al., 2009). This study has illustrated that supplementary forensic reports do not appear to significantly influence juror decision making, though findings point to a positive correlation between the use of forensic reports, and jurors' recognition of forensic bias in experts (Found & Edmond, 2012; Howes & Kemp, 2017). Research has largely neglected the role of supplementary materials such as jury instructions and forensic reports, as the few studies investigating the effects of such materials on juror decision making have found their impact to be negligible (McAuliff & Kovera, 2008; Shaw & Skolnick, 1995; Simmonsen, 2012). This has led to research stagnating rather than exploring further possible avenues concerning the enhancement of jurors' understanding of forensic evidence using supplementary materials. The findings of this study suggest that further investigation into the use of supplementary materials to educate jurors on forensic and other biases may be invaluable to improving the Australian judicial system (Howes, 2015; Howes & Kemp, 2017).

Chapter 3.

Study 2. The Effects of Emotional and Rational Information Processing on Juror Decision Making

Contrary to popular belief, forensic experts are prone to committing errors. As a result weak or flawed forensic evidence is often introduced and presented in courts. The role of jurors in separating good from bad forensic evidence is therefore critical. It has been proposed that jurors process information emotionally or rationally, and that this may influence decision making. Information provoking emotional responses has also been found to inhibit rational processing, and therefore accuracy. Found and Edmond (2012) proposed that using simplified forensic reports would allow readers, including jurors, to better evaluate forensic evidence, and recognise forensic bias, even when evidence prompts emotional arousal. The aim of this study was to evaluate Found and Edmond's (2012) forensic report format on jurors' decision making relative to their use of emotional or rational information processing. One hundred and sixty-two participants read a trial transcript and a forensic report based on the experimental condition they had been assigned. Some processed information emotionally, and some rationally. Participants reported verdict, degree of guilt, and forensic confidence. Emotional manipulation did not have a significant effect on verdict, or forensic confidence. The forensic report also failed to influence participants' recognition of forensic bias. Participants' verdict and degree of guilt scores were correlated with forensic expert confidence, highlighting the issue of jurors' reliance on heuristics when evaluating forensic evidence. Implications and avenues for future research are discussed.

Keywords: Forensic science, bias, juror decision making, emotional, rational, dual processing

3.2 Introduction

Forensic and cognitive biases influence forensic experts, judges, jurors, and verdict outcomes. Research into how biases affect juror decision making have offered mixed results. Some researchers have linked juror information processing to jurors' cognitive capacity and intelligence (Kleider et al., 2012; McAuliff & Kovera, 2008). Others have proposed that jurors' emotions can dramatically affect behaviour, particularly when evidence is provocative, or presented in a provocative manner (Lieberman, 2002; Wiener et al., 2006). Yet others have suggested that jurors overestimate the strength of forensic evidence, their understanding of forensic evidence, and their own general scientific knowledge, affecting the reliability of juror decision making (Goodman-Delahunty & Hewson, 2010; McAuliff & Kovera, 2008; McQuiston-Surrett & Saks, 2009). Despite these findings and some proposed countermeasures, assisting jurors to make more reliable decisions has not been a high priority in legal circles (Edmond, 2015; McAuliff et al., 2009). This is in part due to a lack of consensus on what theoretical model should be used to explain the intricacies of juror information processing and decision making.

3.3 Models of Juror Information Processing and Decision Making

A number of theoretical models of information processing for use in juror decision making research have been proposed. Some of these are well established, despite the lack of evidence to support underlying presuppositions (Epstein, 2003; Evans, 2008; McAuliff et al., 2009; Pennington & Hastie, 1992). One such theory is the frequently cited story model.

3.3.1 The Story Model

Developed by Pennington and Hastie (1991, 1992, 1993), the story model dictates that the juror is "a sense-making information processor who strives to create a meaningful summary

of the evidence available that explains what happened in the events depicted through witnesses, exhibits, and arguments at trial" (Pennington & Hastie, 1991, p. 519). To illustrate this, Pennington and Hastie (1992) tasked 414 participants with reading a stimulus case, and reporting their verdicts and confidence in the forensic evidence. Some participants were also required to recall as much of the evidence as they could, and record it in order of presentation. Pennington and Hastie (1992) found that participants were significantly more likely to commit to a verdict when evidence was presented using a *story* items sequence, and that the order in which evidence was presented had a significant effect on mock jurors' memory of evidence presented. These findings suggested that perceived strength of the evidence in favour of one verdict over another represented a function of how sufficiently a juror could develop a story, which in turn depended on the sequence and types of evidence used (Pennington & Hastie, 1992). The story model is often presented in the form of checklists, flow charts, and similar visual representations, and although widely adopted, has not been consistently supported by research (Olson-Fulero & Fulero, 1997; Spottswood, 2014). Due to this, some researchers have looked to other models of information processing to explain juror behaviour. One of these is Chaiken's (1980) Heuristic-Systematic Model.

3.3.2 The Heuristic-Systematic Model

Chaiken (1980, 1987) proposed a dual-process model involving concurrent systematic and heuristic information processing. Systematic reasoning refers to the use of "highly effortful cognitive activity aimed at the careful and logical analysis of a persuasive message's content", (McAuliff et al., 2009, p. 248). Heuristic reasoning refers to "the use of mental shortcuts or decision-rules to evaluate a persuasive message", involving the use of environmental and context-specific cues tied to values held by the receiver of a message (McAuliff et al., 2009, p. 248). Research has also found that individuals using systematic processing better distinguish strong from weak rational arguments, and more easily disregard factors not relevant to the

message content (Kemmelmeier, 2010; Lieberman, 2002; McAuliff et al., 2009). Conversely heuristic processing leaves individuals susceptible to the influence of irrelevant information, and cues, such as appeal of the message source, where individuals neglect to differentiate between strong and weak rational arguments (Kemmelmeier, 2010; Lieberman, 2002; McAuliff et al., 2009). Dual information processing has been linked to motivation and cognitive ability (Lieberman, 2002; McAuliff & Kovera, 2008; See et al., 2009; Todorov et al., 2002; Van der Maas et al., 2011).

The Heuristic-Systematic Model proposes that people engage in either systematic or heuristic processing of information depending on motivation, and cognitive resources (Chaiken, 1980, 1987; McAuliff et al., 2009). Personal relevance, need for cognition, task importance, accountability for one's views, and message content were found to influence motivation of a message receiver, whereas time pressures, mode of communication, prior knowledge, experience, expertise, message repetition, and distraction were identified as components that impact the element of cognitive resources in relation to message comprehension (McAuliff & Kovera, 2008; McAuliff et al., 2009; Van der Maas et al., 2011). Research suggests that the Heuristic-Systematic Model is relevant in contemporary research contexts, yet some doubts remain concerning its applicability relating to investigations of juror decision making (McAuliff et al., 2009; See et al., 2009). Cognitive Experiential Self-Theory is a more recent adaption of the Heuristic-Systematic Model, attempting to consolidate the dichotomous nature of the Heuristic-Systematic Model by proposing the existence of a continuum of behaviour and decision making, thereby accounting for some of the supposed shortcoming of the Heuristic-Systematic Model (Epstein, 1994, 2003; Epstein & Pacini, 1999; Lieberman, 2002).

3.3.3 Cognitive Experiential Self-Theory

Cognitive Experiential Self-Theory asserts that individuals process information in two partially independent systems, those being rational and experiential (emotional) modes (Epstein, 1994, 2003; Epstein & Pacini, 1999; Lieberman, 2002). Experiential processing is strongly related to heuristic decision making, emphasising efficient and mostly effortless processing subject to biases, whereas rational information processing entails effortful and deliberate analytical processing mostly free of affect, and biases (Epstein, 1994, 2003; Epstein & Pacini, 1999; Lieberman, 2002). Cognitive Experiential Self-Theory assumes that "behaviour varies along a continuum and is influenced by the relative contributions of these two systems" (Donovan & Epstein, 1997; Lieberman, 2002, p. 2527). Research on Cognitive Experiential Self-Theory has found some empirical support for the occurrence and applicability of the rational-experiential dichotomy in people's information processing and behaviour across a range of social contexts (Epstein, 2003; Hample & Richards, 2014; Kemmelmeier, 2010; Lieberman, 2002).

Cognitive Experiential Self-Theory has been found to predict a person's interpretation of feedback, highlighting the role of motivation in prompting rational rather than heuristic information processing (Epstein, 2003; Kemmelmeier, 2010; Lieberman, 2002). A number of studies have demonstrated the effects of motivating participants to process information either emotionally or rationally, with and without their knowledge, on the basis of Cognitive Experiential Self-Theory (Lieberman, 2002; McAuliff et al., 2009; Wiener et al., 2006). The strength of Cognitive Experiential Self-Theory as a theoretical basis for research into bias and decision making is highlighted by such dual processing literature examining juror behaviour. One tool commonly used to supplement or support findings from dual processing research is the Need for Cognition Scale (Cacioppo & Petty, 1982; Cacioppo et al., 1983, 1996; McAuliff et al., 2009).

3.3.3.1 The Need for Cognition

The need for cognition refers to the tendency for an individual "to engage in and enjoy thinking" (Cacioppo & Petty, 1982, p.116). The Need for Cognition Scale has been frequently used in decision making research based on dual processing models of information processing (Cacioppo et al., 1983, 1996; Lieberman, 2002; McAuliff et al., 2009; Shestowsky & Horowitz, 2004). McAuliff et al. (2009) employed the Need for Cognition Scale to see whether jurors believed themselves to be using systematic or heuristic decision making strategies, and what jurors actually did. McAuliff et al. (2009) found that many participants reported using systematic reasoning, yet participants predominantly employed heuristic strategies, using broad concepts and primarily qualitative evidence to make decisions about a defendant's guilt and validity of forensic expert and evidence. The Need for Cognition Scale is therefore appropriate for evaluating jurors' use of different information processing and decision making strategies in the context of forensic bias (McAuliff & Kovera, 2008; McAuliff et al., 2009; See et al., 2009; Shestowsky & Horowitz, 2004).

The effects of forensic bias on juror decision making have not been adequately addressed (Daftary-Kapur et al., 2010; Edmond, 2015; McQuiston-Surrett & Saks, 2009). Forensic evidence has been found to be less reliable than generally perceived (Dror et al., 2006; NAS, 2009). Judges have unofficially been assigned the role of gatekeepers in keeping 'junk' science and flawed forensic evidence out of courts, but generally lack the specialised knowledge required to do so (Gatowski et al., 2001; Kovera & McAuliff, 2000). As a result some unreliable forensic evidence has made it into courts (Howes, 2015; Howes & Kemp, 2017; McAuliff et al., 2009; NAS, 2009; PCAST, 2016). The negative consequences of flawed forensic evidence have been well-documented, as exemplified by the Madrid Bomber case and other publicised incidents (Dror et al., 2006; Giannelli, 2007; Kassin et al., 2013). A number of explanations have been proposed in efforts to understand jurors' overestimation of flawed forensic evidence.

3.4 Juror Reasoning and the Role of Bias

Jurors' ability to accurately reason has been linked to a number of factors, including need for cognition, prior knowledge, motivation, and personal biases (McAuliff et al., 2009; Shestowsky & Horowitz, 2004; West et al., 2012). Jurors overestimate their ability to comprehend the validity and reliability of forensic evidence (Goodman-Delahunty & Hewson, 2010; McQuiston-Surrett & Saks, 2009). Studies have shown that jurors' emotional responses to evidence or other factors of a trial can have a significant effect on jurors' information processing and decision making (Kleider et al., 2012; Lieberman, 2002; Wiener et al., 2006).

Wiener et al. (2006) found that jurors who reported stronger emotional reactions to the content of a sexual harassment case were more likely to rely on heuristics and extra-legal factors in reaching a verdict. Emotionally arousing evidence has also been linked to greater damages awarded for severely injured plaintiffs (Lieberman, 2002). Edwards and Bryan (1997) found that emotionally evocative evidence had a significantly greater effect on verdict outcomes when ruled inadmissible. Cognitive Experiential Self-Theory accounts for these behavioural outcomes by proposing that inducing emotional information processing, for example through emotionally evocative evidence, prompts jurors to rely on heuristics (Epstein, 2003; Lieberman, 2002). As a result jurors fail to recognise flawed forensic evidence, instead assigning greater value and relevance to highly detailed forensic evidence, despite not being able to comprehend it (Lieberman, 2002; McAuliff et al., 2009; Wiener et al., 2006). This suggests that inducing rational information processing would allow jurors to more effectively recognise flawed forensic evidence, and take its flaws into account when determining a verdict (Lieberman, 2002). Some supplementary materials used to support jurors in their task have been developed with this in mind.

3.4.1 The Purpose of Supplementary Materials

Jury instructions are one form of supplementary materials used to educate jurors on legal terms, forensic evidence, and jurors' roles and responsibilities (Halverson et al., 1997; Shaw & Skolnick, 1995; Simmonsen, 2012). However, Daftary-Kapur et al. (2010) found that jurors' understanding of jury instructions is low. It has also been found that instructions fail to change juror behaviour resulting from effects of biases (Halverson et al., 1997; Simmonsen, 2012). A more targeted form of supplementary material is the forensic report.

Forensic reports are sometimes introduced alongside forensic evidence to improve clarity of information provided to jurors (Found & Edmond, 2012). However, forensic reports do not necessarily improve jurors' understanding of evidence, as they are no replacement for specialised knowledge (Daftary-Kapur et al., 2010; Found & Edmond, 2012; Howes & Kemp, 2017). Found and Edmond (2012) proposed that simplifying forensic reports may enable lay jurors to more effectively evaluate complex forensic evidence, and recognise flaws (Found & Edmond, 2012; Kassin et al., 2013).

3.4.1.1 The Found and Edmond (2012) Forensic Report Format

Found and Edmond (2012) proposed a format for forensic reports which would improve content quality and clarity in order to improve juror comprehension of evidence, and jurors' ability to recognise flaws. Proposed changes would also help jurors identify potential sources of cognitive and forensic bias, and draw more objective and accurate conclusions without needing to resort to heuristics (Found & Edmond, 2012). In accordance with Cognitive Experiential Self-Theory, jurors provided with a forensic report using the Found and Edmond (2012) format should require less cognitive effort in evaluating the forensic evidence, and therefore be less likely to resort to heuristic over systematic information processing (Lieberman, 2002). The use of rational

information processing of evidence via the Found and Edmond (2012) forensic report should also help mitigate the effects of emotionally arousing evidence on juror decision making.

3.5 Summary

Forensic science now plays a greater role in criminal proceedings than ever before (McQuiston-Surrett & Saks, 2009). However, a growing body of research has brought many concerns regarding the reliability and validity of forensic evidence to light (Giannelli, 2010; NAS, 2009; PCAST, 2016; Wells et al., 2013). This has not stopped flawed forensic evidence from making it into court rooms (Found & Edmond, 2012; Magnussen et al., 2014; McQuiston-Surrett & Saks, 2009; NAS, 2009; PCAST, 2016; Wilson & Dunn, 2004). Jurors' ability to identify flawed forensic evidence once presented in court has been called into question, and their susceptibility to extralegal factors may undermine unbiased decision making (Pozzulo et al., 2008; Pozzulo et al., 2010). Cognitive Experiential Self-Theory accounts for these errors in jurors' judgment and decision making by attributing them to jurors' use of emotional and heuristic over rational information processing (Lieberman, 2002; McAuliff et al., 2009). Found and Edmond (2012) have proposed changes to the presentation of forensic reports to improve juror comprehension, and decision making. The simpler forensic report should deter jurors from emotional and heuristic evaluations of forensic evidence, and encourage rational processing (Found & Edmond, 2012; Lieberman, 2002). This should in turn improve reliability and accuracy of juror decision making, even when the evidence itself is emotionally arousing. Found and Edmond's (2012) claims have not been substantiated. This thesis' first study found that mock jurors were more likely to recognise a forensic expert's bias, yet reported a higher confidence in the forensic evidence when provided with a Found and Edmond (2012) style forensic report. The mixed findings cast some doubt over Found and Edmond's (2012) claims. This study sought to investigate if jurors could be prompted to process information rationally or emotionally, and whether this would have an effect on jurors' evaluation of forensic evidence, and eventual

verdict. A further aim was to determine whether such manipulation could be counteracted through the use of Found and Edmond's (2012) proposed forensic report format.

To do this, a trial stimulus was developed, partly derived from Lieberman (2002) (Appendix E). Bieneck (2009) found trial stimuli, or vignettes, to be particularly relevant in social cognitive research related to the legal system, noting the ability to manipulate a vignette or trial transcript for the purposes of specific research outcomes as a significant advantage over other methods for jury simulation research. While the Lieberman (2002) trial stimulus concerns a civil case, elements generally attributed to criminal cases were introduced to satisfy conditions for guilt judgements and likelihood of guilt assessments. Participants were randomly assigned to one of four conditions. Those in the 'emotionally arousing and unbiased report' condition received emotionally arousing jury instructions (Appendix F), read the trial transcript accompanied by emotionally stimulating forensic evidence (Appendix G), and were then provided with a Found and Edmond (2012) format forensic report (Appendix H) indicating that the forensic expert had been unbiased and objective. Those in the 'emotionally arousing and biased report' condition received the same instructions, read the transcript, were provided with the same evidence, and then read a Found and Edmond (2012) forensic report indicating that the expert had been biased. Participants in the 'rational and unbiased report' condition received jury instructions prompting rational information processing (Appendix I), then read the trial transcript, accompanied by evidence further prompting rational processing (Appendix J). They then received the Found and Edmond (2012) forensic report indicating that the expert had been unbiased and objective. Finally, participants in the 'rational and biased report' condition received the same instructions, transcript, and evidence, but received the Found and Edmond (2012) forensic report indicating that the expert had been biased.

Participants then rendered a verdict, and provided a likelihood of guilt estimate on a scale from 0 to 100. Likelihood of guilt estimates are commonly used in juror decision making research, and offer an alternative interpretation of differences in jurors (Dhami, 2008; McAuliff et al., 2009). Participants also recorded the amount of damages they chose to be awarded to the victim in the case. Although not a standard practice in criminal trials, mock jurors' reporting of damages awarded has been used to demonstrate the effects of emotional arousal on juror decision making (Lieberman, 2002). All participants completed the Forensic Confidence Scale adapted from McAuliff et al. (2009).The scale has been used to capture jurors' confidence in forensic evidence and the expert by whom it was presented (McAuliff et al., 2009). McAuliff et al. (2009) found that greater confidence in forensic evidence correlated with more guilty verdicts in mock jurors.

Participants also completed the Need for Cognition Scale (Cacioppo & Petty, 1982). McAuliff et al. (2009) used the Need for Cognition Scale to determine if participants had a predisposition to using heuristic or rational information processing. The Need for Cognition Scale allows for the accounting of participants' need for cognition as an individual difference factor that might otherwise obscure findings. To a similar end, participants reported which of several science-based subjects they had completed at the secondary or tertiary level of education. It has been suggested that education in the sciences has a tangible effect on jurors' evaluations of forensic evidence (Daftary-Kapur et al., 2010; Goodman-Delahunty & Hewson, 2010). Therefore a record of such an education in conjunction with need for cognition scores offers a more complete picture than the need for cognition alone.

It was hypothesised that forensic confidence scores would be positively correlated with verdict, and likelihood of guilt. It was also hypothesised that participants who received emotionally arousing instructions and evidence, and a forensic report indicating that the expert

had been biased, would report a greater confidence than participants who received the forensic report indicating bias, but received instructions and evidence prompting rational processing. Finally it was hypothesised that participants receiving different instructions and evidence, but the same forensic report indicating that the expert was unbiased and objective, would not significantly differ in their forensic confidence scores, likelihood of guilt estimates, and verdicts.

3.6 Method

3.6.1 Participants

Two hundred and eighty-two participants were recruited from the University of Adelaide, and online advertising. A notable number of participants ($N = 98$) only partially completed the trial stimulus, suggesting that stimulus length and complexity may have been an issue. Remaining participants were excluded if not between the ages of 17 and 80, not an Australian citizen, or had a law degree, to address jury eligibility. The final sample consisted of 162 participants (64 male, 98 female). This study was approved by the University of Adelaide's School of Psychology Human Research Ethics Sub Committee (code number: 14/72).

3.6.2 Measures

3.6.2.1 Jury Instructions

Participants were provided with a brief paragraph containing instructions regarding information presented in the trial transcript. Not all participants received the same instructions. Lieberman (2002) manipulated the content of jury instructions to encourage either emotional or rational processing modes in participants. The manipulation method was emulated for this study.

3.6.2.1.1 Emotional Jury Instructions. Participants provided with emotional jury instructions were informed that evidence and information provided would be graphic and vivid,

and potentially somewhat upsetting. The purpose of these instructions was to evoke an emotional response, and prompt predominantly emotional or heuristic information processing.

3.6.2.1.2 Rational Jury Instructions. Participants provided with rational jury instructions were informed that evidence and information provided would require them to mathematically calculate monetary damages, that this would require addition and multiplication, and to take note of numerical values in the transcript. The purpose of these instructions was to prompt predominantly rational information processing.

3.6.2.2 Trial Transcript

Participants were presented with a nine-page summary of a simulated criminal case (Appendix E) in which it was alleged that the defendant drove recklessly, losing control of his vehicle, causing a collision between two vehicles resulting in the death of the other driver. Eye- and character witnesses were not reliable, and biased. This ensured that the forensic evidence was the critical factor in establishing the defendant's guilt. The examination of the evidence was preceded by information on accident reconstruction, outlining strengths and shortcomings of various procedures, as well as technical aspects of the process, and implications regarding the law. This was followed by a cross-examination, during which the forensic expert admitted that they could only ascertain that the defendant's vehicle was the cause of the accident, and not why, with any certainty. The forensic expert also admitted that they were aware of details concerning the investigation. The cross-examination of the forensic expert was followed by the prosecution's claims for compensation, with detailed justifications for each claim. The trial transcript was concluded by the judge's closing statements, and basic judicial instructions.

3.6.2.3 Found and Edmond (2012) Format Forensic Report

Participants were presented with a forensic report, using a South Australian forensic report template provided by Forensic Science SA (FSSA). The forensic report template was

modified to adopt Found and Edmond's (2012) proposed report format. As outlined by Found and Edmond (2012), the structure of the forensic report was as follows:

- Title

- Executive Summary

- List of exhibits submitted (CCTV footage)

- Statement as to origin of evidence

- Statement of chain of custody of exhibit

- Statement of domain irrelevant information the examiner was provided with

- Statement as to qualifications of examiner

- Methods and materials

- Procedure

- Results

- Conclusions

3.6.2.3.1 Forensic Report Manipulation

3.6.2.3.1.1 Section - Information that the examiner was provided with:

The unbiased forensic report indicated that the forensic examiner was provided with contextual information concerning the auto accident. The forensic expert was also provided with the relevant accident and police report. The forensic report indicating bias provided the same information, as well as stating that the forensic expert was informed that a suspect was already in custody, and that there had been an eyewitness.

3.6.2.3.1.2 Section - Conclusions:

Both forensic reports contained an identical summary of the forensic evidence, how it was processed, and conclusions drawn about the comparison. The biased forensic report also

stated that the forensic expert was aware of details relating to the case not relevant to the analysis, including criminal and medical histories of the parties involved in the accident, and that the defendant had previously lost his license after a motor vehicle accident.

3.6.2.4 Forensic Evidence

After reading the entire transcript, participants were provided with several exhibits of forensic evidence. Not all participants received the same exhibits of forensic evidence.

3.6.2.4.1 Emotional Forensic Evidence. Participants who received emotional jury instructions prior to the trial transcript were provided with three exhibits of forensic evidence. The first exhibit presented skid marks from the accident site, as well as a still image of two car wrecks shortly after the occurrence of the accident. The second exhibit was a motor vehicle accident report completed by the relevant parties. The report was primarily neutral, though emotional and evocative language was used. The third exhibit was an alleged damages report containing all claims of expenses by the prosecution. The purpose of the exhibits, particularly the images, was to provide further information while reinforcing participants' emotional or heuristic information processing.

3.6.2.4.2 Rational Forensic Evidence. Participants who received rational jury instructions prior to the trial transcript were also provided with three exhibits of forensic evidence. The first exhibit showed a still image of a 3D reconstruction of the vehicles involved in the accident at the time of the impact. The image was not photo-realistic. It was accompanied by the image of skid marks from the accident site. The second exhibit was the alleged damages report also provided to participants who received the emotional forensic evidence. The rational version of the exhibit was missing several numeric values, requiring participants to rely on notes and calculations to determine original and final values of financial claims of expenses. The third exhibit was a motor vehicle accident report completed by both parties, and identical

to the report provided to participants receiving the emotional forensic evidence, though without evocative and emotional words and phrases. The purpose of the exhibits was to provide further information while reinforcing participants' rational or systematic information processing.

3.6.2.5 Participant Questionnaire

Participants were tasked with completing a questionnaire (Appendix K) partly derived from Goodman-Delahunty and Hewson (2010), Lieberman (2002), and McAuliff et al. (2009), consisting of several sections. The trial question section asked jurors to select a verdict, and provide a likelihood of guilt estimate ranging from 0 to 100.

3.6.2.5.1 Forensic Confidence Scale. Participants then completed the Forensic Confidence Scale adapted from McAuliff et al. (2009). The scale is comprised of thirteen 5-point Likert scale questions, with answers ranging from Strongly Disagree to Strongly Agree. Two of the items were negatively worded for the purposes of manipulation checks. Examples of items include 'the expert's research was based on good scientific principles' and 'the expert did not use valid methods of image identification comparison' (McAuliff et al., 2009).

The final section asked participants to complete a number of questions relating to perceived prior knowledge of forensic evidence, as well as testing whether mock jurors could recall information relating to pattern evidence presented in the trial transcript. They were also tasked with reporting their level of emotional involvement with the study, and level of mental effort required. Participants were then tasked with completing the Need for Cognition Scale (Cacioppo & Petty, 1982).

3.6.2.5.2 Need for Cognition Scale. The Need for Cognition Scale is derived from Cacioppo and Petty (1982). It has been extensively tested and validated with regard to identifying peoples' need for cognition (McAuliff & Kovera, 2008; McAuliff et al., 2009; See

et al., 2009; Shestowsky & Horowitz, 2004). It consists of eighteen 5-point Likert scale questions asking participants to identify how they felt with regard to various cognitive demands, with answers ranging from Not at all like me to Very like me. Half the items were negatively worded. Examples of items include 'I would prefer complex to simple problems' and 'the idea of relying on thought to make my way to the top appeals to me' (Cacioppo & Petty, 1982).

Scores ranged from 72 to -72, with a lower score indicating a lower need for cognition. Participants who scored between -72 and -15 points (bottom 25%) were deemed to have a low need for cognition. Participants who scored between -14 and 14 points were deemed to have some need for cognition, and participants scoring between 16 and 43 points were deemed to have a moderate need for cognition. Participants scoring higher than 43 (top 25%) were deemed to have a high need for cognition.

3.6.3 Design

An experimental between-groups design was employed for the purposes of this study. Study group was the independent variable with four levels, those being emotional processing and unbiased report group, emotional processing and biased report group, rational processing and unbiased report group, and rational processing and biased report group. Dependent variables were verdict, likelihood of guilt, forensic confidence, and need for cognition.

3.6.4 Procedure

Participants were recruited to participate in the study using the Qualtrics online survey software. Before the transcript, participants were required to complete demographic questions, to ensure participant eligibility. These included questions concerning which of four secondary school level science-related subjects (math, physics, chemistry, biology) they had completed, and which of five tertiary level subjects (math, physics, chemistry, biology, law) they had begun or

completed. Participants were then either presented with emotional or rational jury instructions. The trial transcript that followed included testimonies from medical specialists, eyewitnesses, and acquaintances of the victim and the accused. Testimonies were followed by a section on accident reconstruction, including the forensic science behind accident reconstruction, and the law. The transcript concluded with a cross examination of the forensic expert, and final remarks by the judge. Participants were then either presented with emotional or rational forensic evidence. Some participants received a forensic report indicating that forensic expert was biased, and some received a report indicating that the expert had been unbiased and objective. Participants then completed the study questionnaire, including the Forensic Confidence Scale and Need for Cognition Scale. Data was consequently recorded in a Microsoft Excel^{TM} file in preparation for analysis.

3.6.5 Data Screening

Data for 282 participants was entered into SPSS Version 20 and screened for normality. Data of 120 participants was either incomplete or indicated that a participant did not meet the conditions required to be included. The final data set, after removal of incomplete data and errors, and exclusion of participants who did not meet appropriate conditions, consisted of 162 (64 male, 98 female) participants.

3.7 Results

3.7.1 Manipulation Checks

Age groups were non-normally distributed, with a skewness of 2.82 ($SE = 0.19$), as expected of a participant group predominantly made up of university students. As generally found in behavioural research, more participants were female (Lobato et al., 2014). See Table 1 for participant characteristics.

3.7.1.1 Need for Cognition

Need for cognition scores were evenly distributed ($M = 20.2$, $SD = 16.3$). A Oneway Analysis of Variance (ANOVA) was conducted to determine whether participants' need for cognition scores differed across study conditions. There were no significant differences in need for cognition scores across study conditions, $F(3,158) = .313$, $p = .816$, $\eta^2 < .01$.

Table 1. *Participant Characteristics*

Measures		1st Condition	2nd Condition	3rd Condition	4th Condition	Total
Age	18-24	35	26	31	33	125
	25-34	10	2	3	6	21
	35-44	3	3	0	1	7
	45-54	0	2	2	1	5
	55-64	0	1	0	1	2
	65+	0	0	0	2	2
Gender	Male	16	15	19	14	64
	Female	32	19	17	30	98
Verdict	Guilty	32	22	24	26	104
	Not Guilty	16	12	12	18	58
Total Participants		48	34	36	44	162

3.7.1.2 Emotional Involvement

A Oneway ANOVA was conducted to determine if study condition had an effect on self-reported emotional involvement with the study. It was not significant, $F(3,158) = .156$, $p = .93$, $\eta^2 < .01$.

3.7.1.3 Mental Effort

A Oneway ANOVA was conducted to determine if study condition had an effect on self-reported mental effort required to complete the study. It was also not significant, $F(3,158) = .918$, $p = .43$, $\eta^2 = .02$.

3.7.1.4 Damages Awarded

Damages awarded were evenly distributed. A Oneway ANOVA was conducted to determine if verdict had an effect on damages awarded. It was significant, $F(1,160) = 9.91$, $p < .005$, $\eta^2 = .06$. As expected, participants who found the defendant guilty awarded a higher percentage of the total possible damages awarded ($M = 48.4$, $SD = 34.7$, 95% CI [41.7, 55.2]) than participants finding the defendant not guilty ($M = 30.8$, $SD = 27.1$, 95% CI [23.6, 37.9]).

3.7.1.4.1 Study Condition. A Oneway ANOVA was conducted to determine whether there was a correlation between damages awarded, and whether participants were provided with emotionally arousing or rationally prompting jury instructions and forensic evidence, and biased or unbiased forensic report. It was not significant, $F(3,158) = .207$, $p = .89$, $\eta^2 < .01$.

3.7.2 Verdict

A Oneway ANOVA was conducted to determine whether participants who differed in their verdicts would differ in their reported likelihood of guilt estimate. Verdict had a significant effect on likelihood of guilt, $F(1,160) = 60.8$, $p > .001$, $\eta^2 = .28$.

Participants who judged the defendant to be guilty reported a higher likelihood of guilt ($M = 74.1$, $SD = 18.2$, 95% CI [70.5, 77.6]) than participants who had judged the defendant to not be guilty ($M = 45.6$, $SD = 28.1$, 95% CI [38.2, 53.0]).

It was also hypothesised that there would be a significant correlation between verdict and forensic confidence. A Oneway ANOVA was conducted to determine whether participants who differed in their forensic confidence differed in their verdicts. Forensic confidence had a significant effect on verdict, $F(28,133) = 1.59$, $p = .044$, $\eta^2 = .25$.

Participants who deemed the defendant guilty reported a greater confidence in the forensic evidence ($M = 9.4$, $SD = 5.3$, 95% CI [8.34, 10.39]) than participants who deemed the

defendant not guilty ($M = 6.3$, $SD = 5.0$, 95% CI [5.03, 7.65]), suggesting that the perceived strength of the forensic evidence plays a prominent role in jurors' decision making outcomes when central to the trial.

3.7.3 Forensic Confidence

3.7.3.1 Instruction and Evidence Type

A Oneway ANOVA was conducted to determine whether jury instruction and evidence type would have an effect on forensic confidence scores. Jury instruction and forensic evidence type had a significant effect on forensic confidence scores, $F(1,160) = 4.334$, $p = .039$, $\eta^2 = .03$.

Contrary to expectations, participants who received emotionally arousing jury instructions and evidence reported lower forensic confidence scores ($M = 7.4$, $SD = 5.2$, 95% CI [6.21, 8.56]) than those who received instructions and evidence prompting rational processing ($M = 9.1$, $SD = 5.4$, 95% CI [7.95, 9.11]).

3.7.3.2 Found and Edmond (2012) Forensic Report

Another Oneway ANOVA was conducted to determine if forensic report content would have an effect on forensic confidence. It was not significant, $F(1,160) = 1.731$, $p = .19$, $\eta^2 = .01$.

3.7.3.3 Instruction and Evidence Type and Found and Edmond (2012) Forensic Report

A third Oneway ANOVA was conducted to determine whether study condition would have an effect on forensic confidence. It was not significant, $F(3,158) = 2.256$, $p = .084$, $\eta^2 = .04$.

3.7.4 Education

3.7.4.1 Secondary Education

A Oneway ANOVA was conducted to determine if the number of science-related subjects undertaken in high school had a significant effect on forensic confidence ratings. It was significant, $F(4,157) = 3.06$, $p = .019$, $\eta^2 = .07$.

Participants who had completed all four of the science-related high school subjects ($M = 6.4$, $SD = 5.5$, 95% CI [4.86, 7.93]) listed in the survey reported significantly lower forensic confidence ratings than participants who had completed none ($M = 10.4$, $SD = 6.0$, 95% CI [4.45, 15.5]), two ($M = 9.9$, $SD = 4.5\%$, 95% CI [8.37, 11.3]) or three ($M = 9.2$, $SD = 5.4$, 95% CI [7.50, 10.80]) of the subjects.

3.7.4.2 Tertiary Education

A Oneway ANOVA was conducted to determine if the number of tertiary subjects undertaken had a significant effect on forensic confidence ratings. It was not significant, $F(5,156) = 1.38$, $p = .235$, $\eta^2 = .04$.

3.8 Discussion

The aim of the present study was to see if manipulating mock jurors' information processing would affect their forensic confidence, and verdicts. The study also sought to determine if the use of a Found and Edmond (2012) style forensic report would have an effect on recognition of bias and forensic confidence, and if mock jurors' interpretation of the forensic report's content would differ based on whether they were prompted to process information emotionally or rationally.

As expected, juror verdicts were significantly correlated with likelihood of guilt estimates. Jurors' verdicts also significantly correlated with self-reported confidence in the

forensic evidence presented during the trial. As in previous research, mock jurors reporting a greater confidence in the forensic evidence were more likely to find the defendant guilty (McAuliff et al., 2009; Smith et al., 2011). The second hypothesis was that the type of jury instructions and forensic evidence would influence jurors' information processing, and forensic confidence.

3.9 Can Jury Instructions and Evidence Type Manipulate Information Processing?

Findings regarding the effects of jury instruction and evidence type on juror behaviour were mixed. Jury instruction and evidence type were found to have a significant effect on reported forensic confidence. However, these were in the opposite direction to expectations. Participants prompted to process information rationally, and who viewed rational forensic evidence, reported a higher confidence in the forensic evidence. One explanation for this may be that the prompting of rational processing, and presenting of quantitative evidence does not prompt rational evaluation of evidence, but enforces the use of heuristics in favour of forensic evidence. This explanation also accounts for previous findings that supplementary materials such as forensic reports increase mock jurors' confidence in forensic evidence, even when those reports contain information indicating that the evidence was likely corrupted or biased (McAuliff et al., 2009; Smith et al., 2011). However forensic report content alone was not found to significantly affect jurors' verdicts or forensic confidence, casting further doubt over the practical application of the Found and Edmond (2012) forensic report format to improve juror information processing and decision making. Several other findings raise questions concerning the manipulation of jurors' information processing.

Study condition was not significantly correlated with jurors' self-reported emotional involvement in the trial. Participants across all conditions generally reported to have been 'slightly emotionally involved', indicating that participants provided with instructions and

evidence designed to be emotionally arousing were not sufficiently affected to report a higher emotional involvement. Lieberman (2002) found that emotionally aroused participants awarded greater amounts in damages. The finding that participants provided with emotionally arousing instructions and evidence did not award greater damages therefore supports the idea that mock jurors were not sufficiently emotionally involved. Jurors' self-reported mental effort required to complete the study presents a similar issue.

Study condition was not found to correlate with self-reported mental effort. Participants across all conditions generally reported neither disagreeing nor agreeing with the notion that completion of the study required high mental effort. However, as participants read near identical amounts of information it is not surprising that participants prompted to process information rationally would not necessarily report greater mental effort than those provided with emotionally arousing instructions and evidence. Nonetheless it is unclear how much of the differences in forensic confidence scores of participants provided with different instruction and evidence types can be attributed to manipulation of jurors' information processing, and how much to other factors. One such factor is education.

3.10 Education and Juror Decision Making

Education has been a prominent subject with regard to improving juror information processing and decision making (Edmond, 2015; Hope et al., 2004; McAuliff et al., 2009; Simmonsen, 2012). Research on directly educating jurors has led to changes relating to the use of supplementary materials such as jury instructions, written information provided alongside forensic and other evidence, and changes to the presentation of evidence in court (Found and Edmond, 2012; Goodman-Delahunty & Hewson, 2010; Simmonsen, 2012). Yet the use of such materials has been shown to have little to no effect on jurors' information processing, bias recognition, understanding of evidence, and decision making (Goodman-Delahunty & Hewson,

2010; McAuliff et al., 2009; Park & Feigenson, 2013). Little research has been conducted on the effects of jurors' schooling and education on their information processing, decision making, and ability to recognise biases and flawed forensic evidence (Daftary-Kapur et al., 2010; McAuliff et al., 2009).

Participants reported whether they had completed any of four science-based subjects at the secondary level. The more subjects they had participated in, the lower mock jurors' forensic confidence, though only participants that completed all four subjects reported a significantly lower forensic confidence score. The finding supports the idea that prior relevant science-based knowledge and experience improve jurors' comprehension of forensic evidence, and recognition of flawed science (Daftary-Kapur et al., 2010; Goodman-Delahunty & Hewson, 2010). The same analysis was conducted for science-subjects at the tertiary level. No significant effects were found, though this was no doubt due to the participant sample being predominantly first year psychology students. Within the Cognitive Experiential Self-Theory framework, relevant education contributes to personal relevance, motivation, and difficulty, supporting the idea that appropriate science-based knowledge and experience improves the likelihood of rational processing (Lieberman, 2002; McAuliff et al., 2009). Given the correlation between science-based subjects completed in high school and participants' forensic confidence, investigating the effects of science-based knowledge and experience at the tertiary level on mock jurors' comprehension of evidence and recognition of flawed science has merit (Daftary-Kapur et al., 2010; Goodman-Delahunty & Hewson, 2010).

These findings have a number of implications relevant to future research on juror behaviour, and the use of supplementary materials in court. The finding of a correlation between forensic confidence and verdict, mirrored across juror decision making research, highlights the need to address juror understanding of forensic evidence (Daftary-Kapur et al., 2010; McAuliff

et al., 2009; McQuiston-Surrett & Saks, 2009; Smith et al., 2011). Supplementary materials have shown to be lacking in this regard, and therefore need to be re-examined, and redesigned to directly address juror comprehension of specific forensic evidence, and concepts such as guilt beyond a reasonable doubt (Found & Edmond, 2012; Simmonsen, 2012; Reynolds, 2013). Furthermore, jurors' evaluation of forensic evidence has been shown to be biased by supplementary materials and the courtroom context (Simmonsen, 2012; Smith et al., 2011). This indicates that further research is needed into the effectiveness of different supplementary materials, and how those materials can be used to mitigate rather than exacerbate the use of heuristics, and effects of biases.

This study's finding that secondary education and forensic confidence were correlated points to an avenue of research that has thus far been underexplored in the context of juror information processing and decision making. Some researchers' efforts to educate mock jurors on specifics relating to their trial have been unsuccessful in improving juror decision making outcomes, and greater intelligence has not been found to improve mock jurors' recognition of bias (Daftary-Kapur et al., 2010; Ehrlinger et al., 2005; Halverson et al., 1997; Simmonsen, 2012; West et al., 2012). The benefits of a science-based education have been well documented (DeBoer, 2000; Goldman & Smith, 2011; McDermott & Hand, 2015). Findings indicate that research into a potential link between formal science-based education and juror evaluation of forensic evidence has merit.

Inconsistencies across past juror decision making research highlight the need to identify models and scales that most completely explain juror information processing and behavioural outcomes. To that end this study provides further support for the use of Cognitive Experiential Self-Theory in explaining juror behaviour while accounting for effects of individual differences, and the interaction of emotional and rational information processing (McAuliff et al., 2009;

Wiener et al., 2006). The model is being increasingly adopted by researchers in the field of juror decision making, and future studies based on Cognitive Experiential Self-Theory will further aid to solidify the model as the most comprehensive approach to understanding juror information processing and decision making outcomes (Epstein, 2003; Lieberman, 2002; McAuliff et al., 2009).

3.11 Limitations of the Study and Considerations for Future Research

A number of shortcomings limit the generalisability of this study's findings. The final participant pool was predominantly made up of university students, likely to have a better grasp of scientific concepts and critical analysis than a more general participant sample. However, students have been found to be comparable to non-student samples for the purposes of jury simulation research (Bornstein et al., 2017). A notable 120 prospective participants dropped out before completion of the study. This was likely due to the study's length. Although the transcript was comparable in length to those in other juror decision making studies (Goodman-Delahunty & Hewson, 2010; Lieberman, 2002), additional forensic evidence, a lengthy questionnaire, and the use of several scales resulted in a study longer than the length of time many participants were willing to commit. The study was conducted online, further contributing to the likelihood of participants being distracted and losing interest before completion. This may also have contributed to the lack of statistical significance in analyses of the effects of instruction and evidence type on self-reported mental effort and emotional involvement, and highlights the importance of succinct research designs, particularly when conducted online. Though the findings suggested that jurors may be manipulated to process information more rationally, a lack of baseline measures of processing style preference limits the conclusions drawn from the study's results. Future investigations into the effects of emotional and rational information processing, juror decision making, and forensic bias would therefore benefit from incorporating a baseline measure of processing preference, such as the Rational-Experiential Inventory (Pacini & Epstein,

1999). The Rational-Experiential Inventory has been used to identify individual differences in information processing and behavioural tendencies, allowing researchers to determine if an individual is more prone to processing information and making decisions using rational or experiential processing modes (Björklund & Bäckström, 2008; Pacini & Epstein, 1999). In future research the Rational-Experiential Inventory could allow researchers to capture participants' baseline information processing tendencies, and help provide a clearer picture of how attempted manipulation of processing styles might affect juror decision making outcomes.

In spite of these limitations, this study's findings build on currently scarce literature concerning the effects of different information processing strategies when encountering emotionally arousing evidence, and different supplementary materials. The findings echo those of past research, suggesting that verdict is linked to confidence in forensic evidence, and that mock jurors can be manipulated into overestimating the quality of forensic evidence by promoting the use of heuristic over rational information processing. This study's findings have also shown that a potential link between science-based formal education and juror decision making merits further investigation.

The critical role of interactions between emotional and rational information processing in juror decision making are increasingly evident (Daftary-Kapur et al., 2010; Edmond, 2015; Lecci & Myers, 2009; Lieberman, 2002; McAuliff et al., 2009; Smith et al., 2011). Current supplementary materials are ineffective in improving jurors' comprehension of forensic evidence, and recognition of flaws and bias, in some cases have the opposite effect (Daftary-Kapur et al., 2010; Simmonsen, 2012; Smith et al., 2011). To address this, further research is required into how supplementary materials may be adapted to improve juror understanding and recognition of flawed evidence. A broader look at science-based education may also provide another avenue of exploration in the ongoing quest to improve the reliability and validity of

judicial outcomes, and the legal system as a whole (Costanzo, 2013; Edmond, 2015; Simmonsen, 2012).

Chapter 4.

Study 3. Effects of Cognitive Load on Juror Decision Making in the Presence of Forensic Bias

Forensic and cognitive bias can influence and undermine validity of forensic experts and the evidence they present. This is a problem given the increasing use of forensic evidence presented to jurors likely ill-equipped to evaluate it. Cognitive Experiential Self-Theory provides a concrete framework for understanding juror information processing and decision making. According to Cognitive Experiential Self-Theory, jurors' reliance on heuristics and cognitive biases, such as overestimation of forensic experts' reliability when evaluating information and making decisions, is related to whether they process information rationally, or heuristically. Rational processing results in more accurate decision making outcomes. One factor contributing to whether jurors use rational or emotional processing is cognitive load. Higher cognitive loads increase the likelihood of heuristic over rational processing and decision making. The aim of this study was to investigate whether cognitive load could account for jurors' failure to recognise or act on flawed forensic evidence. Results indicated that jurors did not differ across low, moderate, and high cognitive load conditions, but that gender and forensic bias affected verdict outcomes. Implications of findings are discussed.

Keywords: Forensic bias, juror decision making, cognitive load, Cognitive Experiential Self-Theory

4.2 Introduction

Scientific methods used to collect and analyse material evidence to be presented in court are generally referred to as forensic science. Advances in the forensic sciences over the last two decades have led to its increasingly important role in criminal cases (Edmond, 2015; McQuiston-Surrett & Saks, 2009; PCAST, 2016). Recent indications that forensic science is far less reliable than generally perceived have not stifled the well-documented impact of forensic evidence on trial outcomes (Dror et al., 2006; NAS, 2009; PCAST, 2016). Literature has also found that despite judges' lack of specialised knowledge of forensic sciences, they have inadvertently been assigned a gatekeeper role regarding admissibility of forensic evidence based on its reliability and validity (Gatwoski et al., 2001; McAuliff et al., 2009; PCAST, 2016). However, this has been shown to be insufficient in keeping unreliable and flawed forensic evidence out of courts (Gatowski et al., 2001; Kovera & McAuliff, 2000; NAS, 2009; PCAST, 2016). This has raised questions concerning the role of jurors in separating reliable from unreliable forensic evidence.

4.3 How Do People Reason? A Dual Processing Approach

Cognitive psychology literature has shown that judgement and decision making are complex. Lay people generally overestimate their ability to reason and solve simple and complex problems (Evans, 2008; Toplak et al., 2014). The ability to accurately reason is also affected by factors such as stress, emotional involvement, education, and motivation (Hilbert, 2012; Toplak et al., 2014). A number of recent studies have investigated lay persons' scientific reasoning ability in relation to forensic evidence. Participants struggled to accurately comprehend forensic expert testimony, failed to recognise methodological issues such as missing control groups and sample bias, and greatly overestimated their comprehension of forensic evidence (Goodman-Delahunty & Hewson, 2010; McAuliff & Kovera, 2008; McQuiston-Surrett & Saks, 2009). Other studies have indicated that jurors are able to recognise flaws in forensic evidence, but that such recognition does not greatly lower jurors' estimations of forensic evidence when determining a

verdict (Edmond, 2015; McAuliff et al., 2009). Since the 1970s a number of models have been developed to explain decision making in jurors. The Story Model has been a popular model of juror behaviour due in part to its simplicity (Pennington & Hastie, 1992). However dual processing models of information processing provide a more current and comprehensive theoretical framework for understanding the cognitive processes contributing to findings of current juror decision making literature (Epstein, 2003; Evans, 2008; McAuliff et al., 2009).

4.3.1 Cognitive Experiential Self-Theory

Cognitive Experiential Self-Theory is derived from Chaiken's (1980, 1987) Heuristic-Systematic Model (Epstein, 2003). The theory has previously been used in juror decision making research to highlight the effect of cognitive biases on decision making (Lieberman, 2002; McAuliff et al., 2009). It proposes that individuals process information in one of two modes: a conscious *rational* mode, involving highly effortful cognitive activity and logical processing of information, and an unconscious *experiential* (emotional) mode, involving fewer cognitive resources, and a higher reliance on mental shortcuts and heuristic processing (Epstein, 2003; Lieberman, 2002).

According to Cognitive Experiential Self-Theory, the two most important factors to influence the use of rational or experiential processing are an individual's level of *motivation* and *ability* (Epstein, 2003; McAuliff et al., 2009). Personal relevance, personal beliefs, and one's desire to engage in cognitively engaging tasks have been linked to one's *motivation* to process information rationally or experientially. Factors associated with one's *ability* to process information rationally rather than experientially include complexity of the information, one's cognitive capacity, attention, and prior knowledge (Epstein, 2003; McAuliff et al., 2009). Lower *motivation* or *ability* result in an individual more likely to engage in experiential processing when evaluating information compared to a person with high *motivation* and *ability* (Epstein, 2003;

McAuliff et al., 2009). One subject that encompasses several factors linked to information processing *ability* is cognitive load.

4.3.1.1 Cognitive Load

Cognitive load refers to the amount of cognitive effort exerted relative to one's cognitive capacity. The more challenging a mental task, the greater the cognitive load on an individual (Kleider et al., 2012; Levinson, 2007; Sweller, 1994). It has been shown that lay people burdened with a greater cognitive load are more prone to making errors in reasoning tasks (Levinson, 2007; Sweller, 1994). High cognitive load has also been linked to a greater likelihood of biased decision making, and the use of heuristics (Kleider et al., 2012; Levinson, 2007). Studies have looked at the effects of cognitive load on juror decision making and racial bias. Mock jurors who completed cognitively taxing tasks before rendering verdicts were more likely to find black defendants and not white defendants guilty when accused of the same crime (Kleider et al., 2012; Levinson, 2007). Kleider et al. (2012) argued that the substantial restriction on cognitive resources due to high cognitive loads suppressed mock jurors' ability to dismiss racial prejudices and stereotypes. The indirect effects of cognitive load imposed by jury directions and expert evidence have also been examined.

4.3.1.1.1 Cognitive Load in the Courtroom

McKimmie et al. (2013) conducted a series of studies demonstrating a link between extralegal factors and cognitive load, finding that mock jurors committed greater cognitive resources to encoding features of a female defendant incongruent with offender stereotypes, with jurors less able to recall expert witness testimony when presented with a counter-stereotypical (female) rather than a stereotypical (male) defendant. Ede and Goodman-Delahunty (2013) examined the effects of different instructional elements on mock jurors' cognitive load and how these related to verdicts. Findings indicated that instructional elements had an effect on cognitive

load, and that mock jurors rendering a guilty verdict experienced greater cognitive load. However, instructional element did not predict verdict choice, highlighting a knowledge gap in the literature on the link between cognitive load and juror decision making that merits further investigation (Ede & Goodman-Delahunty, 2013). Though the effects of cognitive load on jurors' processing of forensic evidence have not been directly investigated, the role of biases in juror decision making have been explored.

4.4 Juror Biases and Forensic Evidence

Aspects of a trial not relevant to the jurors' task of objectively evaluating evidence and rendering a verdict can bias jurors' decision making. Age, gender, sexuality, ethnicity, and attractiveness of the defendant and victim have been shown to influence verdicts (Kleider et al., 2012; Lieberman, 2002). The nature and description of the crime, crime scenes, and evidence can also influence juror decision making, often favouring the prosecution (Lieberman, 2002; McQuiston-Surrett & Saks, 2009). The effects of such extralegal factors highlight how personal motivations influence juror behaviour (Daftary-Kapur et al., 2010; Lieberman, 2002). These effects were found to be more pronounced when jurors were burdened by a greater cognitive load, highlighting the link between rational and emotional information processing (Kleider et al., 2012; Levinson, 2007). Literature on the effects of biases on jurors' interpretation of potentially flawed forensic evidence has raised concerns. Tools have been developed to help assess the likelihood of jurors misinterpreting evidence due to bias.

4.4.1 The Forensic Evidence Evaluation Bias Scale

Pre-trial bias has become a growing challenge given the need for impartial juries to sit on criminal proceedings (Hope et al., 2004). This has presented a further challenge given jurors' use of heuristics in evaluating forensic evidence (Edmond, 2015; Lieberman, 2002). Smith and Bull (2012) developed and validated the Forensic Evidence Evaluation Bias Scale (Appendix L). The

scale has been used to reliably determine jurors' pre-trial attitudes toward forensic evidence, and predict the perceived strength of forensic evidence presented at trial. Smith and Bull (2012) found that mock jurors who reported higher pre-trial confidence in forensic evidence were more likely to find a defendant guilty due to overestimating the reliability of weak forensic evidence. The Forensic Evidence Evaluation Bias Scale was found to significantly, though only low to moderately, correlate with the well-established Juror Bias Scale (Kassin & Wristsman, 1983), which is commonly used to evaluate jurors' pre-trial bias as a result of individual differences. A more recently developed tool concerned with capturing jurors' confidence in forensic evidence presented at trial is the Forensic Confidence Scale (McAuliff et al., 2009).

4.4.2 The Forensic Confidence Scale

The Forensic Confidence Scale was developed by McAuliff et al. (2009). The scale was used to evaluate mock jurors' perceptions of forensic evidence quality and credibility. McAuliff et al. (2009) found forensic evidence ratings to be positively correlated with mock jurors' verdicts. The Forensic Confidence Scale was also used to show that most jurors failed to recognise flaws in forensic evidence, with authors suggesting a link between cognitive effort and recognition of flawed forensic evidence (McAuliff et al., 2009). The use of the Forensic Confidence Scale in conjunction with the Forensic Evidence Evaluation Bias Scale theoretically allows for a relationship between pre-trial forensic bias and jurors' perceptions of forensic evidence, if any, to be reliably captured. As suggested by McAuliff et al. (2009), the use of the Forensic Confidence Scale may also aid in confirming a relationship between cognitive load, jurors' perceptions of forensic evidence, and verdict outcomes.

4.5 Summary

The reliability of forensic evidence has recently come under scrutiny. Lay persons' perceptions of forensic evidence are, in light of this, unusually positive (Goodman-Delahunty &

Hewson, 2010; McAuliff & Kovera, 2008; McQuiston-Surrett & Saks, 2009). According to Cognitive Experiential Self-Theory, this is likely due to jurors' use of heuristics in evaluating forensic evidence at trial (Epstein, 2003; Lieberman, 2002). The use of heuristics and biases such as prejudices related to demographic characteristics of defendant or victim have been linked to cognitive load (Kleider et al., 2012; Levinson, 2007). This study sought to find a similar link between cognitive load, forensic bias, and overestimation of flawed forensic evidence.

To test this, a trial stimulus partly derived from a sample transcript available via the Courts Administration Authority of South Australia (n.d.) was designed. Participants were randomly assigned to low, moderate, or high cognitive load conditions. Those in the high load condition were tasked with reviewing every component of the testimony and all evidence at the conclusion of each of four testimonies, whereas those in the moderate load condition only reviewed the most recent evidence and testimony, and those in the low load condition did not review testimony. The trial stimulus was designed to favour the defence with clearly biased witnesses, and highly questionable forensic evidence due to a seemingly biased forensic expert. The study also sought to replicate the purported effects of cognitive load on extralegal factors, in this case, the effect of participant gender on verdict, by using a trial stimulus in which the male defendant was accused of stalking his ex-girlfriend.

To enhance gender effects, the forensic expert and lawyer for the prosecution were also made female. McKimmie et al. (2004) investigated the influence of expert witness gender on the perceived impact of their testimony, findings indicating that an expert witness was less persuasive when gender was not consistent with the stereotypical gender associated with a particular case domain. Neal (2014) reviewed a comprehensive body of literature on women's participation in the legal system as expert witnesses. Male expert witnesses were found to have an advantage of females in terms of perceived credibility and persuasiveness, while context effects were found to

exacerbate gender differences in favour of males. Such findings have come to notably influence trial strategy, particularly in the United States (Freckelton et al., 2016; McKimmie et al., 2004; Neal, 2014).

Participants were tasked with rendering a verdict, but also provided a likelihood of guilt estimate on a scale from 0 to 100. The use of likelihood of guilt estimates is widespread in juror decision making literature, and has for some researchers offered a more insightful indicator of changes in juror behaviour (Dhami, 2008; McAuliff et al., 2009).

It was hypothesised that cognitive load would be linked to jurors' reported confidence in forensic evidence, and that jurors forced to process more information, thereby accumulating a greater cognitive load, would overestimate the strength of flawed forensic evidence. It was also hypothesised that jurors with a higher cognitive load would be more likely to render guilty verdicts than jurors with a lower cognitive load, due to their greater confidence in the flawed forensic evidence. It was further hypothesised that participants in the moderate and high load conditions would also report greater likelihood of guilt estimates. Finally, it was hypothesised that female participants would be more likely to find the defendant guilty than their male counterparts, and that female participants in the moderate and high cognitive load conditions were more likely to find the defendant guilty than females in the low load condition.

However, to accurately determine the effects of cognitive load on juror behaviour, it seemed important to determine whether the proposed manipulation was effective in imposing differing levels of cognitive load on participants. Though self-report is a common measure of cognitive load, an investigation into how reliably cognitive load can be manipulated in mock jurors would present an invaluable contribution to the limited literature on jurors' cognitive load and decision making (Kleider et al., 2012; Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009).

To do this, the transcript derived from the Courts Administration Authority of South Australia (n.d.) was employed, with participants randomly assigned to study conditions as intended for the main study. Participants were, prior to reading the trial transcript, presented with a number of words selected from the Affective Norms for English Words (ANEW) word list (Bradley & Lang, 1999; Clevinger, 2014) to memorise. The memorisation task is a source of cognitive load, and also serves to assess if study length, rather than cognitive load, is the cause of a decline in jurors' information processing. Participants were then tasked with reading the transcript, with those in moderate and high cognitive load conditions prompted to review some or all testimony at regular intervals. After each block of testimony, and review, all participants completed multiple choice questions, and were asked to list the words displayed prior to the transcript. At the conclusion of the transcript, participants were also asked to report mental effort. The design was derived from Clevinger (2014), in which it was used to demonstrate that higher cognitive load negatively affected accuracy on reading comprehension tasks. Reading comprehension may not always play an important role in the court room, or relate to jurors' ability to accurately process information and make decisions during a real trial. However, the written nature of mock trials predominantly used in juror behaviour research points to reading comprehension as a reliable indicator of attention, and for the purposes of this study, jurors' ability to process information at varying levels of cognitive load.

4.6 Experiment 1

4.6.1 Method

4.6.2 Participants

Two hundred participants were recruited using online advertising, and the University of Adelaide's RPS. Informed consent was obtained immediately prior to participation in the study. Participants were excluded if not between the ages of 18 and 80, not an Australian citizen, or had a law degree, to address jury eligibility. The final sample consisted of 192 participants (42 male, 149 female). This study was approved by the University of Adelaide's School of Psychology Human Research Ethics Sub Committee (code number: 17/02).

4.6.3 Dependent Measures

4.6.3.1 Stimulus Materials

4.6.3.1.1 Word Memorisation Task. After completing demographic questions, all participants were shown five bi-syllabic, low arousal, neutral words from the ANEW word list (Bradley & Lang, 1999; Clevinger, 2014). These were shown one at a time, for a duration of five seconds. Participants were asked not to write these words down, but instead attempt to memorise them as best as they could. At four instances throughout the trial transcript, participants were asked to recall as many of these words as they could recall, in no particular order. Clevinger (2014) employed this method to demonstrate the effects of cognitive load on accuracy in reading comprehension tasks.

4.6.3.1.2 Trial Transcript. Participants were presented with an 11-page summary of a simulated criminal case (Appendix M) in which it was alleged that the defendant unlawfully stalked his ex-girlfriend over a 12-month period. The transcript was partly derived from a sample transcript available via the Courts Administration Authority of South Australia (n.d.) (Appendix N). Significant portions of the transcript were modified so that participants would

be unlikely to recognise the original transcript if they had previously come across it, and to ensure that the transcript suited the study's purpose.

The witness testimonies used in this trial transcript revealed, under cross-examination, that witnesses maintained a high degree of unreliability, and bias. This ensured that the forensic evidence, in the case of the simulated trial being pattern evidence in the form of CCTV footage and image comparison performed by a forensic expert using a range of forensic techniques, was an important factor establishing the defendant's guilt beyond a reasonable doubt. The examination of the forensic evidence was preceded by information on forensic CCTV footage and image comparison by the forensic expert, outlining some strengths and shortcomings of the various procedures, as well as technical aspects of the process, implications regarding the law, and how the analysis had come to conclude that the defendant had appeared to be stalking the victim at her property. This was followed by a cross-examination, during which the forensic expert admitted that there was some uncertainty regarding the conclusions drawn by the expert, and that the forensic expert also was aware of details concerning the investigation. The expert was purposefully made out to appear biased in her analyses and evaluations of the forensic evidence, and made a number of assumptions and claims that suggested the expert was in favour of finding the defendant guilty. The trial transcript was concluded by the judge's closing statements, and basic judicial instructions.

The trial simulation consisted of three testimonies, followed by the forensic expert's testimony. After each testimony, participants in the moderate cognitive load condition were presented with the testimony they had just read, for the purposes of reviewing the testimony a second time. Participants in the high cognitive load condition were instead required to review all evidence and testimony presented up to that point in the trial. Participants in the low load condition were not tasked with reviewing any of the information. Following this, all participants

completed several multiple-choice questions concerning the information they had just read, before being tasked with listing as many words as they could recall of those shown to them prior to the trial transcript presentation.

4.6.3.1.3 Questionnaire. Participants were tasked with completing a brief questionnaire at the conclusion of the trial. The first section contained one question asking jurors to present a verdict by selecting guilty or not guilty. The second section of the questionnaire asked participants to report their levels of motivation, their emotional involvement, and finally the mental effort required to complete the study, using 5-point Likert scales.

4.6.4 Design

An experimental between-groups design was employed for the purposes of this study. Study condition was the independent variable with three levels, those being low cognitive load (trial stimulus without review of testimony), moderate cognitive load (trial stimulus material with review of most recent testimony), and high cognitive load (trial stimulus material and review of all evidence presented up to that point). Dependent variables were level of accuracy on multiple choice questions, word recall scores, and self-reported mental effort.

4.6.5 Procedure

The methods employed in recruiting participants for this study included online advertising, word of mouth and flyer distribution at the University of Adelaide, North Terrace campus, and the University of Adelaide's RPS. Qualtrics online survey software was employed for the purpose of hosting the experiment online. Participants who followed the appropriate link to the study were presented with participant information, and an instruction page, tasking them with reading a trial transcript, following instructions throughout, and then completing a final questionnaire. Before the transcript, participants were required to complete demographic questions, ensuring participant eligibility.

After completion of demographic questions, participants were shown five words to memorise, one at a time, for the purposes of the word memory task, before proceeding with the reading of the mock trial in the form of an 11-page transcript.

The trial stimulus included testimonies from the victim, a friend of the victim, and the accused. Those testimonies were followed by a section on CCTV footage and image reconstruction, including the forensic science behind image reconstruction, and the relationship of such forensic evidence with the law. A forensic expert then presented CCTV footage and image reconstruction relevant to the case. The trial transcript concluded with a cross-examination of the forensic expert, lawyers' closing statements, and final remarks by the judge. Participants in the moderate load condition were, after each testimony, provided with the testimony they had just read, and prompted to review it. Participants in high cognitive load condition were, after each testimony, provided with all of the testimony that had been presented so far, and prompted to review it, while those in the low cognitive load condition were not asked to review testimony. All participants then answered a set of multiple choice questions about the transcript's content, and listed as many of the words shown at the beginning of the experiment as they could recall, in no particular order

At the conclusion of the trial, a brief questionnaire with two sections was completed by all participants. The first section required participants to provide a final verdict of guilty or not guilty. The second section prompted participants to indicate their motivation to complete the study, their emotional involvement, and the mental effort required to complete the study.

4.6.6 Data Screening

Data for 192 participants was entered into SPSS Version 20 and screened for normality and skewness. Data from 11 participants was incomplete, and consequently removed. The final data set consisted of 181 (38 male, 143 female) participants. Age groups were non-normally

distributed, with skewness of 4.17 (*SE* = 0.18) as participants included a large cohort of first year psychology students. More females than males participated in the study, as is common for studies involving voluntary participation (Lobato et al., 2014).

4.7 Results

4.7.1 Word Memorisation Task

A Oneway ANOVA was conducted to determine if study condition had an effect on participants' word memorisation scores after the first testimony. It was not significant, $F(2,178) = .034, p = .967, \eta^2 < .01$. A Oneway ANOVA was also conducted to determine if study condition had an effect on participants' word memorisation scores after the final testimony. It was again not significant, $F(2,178) = .766, p = .466, \eta^2 = .08$.

Results indicate that the variation in length of reading tasks across conditions did not have an effect on participants' ability to recall information they were asked to memorise.

4.7.2 Reading Comprehension Task

A Oneway ANOVA was conducted to determine if study condition had an effect on participants' reading comprehension scores after the first testimony. It was not significant, $F(2,178) = .328, p = .721, \eta^2 < .01$. A Oneway ANOVA was also conducted to determine if study condition had an effect on participants' word memorisation scores after the final testimony. It was significant, $F(2,178) = 12.048, p < .001, \eta^2 = .12$. A final Oneway ANOVA was conducted to determine if study condition had an effect on participants' total reading comprehension scores. It was significant, $F(2,178) = 5.447, p = .005, \eta^2 = .05$.

LSD Post hoc comparisons revealed that participants in the low cognitive load condition performed significantly better on the reading comprehension task after the final testimony (*M* = 2.50, *SD* = 0.9, 95% CI [2.26, 2.72]) than those in the moderate (*M* = 2.1, *SD* = 0.6,

95% CI [1.95, 2.29]) and high cognitive load conditions ($M = 1.8$, $SD = 0.8$, 95% CI [1.61, 2.00]). The difference between the moderate and high cognitive load conditions was also significant. Further LSD Post hoc comparisons indicated that participants in the low cognitive load condition recorded significantly better total reading comprehension scores ($M = 10.1$, $SD = 2.1$, 95% CI [9.55, 10.64]) than those in the high cognitive load condition ($M = 9.0$, $SD = 1.85$, 95% CI [8.52, 9.47]). Participants in the moderate cognitive load condition ($M = 9.8$, $SD = 1.7$, 95% CI [9.36, 10.23]) also performed significantly better than those in the high cognitive load condition. Differences between participants in low and moderate conditions were not significant.

Results indicate that there were no significant differences in memory across conditions, despite varying study lengths. Participants in moderate and high cognitive load conditions performed significantly worse on the reading comprehension task, indicating that information processing ability was successfully manipulated. Findings therefore support the study's cognitive load manipulation for purposes of the main experiment.

4.8 Experiment 2

4.8.1 Method

4.8.2 Participants

Two hundred and sixty-three participants were recruited via flyers, online advertising, word of mouth, and the University of Adelaide's RPS. Participants provided informed consent prior to participation in the study. As in Experiment 1, participants were excluded if not jury eligible in South Australia. Two hundred and fifty-one participants (74 male, 177 female) made up the final participant sample. This study received ethics approval from the University of Adelaide's School of Psychology Human Research Ethics Sub Committee (code number: 16/11).

4.8.3 Dependent Measures

4.8.3.1 Forensic Evidence Evaluation Bias Scale

Participants were tasked with completing the Forensic Evidence Evaluation Bias Scale (Smith & Bull, 2012). The scale has been used to show differences in jurors' pre-trial perception of the strength and reliability of forensic science and evidence. Participants were asked to respond to questions using 5-point Likert scales, with answers ranging from *Strongly Disagree* to *Strongly Agree*. Possible scores ranged from -20 to 20, with a positive score indicating pre-trial bias in favour of forensic science. The shortened 10-item version of the scale employed in this study was selected on the basis of Smith and Bull's (2012) validation of the scale (Appendix L).

4.8.3.2 Stimulus Materials

4.8.3.2.1 Trial Transcript. Participants were presented with the 11-page summary of a simulated criminal case (Appendix M), partly derived from a sample transcript available via the Courts Administration Authority of South Australia (n.d.) (Appendix N), and used in Experiment 1.

The witness testimonies offered the same information as those used in Experiment 1. Witnesses were made out to be overtly biased and unreliable, through their use of uncertain statements and the revelation of contradictions under cross-examination. This was done to emphasise the importance of the forensic evidence and testimony presented after eye- and character witness testimonies. All aspects of the forensic evidence and testimony were retained from experiment 1. The trial transcript was concluded by the judge's closing statements, and basic judicial instructions.

The trial simulation consisted of three testimonies, followed by the forensic expert's testimony. After each testimony, participants in the moderate cognitive load condition were presented with the testimony they had just read, for the purposes of reviewing the testimony a

second time. They were then asked to provide a preliminary verdict based on the evidence up until that point, by selecting guilty or not guilty, and an estimation of the defendant's guilt on a scale ranging from 0 to 100 (See Appendix O). Participants in the high cognitive load condition were instead presented with all of the evidence and testimony presented up to that point in the trial, for review, before being tasked with providing a preliminary verdict and estimation of guilt, after each testimony. Participants in the low load condition were not required to review any information, or provide preliminary verdicts, and instead read through the trial simulation from start to finish without interruption.

4.8.3.2.2 Questionnaire. Participants were tasked with completing a questionnaire originally partly derived from Goodman-Delahunty and Hewson (2010), Lieberman (2002), and McAuliff et al. (2009). It consisted of three sections.

The first section contained one question requiring participants to present a verdict by selecting guilty or not guilty, and a question requesting rate their certainty of the suspect's guilt using a scale ranging from 0 to 100.

4.8.3.2.2.1 Forensic Confidence Scale. Participants completed the Forensic Confidence Scale adapted from McAuliff et al. (2009) (Appendix C). The 13 questions on the scale related to participants' opinions concerning the forensic evidence, and the examiner who presented it. Participants were asked to respond to questions using 5-point Likert scales, with answers ranging from Strongly Disagree to Strongly Agree. One of the questions was not factored into the forensic confidence analysis as it asked participants to rate the usefulness of witness testimony other than forensic evidence in reaching their verdict. Possible scores ranged from -24 to 24, with a higher score indicating a greater confidence in the forensic expert, and the forensic science and evidence presented during the trial, and a negative score indicating a lack of confidence in the forensic expert, and evidence. The Forensic Confidence Scale was

followed by an open-ended question that asked participants to report any aspects that they may have considered to be a cause for, or consequence of bias, and how this may have affected their verdict.

The third and final section of the questionnaire asked participants to report their levels of motivation, their emotional involvement, and finally the mental effort required to complete the study, using 5-point Likert scales.

4.8.4 Design

An experimental between-groups design was employed for the purposes of this study. Study condition was the independent variable with three levels, those being low cognitive load (trial stimulus without review of testimony), moderate cognitive load (trial stimulus material with review of most recent testimony), and high cognitive load (trial stimulus material and review of all evidence presented up to that point). Dependent variables were verdict, degree of guilt, and confidence in forensic evidence as determined by the Forensic Confidence Scale. Pre-trial bias as recorded via the Forensic Evidence Evaluation Bias Scale was treated as a covariate.

4.8.5 Procedure

Participants, recruited via flyers, online advertising, word of mouth, and the University of Adelaide's RPS, were provided a link to the study designed using the Qualtrics online survey software. Participants read basic participant information, and an instruction page, before being tasked with completing demographic questions, ensuring participant eligibility. All participants were then presented and tasked with completing the 10-item version of the Forensic Evidence Evaluation Bias Scale (Smith & Bull, 2012).

Participants then read the 11-page trial transcript. The trial stimulus included three witness testimonies, followed by a section on CCTV footage and image reconstruction, including the relationship of such forensic evidence with the law. A forensic expert then presented CCTV

footage and image reconstruction relevant to the case. The trial transcript concluded with a cross-examination of the forensic expert, lawyers' closing statements, and final remarks by the judge. Participants in the moderate load condition were, after each block of testimony, provided with the testimony they had just read, and prompted to review it, before rendering a preliminary verdict of guilty or not guilty, and an estimation of the defendant's guilt on a scale ranging from 0 to 100. Participants in the high cognitive load condition were, after each block of testimony, provided with all of the testimony that had been presented so far, and prompted to review it, before also rendering a preliminary verdict, and estimation of the defendant's guilt.

A questionnaire with three sections was then completed by all participants. The first section required participants to provide a final verdict of guilty or not guilty, and a final estimation of guilt using a scale ranging from 0 to 100. The second section contained the Forensic Confidence Scale, comprised of 13 Likert-scale questions with reference to participants' confidence in the forensic evidence and examiner, followed by the open-ended, voluntary question asking participants to list sources of bias they may have come across during the trial. The last section prompted participants to indicate their motivation to complete the study, their emotional involvement, and the mental effort required to complete the study.

4.8.6 Data Screening

The data from 263 participants was entered into SPSS Version 20 and screened for normality Data from 12 participants was either incomplete or indicated that a participant did not meet the conditions required to be included, such as Australian citizenship. The final data set, after removal of incomplete data and errors, and exclusion of participants who did not meet appropriate conditions, consisted of 251 (74 male, 177 female) participants.

4.9 Results

4.9.1 Manipulation Checks

Age groups had a positive skew of 2.16 ($SE = 0.15$) due to recruitment at the University of Adelaide campus. Participants were predominantly female, as is common in research involving voluntary participation (Lobato et al., 2014). See Table 1 for participant characteristics.

Table 1. *Participant Characteristics*

Measures		Low Cognitive Load	Moderate Cognitive Load	High Cognitive Load	Total
Age	18-24	57	63	54	174
	25-34	20	14	17	51
	35-44	6	5	6	17
	45-54	1	1	3	5
	55-64	0	2	2	4
Sex	Male	28	21	25	74
	Female	56	64	57	177
Verdict	Guilty	47	52	49	148
	Not Guilty	37	33	33	103
Total Participants		84	85	82	251

4.9.1.1 Study Condition

A Oneway ANOVA was conducted to determine if study condition had an effect on participants' self-reported mental effort. Participants across study conditions differed in their reported level of mental effort, $F(2,248) = 29.726$, $p < .001$, $\eta^2 = .19$. Post hoc tests revealed that participants in the low cognitive load condition reported lower mental effort ($M = 2.69$, $SD = 0.7$, 95% CI [2.54, 2.84]) than those in the moderate load condition ($M = 3.25$, $SD = 1.0$, 95% CI [3.03, 3.47]), and high load condition ($M = 3.68$, $SD = 0.7$, 95% CI [3.53, 3.84]). Differences between participants in the moderate and high load conditions were not statistically significant.

4.9.1.2 Study Completion Time

Before examining the effect of study condition on study completion time, outliers were removed to account for inaccurate study completion time readings due to participants not completing the study in one sitting, and inaccurate or incomplete data.

A Oneway ANOVA was then conducted to determine if study condition had an effect on participants' study completion time. The ANOVA was significant, $F(2,208) = 3.580$, $p = .03$, $\eta^2 = .03$.

As expected, participants in the low cognitive load condition spent fewer minutes completing the study ($M = 32.4$, $SD = 13.7$, 95% CI [29.13, 35.60]) than those in the moderate load condition ($M = 39.5$, $SD = 20.4$, 95% CI [34.75, 44.14]), and those in the high load condition ($M = 39.2$, $SD = 18.7$, 95% CI [34.53, 43.80]); however there was a very small effect size. Time to complete the study did not significantly differ between participants in the moderate and high cognitive load conditions.

4.9.1.3 Pre-Trial Forensic Bias

The mean pre-trial forensic evaluation bias score was -4 ($SD = 4.68$), indicating that participants were sceptical of forensic science. A Oneway ANOVA was conducted to determine whether participants assigned to different conditions differed in their pre-trial bias. It was not significant, $F(2,248) = 0.548$, $p = 0.579$, $\eta^2 < .01$.

4.9.2 Verdict

4.9.2.1 Study Condition

A Chi Square Test was conducted to determine if there was a relationship between study condition and verdict. There was no significant relationship between study condition and verdict, $\chi^2(2, 251) = 0.5$, $p = .78$ (two-sided).

4.9.2.2 Gender

A Chi Square Test found that there was a significant relationship between gender and verdict, $\chi^2(1, 251) = 5.9$, $p = .015$ (two-sided). Gender had a small to moderate effect on verdict. Only 47.3% of male participants found the defendant guilty, in contrast to 63.8% of female participants.

4.9.2.3 Forensic Confidence

A Oneway ANOVA was conducted to determine whether participants who differed in their forensic confidence would differ in their verdicts. Forensic confidence had a significant main effect on verdict, $F(1,249) = 51.587$, $p < .001$, $\eta^2 = .17$. Participants who found the defendant guilty reported a greater confidence in the forensic evidence ($M = 5.4$, $SD = 5.5$, 95% CI [4.53, 6.33]) than participants who found the defendant not guilty ($M = 0.35$, $SD = 5.5$, 95% CI [-0.72, 1.42]).

4.9.3 Likelihood of Guilt

Participants reported a mean likelihood of guilt of 62.3% ($SD = 25.2$, 95% CI [59.15, 65.42]). Given the statistically significant difference in verdicts between males and females, it was expected that likelihood of guilt would reflect a similar contrast. A Two Way ANOVA was conducted to determine if gender and study condition had an effect on likelihood of guilt estimates. Gender did not have a main effect on likelihood of guilt estimates, $F(1,245) = 0.025$, $p = 0.87$, $\eta^2 < .01$. Study condition also did not have a main effect on likelihood of guilt estimates, $F(2,245) = 0.498$, $p = 0.61$, $\eta^2 < .01$. Finally gender by study condition did not interact to produce an effect on likelihood of guilt estimates, $F(2,245) = 0.540$, $p = 0.58$, $\eta^2 < .01$.

To more accurately determine if cognitive load had an effect likelihood of guilt estimates, an ANCOVA was conducted to determine the effect of study condition on likelihood of guilt

estimates with mental effort as a covariate. The ANCOVA was not significant, $F(2,247) = 0.486$, $p = 0.615$, $\eta^2 < .01$.

4.9.3.1 Forensic Confidence and Likelihood of Guilt

A linear regression was conducted to determine whether forensic confidence could predict likelihood of guilt estimates. It was significant, $F(1,249) = 85.71$, $p < 0.001$, $R^2 = .256$. Forensic confidence was found to significantly predict 25.6% of the variance. See Figure 1.
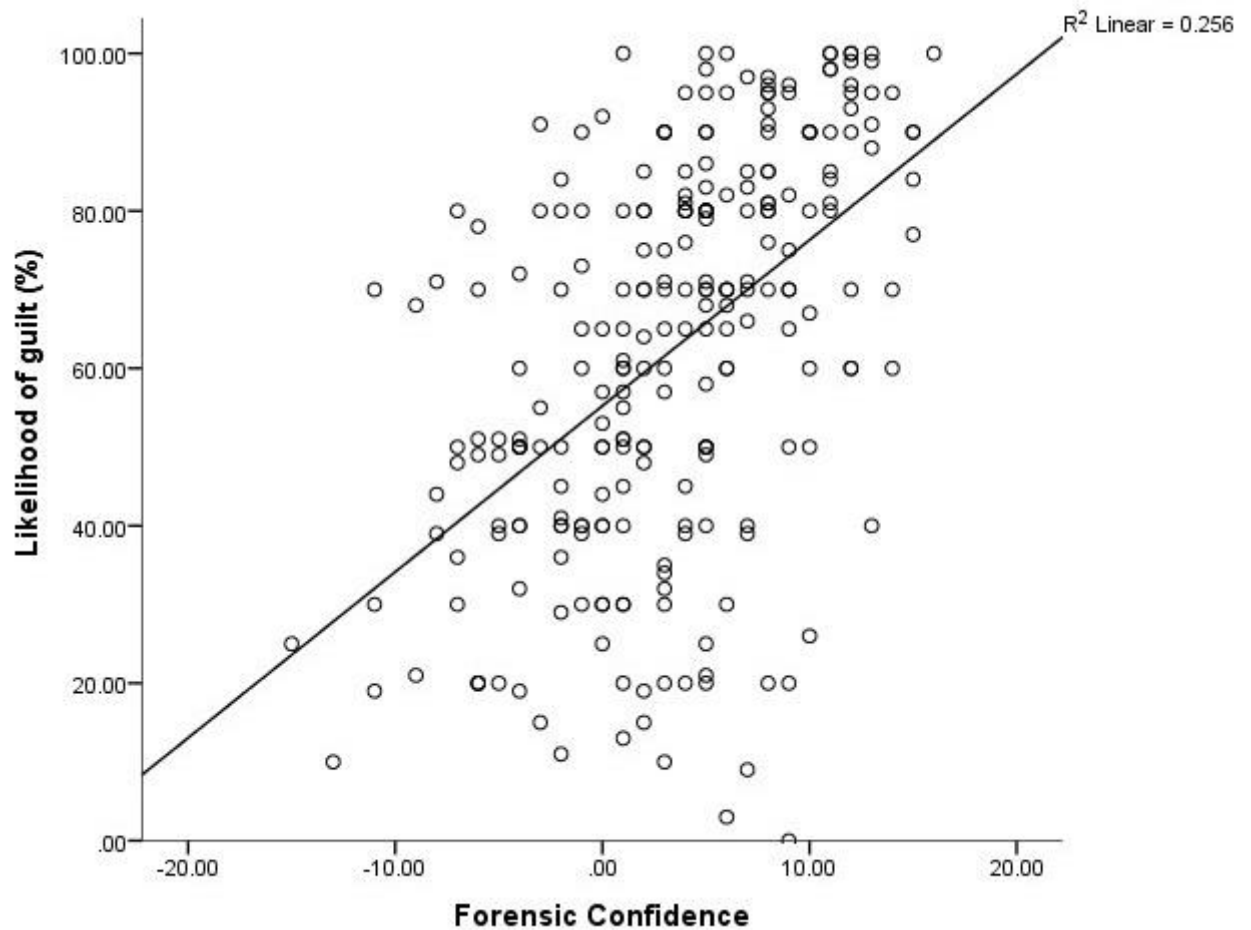
Figure 1. Scatterplot illustrating the linear relationship between Juror Likelihood of guilt estimates and Forensic Confidence scores.

To evaluate whether cognitive load had an effect on jurors' forensic confidence, a Oneway ANOVA was conducted to determine the effect of study condition on forensic confidence. The ANOVA was not significant, $F(2,248) = 0.889$, $p = 0.41$. $\eta^2 < .01$.

4.9.4 Recognition of Bias

Participants were asked to report what aspects of the trial they found to have been biased, if any. This question was voluntary, and only 154 of 251 participants reported what they felt may have been affected or otherwise been a source of bias. Those responses were sorted into one of four categories: only eye- and character witnesses were biased, only the forensic expert was biased, that everyone was biased, or that everyone was biased but that the forensic expert's skill and experience should and would enable the expert to overcome that bias in their analysis. Categories were developed by identifying key terms referencing parties involved in the presentation of evidence at trial. These included the expert, eye- and character witnesses, no-one, everyone, or that the expert/everyone was biased, but the expert was reliable.

A Chi Square Test was conducted to determine if there was a relationship between self-reported recognition of bias and verdict. There was a significant relationship between self-reported recognition of bias and verdict, $\chi^2(3, 149) = 21.86$, $p < .001$ (two-sided). A higher proportion of participants who found the defendant guilty reported that the forensic expert was biased but could overcome their bias (25.3%) compared to participants who found the defendant not guilty (1.4%). In contrast, a higher proportion of participants who found the defendant not guilty reported that all witnesses and the forensic expert had been biased (51.4%) than those who found the defendant guilty (26.6%).

4.10 Discussion

The aim of the present study was to determine if cognitive load would influence jurors' behaviour, and if manipulation of cognitive load could modify jurors' recognition of flawed forensic evidence, and therefore improve decision making outcomes. The study also sought to determine whether gender biases would influence juror behaviour, and if manipulation of cognitive load could mitigate the effect of those biases on juror decision making. Previous studies have found that cognitive load impairs jurors' reasoning skills and ability to suppress heuristics and prejudices under specific conditions (Kleider 2012; Levinson, 2007).

4.11 The Effects of Cognitive Load

Participants in the low cognitive load condition reported taking less time, and requiring less mental effort to complete the study than participants in moderate and high load conditions. It was expected that participants in the moderate and high cognitive load conditions would be more likely to have confidence in clearly flawed forensic evidence, and would therefore be more likely to find the defendant guilty. However, participants did not differ in their verdicts across conditions. Though participants who found the defendant guilty rated the forensic evidence far more highly than those who found the defendant innocent, cognitive load yet again did not have a significant effect on forensic evidence ratings. A number of explanations may account for this.

One reason for these findings may have been the effects of gender biases on juror behaviour. Female participants were found to be significantly more likely to render a guilty verdict than their male counterparts. Previous literature on gender effects in courtrooms has been mixed. Pozzulo et al. (2010) demonstrated that male and female jurors responded differently to manipulations of defendant and victim characteristics. Women have also been shown to render more guilty verdicts than men in cases involving infant victims, mental illness, elder abuse, and in cases where the defendant was male (Bottoms et al., 2011; Golding et al., 2005; Mossiere &

Maeder, 2016). Women have also been shown to more readily render verdicts in favour of the plaintiff in discrimination cases where the plaintiff was female (Blodorn et al., 2012). Gender differences in the context of scientific evidence have scarcely been examined since Kovera et al.'s (1999) finding that males but not females were influenced by expert testimony in a hostile work environment case. The effects of gender on this study's outcomes reinforce previous findings indicating that gender effects likely require greater consideration when investigating juror decision making (Blodorn et al., 2012; Kovera et al., 1999; Pozzulo et al., 2010).

Further analyses revealed that even when accounting for gender differences, cognitive load did not have an effect on verdicts. Similarly, cognitive load did not have an effect on likelihood of guilt estimates. Interestingly, likelihood of guilt estimates did not significantly differ between males and females, despite a significant relationship between gender and verdict. A possible reason for this may be related to how jurors of different genders interpret the verdict dichotomy, and likelihood of guilt estimates, when determining guilt.

4.12 Comparing Verdict and Likelihood of Guilt

The standard of proof specified for the degree of belief of guilt required before conviction in criminal cases is beyond reasonable doubt. Studies have shown that judges interpret reasonable doubt at a value of 90% or above (Dhami, 2008; Zander, 2000). Other researchers have found that jurors are uncertain and differ in their interpretations of what reasonable doubt entails (Reynolds, 2013; Zander, 2000). It has also been shown that jurors lower their probability of guilt standards in criminal trial cases relative to judges' expected values of 90% or greater (Dhami, 2008; Reynolds, 2013). This effect is magnified when factors such as race, gender, and nature of the crime are interpreted by jurors using preconceptions and biases (Reynolds, 2013). In the current study, the nature of the crime, and gender of the forensic expert may have biased female participants in favour of the forensic evidence, and a guilty verdict. Likelihood of guilt estimates

were found to be high overall. This lends further support to the theory that gender biases may have contributed to the finding of significant differences between male and female verdicts but not likelihood of guilt estimates. Interestingly, forensic confidence correlated with verdict, but not with gender, indicating two distinct sources of bias.

Studies have found that mock jurors generally overestimate the strength of forensic evidence, and their own ability to comprehend it (Goodman-Delahunty & Hewson, 2010; McQuiston-Surrett & Saks, 2009). It has also been found that greater cognitive load prompts use of heuristic over rational processing (Kleider et al., 2012; Levinson, 2007). The trial stimulus used in this study employed a clearly biased forensic expert who presented questionable findings when scrutinised using logic and reason. Yet forensic confidence did not differ across conditions, while having a significant effect on verdicts and likelihood of guilt estimates. As forensic confidence and gender were not correlated, it is likely that gender and forensic bias had separate but significant effects on participant decision making. It is possible that participants reported higher forensic confidence in order to justify their verdict selection, though this would not explain the linear relationship found between forensic confidence and likelihood of guilt estimates. Several explanations come to mind in attempting to account for these findings.

4.13 Limitations of the Study and Considerations for Future Research

One explanation would be that participants across conditions did not sufficiently differ in cognitive load. Similarly, the findings might be explained if the study did not capture cognitive load. Participants in the moderate and high load conditions took longer to complete the study, and reported higher mental effort, than those in the low cognitive load condition. Forensic confidence also differed across conditions, albeit not significantly. These results suggest that there was a difference across conditions, though the magnitude of that difference, particularly between moderate and high load conditions, is debatable. Furthermore, these results may be due

to the trial stimulus inducing too great a cognitive load in all conditions. If the stimulus material was too complex or mentally taxing even without prompting participants to review some or all testimony to impose a greater cognitive load, differences in forensic confidence and verdicts across conditions would not be as evident as other factors, such as the effect of gender on verdicts. This explanation is somewhat supported by significant differences found between low and moderate cognitive load conditions, but not moderate and high cognitive load conditions, when looking at reported reading time, mental effort, and, to a lesser degree, forensic confidence. The effect of gender bias on verdict regardless of cognitive load also indicates that cognitive load may have been too great in all conditions, or not sufficiently different from one condition to the next. This explanation is also supported by this study's findings regarding participants' self-reported sources of bias. Another potential explanation for the findings in question comes from Smith et al.'s (2011) research on juror perceptions of forensic evidence in the courtroom context.

Smith et al. (2011) sought to determine whether mock jurors could distinguish between strong and weak forensic evidence, and if the context in which that evidence presented would have an effect on the ability to make that distinction. Findings indicated that mock jurors performed better than expected when no context was provided, reliably recognising weak and strong forensic evidence. Interestingly however, mock jurors inflated their estimations of how strong the forensic evidence was when presented in a trial context. Furthermore, jurors' over-estimation of the objectively weak forensic evidence was greater than that of the objectively strong forensic evidence (Smith et al., 2011). The findings suggest that drawing attention to forensic evidence, be it through the presentation of evidence in court, or the use of supplementary materials, draws attention to forensic evidence inflating jurors' estimations, even when the courtroom presentation or supplementary material are intended to highlight shortcomings of that evidence (Smith et al., 2011). These conclusions are supported by this study's outcomes.

Within the Cognitive Experiential Self-Theory framework, these findings indicate that jurors should theoretically be able to distinguish between weak and strong forensic evidence when processing information rationally. However, they also highlight how readily the courtroom context, and elements associated with the trial process, may prompt jurors to employ heuristic processing, and as a result negatively impact decision making outcomes (Lieberman, 2002; Smith et al., 2011). When considering the compounding effects of cognitive load on information processing style, it is unsurprising, yet deeply troubling, that the range of methods used in attempting to improve juror information processing and decision making have thus far failed, particularly with regard to appropriate processing of complex information such as forensic evidence (Daftary-Kapur et al., 2010; Lieberman, 2002; McAuliff et al., 2009; Smith et al., 2011).

Participants across conditions did not noticeably differ in their self-reported sources of bias. Nonetheless a greater proportion of participants in moderate and high cognitive load conditions reported that eye-witnesses, but not the forensic evidence and expert, were biased; or that the forensic expert's findings were not compromised by her biases. The proportional differences suggest a greater difference between low and moderate cognitive load conditions than moderate and high cognitive load conditions. This supports the idea that the difference between moderate and high cognitive load conditions were likely not severe enough, and that cognitive load was greater than anticipated in all conditions. Another answer for these findings can be found in cognitive psychology literature.

Research shows that people recognise biases in others, but not themselves (Ehrlinger et al., 2005). Greater cognitive capacity and education on the subject of biases fail to mitigate the bias blind spot effect (Ehrlinger et al., 2005). Participants with forensic bias would therefore be expected to report similar levels of bias in eye- and character witnesses as unbiased participants, but lower levels of forensic expert bias, regardless of conditions. This was reflected in this study's

results. Only 154 of 251 participants reported perceived sources of bias. Mandatory reporting of perceived biases may have led to more accurate and meaningful results. Participants were also not explicitly asked to report their own personal biases, though this may have lent greater support to literature on the subject. Nonetheless these findings support the growing number of legal experts and researchers who argue for revisiting aspects of the adversarial justice system.

4.14 Where to from here? Implications for the Adversarial System

A number of concerns associated with the current justice system have been linked to jurors (Brown, 2014; Findley, 2011; Menon, 1995). In response to these issues, there have been calls to move away from an adversarial to an inquisitorial justice system (Findley, 2011; Grunewald, 2013; Menon, 1995). The adversarial system is characterised by the roles of the accuser and the accused in the investigation of a case, and collecting and presenting evidence orally before a passive judge, with verdict rendered by a lay jury (DeBarba, 2002; Edmond & Vuille, 2014; Grunewald, 2013). The inquisitorial system places responsibility for the investigation, prosecution, and trial of the accused in the hands of a neutral party, often a judge or judges. Judges take a more proactive role in the investigation and at trial. After examining all relevant sources of information and evidence collected prior to the trial, the judge or judges prepare a final verdict, often without the involvement of lay jurors (Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013).

Advocates of the adversarial system have argued that citizens applying common sense to determine a verdict is a central component of modern legal conflict resolution, and that individual differences in jurors enable them to more effectively approach the search for 'truth' and 'justice' from a multitude of angles (DeBarba, 2002; Edmond & Vuille, 2014; Hodgson, 2010; Menon, 1995). Yet the adversarial system's reliability and accuracy has come under increasing scrutiny as evidence of a considerable and growing number of wrongful convictions has emerged in recent

decades (DeBarba, 2002; Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013; Hodgson, 2010). The inquisitorial system has generally been considered more effective at minimising wrongful convictions, as numerous shortcomings of the adversarial system, including the role of the jury, are avoided entirely (Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). Recently procedural mistakes, unreliable forensic evidence, and institutional tunnel vision have been linked to wrongful convictions in Europe, raising doubts over whether the inquisitorial system is more successful in mitigating effects of error and bias (Grunewald, 2013).

Supporters of the adversarial system argue that jurors serve to separate reliable from unreliable evidence, thereby rendering more accurate verdicts than could be based on findings of police and judicial investigations alone (DeBarba, 2002; Hodgson, 2010). The literature on juror behaviour indicates that jurors are more prone to erroneously identifying weak evidence as strong, and letting emotions override rational evaluation of testimony (Lieberman, 2002; McAuliff et al., 2009). This study's findings echo this, as gender and overestimation of forensic evidence were found to significantly influence juror verdicts. Further research into the effects of judicial procedure on juror behaviour is therefore crucial to enable jurors to more effectively perform their civic duty, determine the 'truth', and render a just verdict. Future investigations will also play a critical role in determining whether the use of an inquisitorial or mixed system could lead to a more effective justice system, even if at the cost of the modern jury.

Chapter 5.

Overview

Literature on juror decision making and forensic bias, has highlighted a pressing need for further research into interactions between forensic evidence, juror behaviour, and judicial outcomes. Three research projects were conducted in order to explore the use of supplementary materials in educating jurors about erroneous forensic evidence, the effects of emotional and rational information processing on jurors' biases when interpreting information, and the role of cognitive load in determining juror decision making outcomes. In general, it was found that supplementary materials did not enable jurors to more reliably interpret forensic science, or allow jurors to more effectively distinguish between 'good' and 'bad' forensic evidence. Results also indicated that manipulation of processing style did not deter jurors from processing information heuristically, inhibiting jurors' ability to recognise flawed forensic science and evidence. Finally, it was found that differences in cognitive load had some effect on jurors' processing of information, but that extraneous factors, including forensic confidence, and gender differences, play a prominent role in juror decision making outcomes. Findings, contributions to the literature, and limitations of the research are discussed. Implications of these findings, with emphasis on questions raised about current inquisitorial systems in Australia and overseas, are also explored.

5.2 Introduction

The contribution of forensic science to judicial outcomes has never been greater (Edmond, 2015; Goodman-Delahunty & Hewson, 2010; McQuiston-Surrett & Saks, 2009). Yet literature has shown that forensic science faces a number of challenges, ranging from issues relating to the reliability and validity of forensic techniques to questions concerning the effects of a range of cognitive biases on forensic examinations, analyses, and comparisons (Dror et al., 2006; NAS, 2009; PCAST, 2016). Although a notable body of research has contributed to ongoing developments in forensic laboratories and within legal procedures to reduce the occurrence and impact of erroneous forensic evaluations, "junk" forensic evidence continues to be introduced in courtrooms for presentation to lay jurors (Dror et al., 2006; Kassin et al., 2013; NAS, 2009; PCAST, 2016). The relationships between weak or flawed forensic evidence, lay jurors' perception of such evidence, and verdict outcomes have, in light of this, been thoroughly underexplored (McQuiston-Surrett & Saks, 2009; NAS, 2009; PCAST, 2016; Smith et al., 2011).

Jurors play a critical role in today's administration of justice through the court system (Daftary-Kapur et al., 2010; Lieberman, 2002; NAS, 2009; PCAST, 2016). Jurors are presumed to be objective truth seekers, tasked with evaluating all testimony and evidence presented at trial in an objective, reliable, and rational manner, before rendering life changing decisions (Lieberman, 2002; McQuiston-Surrett & Saks, 2009). The literature on juror decision making has demonstrated that this is not the case, and that jurors generally overestimate their understanding of evidence, and are influenced by their own preconceptions and biases when evaluating testimony and evidence (Kleider et al., 2012; Lieberman, 2002; McAuliff et al., 2009; Ohtsubo et al., 2004; Pozzulo et al., 2010). The growing complexities associated with trials, particularly when involving forensic evidence, have put jurors in an increasingly vulnerable position (Goodman-Delahunty & Hewson, 2010; McAuliff & Kovera, 2008; McQuiston-Surrett & Saks, 2009). It is therefore evident that further research is needed. Areas of investigation must

include how jurors process information, how the use of heuristics, preconceptions, and rational processing come into play in jurors' decision making, and how jurors evaluate forensic evidence. A greater understanding of these phenomena is critical in seeking to improve the reliability and validity of jury verdicts, and improve the confidence and trust in the Australian justice system (Daftary-Kapur et al., 2010; Kleider et al., 2012; Levinson, 2007; Lieberman, 2002; McAuliff et al., 2009). Several studies were conducted looking to identify how jurors process information, how that processing of information can be manipulated, and what avenues, if any, there are for improving jurors' comprehension of forensic evidence, including inherent flaws, and cognitive biases on the part of forensic examiners.

5.3 Study 1: Forensic Evidence and Juror Decision Making: Can Jurors Recognise Bias in Forensic Reports?

Though juror information processing and decision making has not been extensively researched, problems related to jurors' interpretation of evidence and testimony have been acknowledged in literature, and in legal contexts (Magnussen et al., 2014; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009; NAS, 2009; PCAST, 2016; Tran et al., 2011). The primary focus of research on juror behaviour has examined how aspects of a trial such as physical characteristics of the accused and the victim, circumstances of the crime, and pretrial publicity affect jurors' decision making outcomes (Kleider et al., 2012; Lieberman, 2002). Findings from such studies have led to a greater reliance on various supplementary materials (Daftary-Kapur et al., 2010; Found & Edmond, 2012; Simmonsen, 2012).

Supplementary materials in the legal context refer to the provision of information, generally in written or oral form, to improve jurors' comprehension of aspects of a trial not considered lay knowledge (Daftary-Kapur et al., 2010; Found & Edmond, 2012; Halverson et al., 1997; Shaw & Skolnick, 1995; Simmonsen, 2012). This may include such materials as jury

instructions, in-depth explanations of scientific processes, and forensic reports, to help jurors in their processing of information encountered over the course of the trial (Daftary-Kapur et al., 2010; Found & Edmond, 2012; Howes & Kemp, 2017; Simmonsen, 2012). The effectiveness of these supplementary materials has been questioned, with several studies indicating that supplementary materials do not enhance jurors' comprehension of information, and at times impede it (Daftary-Kapur et al., 2010; Halverson et al., 1997; Simmonsen, 2012). Howes & Kemp (2017) argued that low scientific literacy in the western world has led to forensic experts using contentious language when expressing findings, so as to convey scientific information to non-scientists while retaining objectivity. Howes (2015) made a number of suggestions relating to common sources of written miscommunication between forensic experts, law enforcement, judges, and jurors, and how to potentially address them. Found and Edmond (2012) went one step further, proposing a report format to address issues generally associated with modern forensic reports.

Found and Edmond (2012) sought to improve comprehension of forensic evidence, recognition of flawed methods, and bias in forensic experts, by designing a simplified report format modelled after reports designed for publication in scientific journals. The proposed format would remove a significant amount of jargon and technical language, and focus on elements that should enable jurors to comprehend whether evidence was appropriately collected and analysed, and if aspects of that process were likely to bias the expert conducting any analyses (Found & Edmond, 2012). Though based on research such as the NAS (2009) report and findings from McQuiston-Surrett and Saks (2009), no validation of the report format was conducted to support Found and Edmond's (2012) conclusions. In light of previous literature on the ineffectiveness of supplementary materials, and jurors' overestimation of their own understanding of evidence, this thesis first sought to determine whether the Found and Edmond (2012) forensic report format presented a viable tool for improving juror information processing and decision making with

regard to forensic evidence (Daftary-Kapur et al., 2010; Halverson et al., 1997; Simmonsen, 2012).

5.3.1 Study 1: Findings

The central aim of the first study was to determine whether the forensic report format proposed by Found and Edmond (2012) would enable jurors to more effectively identify weak forensic evidence, and bias on the part of the forensic examiner. The study also sought to determine whether this would affect verdict outcomes. It was expected that participants provided with a forensic report indicating bias would report lower confidence in the forensic evidence than participants provided with a forensic report not indicating bias, or participants without a supplementary report. No significant differences in verdicts across participant conditions were expected, in accordance with previous literature on jurors' use of supplementary materials, and verdict choices (Daftary-Kapur et al., 2010; Simmonsen, 2012).

Participants reported a significantly lower confidence in the validity of the forensic expert's study when provided with a forensic report indicating bias, rather than a report not indicating bias, or no report. This only represented one part of the Forensic Confidence Scale. Forensic confidence on the whole was higher in participants provided with a forensic report, regardless of content. Furthermore, forensic confidence had a significant effect on verdict and likelihood of guilt, as participants provided with a forensic report, regardless of content, were significantly more likely to find the defendant guilty.

5.3.2 Study 1: Limitations of the Research and Contribution to the Literature

There were a number of shortcomings limiting the generalisability of the first study's findings. Participants were predominantly university students, and therefore do not accurately represent a sample of the general population from which jurors may have been drawn, as participants may have been more sensitive to methodological flaws related to the forensic

evidence than lay jurors. Contrary to this, Bornstein et al. (2017) found student samples to be comparable to non-student samples for the purposes of jury simulation research. There were also no direct measures of jurors' recognition of bias, which may have more effectively informed differences in jurors' recognition of issues with the forensic evidence across conditions. Forensic report manipulation was minor, and may have been too subtle. However, findings of significant differences across conditions suggest that greater manipulation would likely only amplify findings.

Despite these limitations, the first study presents a number of findings that notably contribute to the current body of literature relating to the use of supplementary materials to improve jurors' evaluation of forensic evidence. Firstly, findings support previous research on the subject of supplementary materials, by indicating that jurors may recognise weak forensic evidence and forensic bias when made very apparent, but do not sufficiently take that recognition into account when making decisions (McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). The study's findings are echoed by Smith et al. (2011) who found that supplementary materials and information provided in a courtroom context inflated jurors' perceptions of forensic evidence strength, even when the forensic evidence is flawed. Results also highlight a direct relationship between forensic confidence and verdict outcomes, which few previous studies have done (McAuliff & Kovera, 2008; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009).

This study found that greater confidence in forensic evidence results in a significantly greater likelihood of a guilty verdict. On the surface this may not present as an issue. However, this study found that confidence in forensic evidence was high even when the evidence was clearly flawed, and when supplementary materials were provided indicating that the evidence was not reliable. Findings made it clear that the Found & Edmond (2012) forensic report format did not improve juror decision making, demonstrating the need for proper validation of any tools

or methods used to support jurors. This is particularly troubling in light of the fact that weak and flawed forensic evidence continues to be introduced in court, despite prominent efforts to address issues with forensic evidence at stages prior to the courtroom (Edmond, 2015; NAS, 2009; PCAST, 2016). The positive relationship between confidence in forensic evidence and verdict outcomes therefore presents an avenue to investigate how jurors' ability to distinguish between strong and weak forensic evidence may be improved by examining the underlying cognitive processes that they use during information processing and decision making (Daftary-Kapur et al., 2010; Edmond, 2015; Smith et al., 2011). This could increase the reliability and validity of verdict outcomes at the hands of jurors in a world where questionable forensic evidence will continue to be admitted to court (Edmond, 2015; NAS, 2009; PCAST, 2016). It would also help to inform the design of tools and methods to aid jurors in their interpretation of forensic science and expert testimony in court.

To do this, further research into how jurors process forensic evidence, the effects of different information processing on verdict outcomes, and how such information processing may be influenced to improve jurors' ability to distinguish between weak and strong forensic evidence, with or without supplementary materials, is critical (Edmond, 2015; Howes & Kemp, 2017; McAuliff et al., 2009).

5.4 Study 2: Effects of Emotional and Rational Information Processing on Juror Decision Making

It has become increasingly evident that forensic and cognitive biases not only affect experts at crime scenes and forensic laboratories, but also judges and jurors in the courtroom (Dror et al., 2006; Gatowski et al., 2001; Kassin et al., 2013; Kovera & McAuliff, 2000; McAuliff et al., 2009). Yet research into jurors' ability to recognise and act on recognition of flawed forensic evidence has been scarce, with most literature on the subject examining jurors' own

biases and preconceptions without attempting to address how jurors process information (Goodman-Delahunty & Hewson, 2010; Lieberman, 2002; McAuliff & Kovera, 2008; McQuiston-Surrett & Saks, 2009; Wiener et al., 2006). This has been due in part to the popularity of several different models of juror information processing and decision making, including the story model, the Heuristic-Systematic Model, and Cognitive Experiential Self-Theory (Chaiken, 1987; Epstein, 2003; Pennington & Hastie, 1991). It therefore seemed prudent to determine which of these models would be most suited for research on jurors' evaluations of forensic evidence, and effects on verdict outcomes.

Review of the literature found that though popular, the story model offered significantly less in explaining the cognitive processes underpinning juror information processing and decision making than the Heuristic-Systematic Model, and Cognitive Experiential Self-Theory (Lieberman, 2002; McAuliff et al., 2009; Olson-Fulero & Fulero, 1997; Spottswood, 2014). Both the Heuristic-Systematic Model and Cognitive Experiential Self-Theory propose that jurors process information rationally or emotionally, each information processing mode with their own strengths and shortcomings (Chaiken, 1987; Epstein, 2003; Kemmelmeier, 2010; Lieberman, 2002; McAuliff et al., 2009). Cognitive Experiential Self-Theory has been more widely used, and distinguishes itself from the Heuristic-Systematic Model by proposing that emotional and rational information processing modes are not independent of each other, but interact along a continuum (Epstein, 2003; Hample & Richards, 2014; Kemmelmeier, 2010). It has also been previously used in juror decision making research, offering a competent and robust model for how and why jurors process information differently across different contexts (Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009).

Previous literature using Cognitive Experiential Self-Theory suggested that jurors could recognise methodological flaws and problems with evidence when processing information

rationally, and less so when processing information emotionally (Epstein, 1994, 2003; Epstein & Pacini, 1999; Lieberman, 2002). It has also been shown that jurors using emotional processing are more prone to the use of heuristics (mental shortcuts in their processing that require fewer cognitive resources and offer an alternative interpretation of information when it can't be rationally understood) and as a result more likely to commit errors when encountering information which they cannot comprehend (Epstein, 2003; Kemmelmeier, 2010; Lieberman, 2002). The study therefore sought to determine if information processing modes could be manipulated, and if such manipulation could improve jurors' recognition of flawed forensic evidence, and forensic bias. In light of the first study's findings concerning the Found and Edmond (2012) forensic report, this study also sought to assess whether the Found and Edmond (2012) report would enable jurors to recognise bias when prompted to process information rationally and not emotionally.

5.4.1 Study 2: Findings

Unsurprisingly, verdict correlated with likelihood of guilt estimates. Verdict also correlated with forensic confidence, supporting the first study's findings. While these results were expected, other results came as a surprise. One such finding was the effect of jury instruction manipulation and evidence manipulation on forensic confidence.

Jury instructions and forensic evidence were manipulated to prompt jurors to process information either rationally or emotionally. The forensic evidence and supplementary forensic report indicated that the forensic expert had been biased. Manipulation of instructions and evidence had a significant effect on jurors' forensic confidence. Contrary to expectations, jurors prompted to process information rationally reported a greater confidence in the forensic evidence than those prompted to process information emotionally. Prompting jurors to process information rationally may have inadvertently led jurors to overestimate the importance of the forensics in

the context of the study, encouraging heuristic interpretations of forensic evidence likely not well understood (Lieberman, 2002; McAuliff et al., 2009; Smith et al., 2011). While the Found and Edmond (2012) forensic report had no tangible effect on this study's outcomes, previous findings on how the report increased jurors' confidence in the evidence, regardless of content, supports this idea. A virtually unexplored area of juror decision making touched upon in this study concerns the role of education in predicting juror information processing and decision making.

Direct education of jurors has been attempted in the form of jury instructions and other supplementary materials, with mixed results (Found and Edmond, 2012; Goodman-Delahunty & Hewson, 2010; Simmonsen, 2012). On the other hand the role of jurors' schooling, including secondary and tertiary education, and the impact of scientific literacy on juror information processing and decision making has not yet been thoroughly investigated (Edmond, 2015; Goodman-Delahunty & Hewson, 2010; Hope et al., 2004). This study's findings indicated that the more science-based subjects a participant completed at the secondary level, the lower their confidence in the forensic evidence. Therefore greater scientific literacy may have enabled some participants to more effectively and accurately evaluate the intentionally weak evidence presented during this study's mock trial.

5.4.2 Study 2: Limitations of the Research and Contribution to the Literature

As with the previous study, there were a number of shortcomings related to the final participant pool. Participants were predominantly university students likely to have a greater understanding of scientific methods and capacity for critical reflection than lay jurors. Bornstein et al.'s (2017) finding that student samples are comparable to non-student samples for the purposes of jury simulation research should, however, alleviate some concerns relating to the use of university students for mock jurors. A significant portion of prospective participants also failed to complete the study, strongly suggesting that the study's length may have been greater than is

practical for research of this nature when conducted online. These factors likely had some effect on participants' mental effort, emotional involvement, and recognition of forensic evidence, limiting the effectiveness of the manipulation.

Despite this, the second study contributes to the currently scarce literature on juror information processing and decision making with regard to forensic evidence, from a dual processing perspective (Lieberman, 2002; McAuliff et al., 2009). This thesis' first study indicated that the Found and Edmond (2012) forensic report may improve jurors' recognition of flawed evidence and effects of forensic bias, but that they are not likely to act on that recognition (Daftary-Kapur et al., 2010; Simmonsen, 2012; Smith et al., 2011). Instead the provision of a forensic report is more likely to result in the overestimation of forensic evidence, particularly when that evidence is weak (Daftary-Kapur et al., 2010; Smith et al., 2011). The thesis' second study builds on results from the first study about the relationship between forensic confidence and verdict outcomes, and demonstrates a number of effects related to the interaction between the use of one juror information processing mode over another, and evaluation of forensic evidence with and without supplementary materials.

Manipulating jurors' information processing appeared to affect their forensic confidence, though in the opposite direction of that which had been anticipated. Jurors prompted to process information rationally reported a greater confidence in the forensic evidence, even when weak. This finding lends further support to the literature proposing that drawing attention to forensic evidence will inflate jurors' evaluation of that evidence, even when it is clearly flawed (Daftary-Kapur et al., 2010; Smith et al., 2011). This study's findings nonetheless demonstrate that dual processing in accordance with Cognitive Experiential Self-Theory can be used to explain juror behaviour (Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009). This is a crucial finding in that it provides a framework for further investigation into how jurors' information

processing may be influenced to enable jurors to distinguish between strong and weak evidence, and render more reliable verdicts. This study yet again highlighted a strong relationship between forensic confidence and verdict outcomes. The potential benefits of enabling jurors to recognise strong and weak forensic evidence and testimony through manipulation of processing style cannot be understated, given findings from the NAS (2009) and more recent PCAST (2016) reports. The second study also contributes to the literature by way of highlighting the potential role of scientific literacy in predicting the reliability of juror decision making.

Efforts have been made to educate jurors on legal principles, and forensic techniques and procedures relevant to evidence presented at trial, with little to no success (Daftary-Kapur et al., 2010; Simmonsen, 2012; Smith et al., 2011). Surprisingly the role of science-based schooling, including secondary and tertiary education, has barely been mentioned in jury information processing and decision making literature (Edmond, 2015; Goodman-Delahunty & Hewson, 2010; Hope et al., 2004). Yet this study's findings suggest that scientific literacy may notably contribute to how effectively jurors recognise strong and weak forensic evidence, including issues with methodology, and causes and effects of forensic bias. Future research presents an opportunity to develop a more comprehensive understanding of tools jurors may employ to more reliably process and act on forensic evidence (Edmond, 2015; Goodman-Delahunty & Hewson, 2010; Hope et al., 2004). Similarly, the study's focus on the interaction between emotional and rational information processing, and the manipulation of processing modes, highlights the need for a more sophisticated approach to how and why jurors' comprehension and behaviour may be manipulated (Kleider et al., 2012; Lieberman, 2002; McAuliff et al., 2009). Using Cognitive Experiential Self-Theory, further efforts to identify how manipulating jurors' information processing might enable them to correctly interpret forensic evidence, and render more accurate verdicts, are therefore critical to improving the reliability and validity of judicial outcomes given

that flawed forensic evidence will likely continue to be presented in courtrooms (Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009; NAS, 2009; PCAST, 2009).

5.5 Study 3: The Effects of Cognitive Load on Juror Decision Making in the Presence of Forensic Bias

The interaction between juror information processing and weak or flawed forensic evidence, and forensic bias, has been thoroughly under-examined (Edmond, 2015; McQuiston-Surrett & Saks, 2009; Smith et al., 2011). A prominent body of research has comprehensively highlighted a number of issues with forensic science, and the fact that weak and flawed forensic evidence continues to be admitted in courts (Gatowski et al., 2001; Dror et al., 2006; Kovera & McAuliff, 2000; McAuliff et al., 2009; NAS, 2009; PCAST, 2016). Other studies have shown that jurors make poor decisions due to preconceptions and personal biases (Goodman-Delahunty & Hewson, 2010; McAuliff & Kovera, 2008; McQuiston-Surrett & Saks, 2009). Jurors also overestimate their ability to comprehend information presented in court, and do not benefit from supplementary materials designed to try and improve information processing and decision making (Daftary-Kapur et al., 2010; Simmonsen, 2012). Despite these findings, literature on jurors' comprehension of forensic evidence is scarce, and has had little to no impact on judicial procedure (Daftary-Kapur et al., 2010; Lieberman, 2002; McAuliff et al., 2009; Simmonsen, 2012).

Research on juror information processing and decision making in the context of forensic evidence has highlighted risks associated with employing lay jurors to make life changing decisions on the basis of information they are not equipped to comprehend (Edmond, 2015; McAuliff & Kovera, 2008; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). Supplementary materials do not address jurors' overestimation of the strength of forensic evidence. Instead, materials inadvertently encourage heuristic processing, compromising jurors'

evaluations of forensic evidence (Daftary-Kapur et al., 2010; Goodman-Delahunty & Hewson, 2010; McQuiston-Surrett & Saks, 2009; Smith et al., 2011). This is an issue due to findings pointing to a direct correlation between forensic confidence and verdicts (McQuiston-Surrett & Saks, 2009; Smith et al., 2011). In response, researchers have explored alternative approaches to investigating cognitive processes underpinning juror information processing and decision making. This has led to a shift away from Pennington & Hastie's (1992) story model, and toward more comprehensive and informative dual processing models such as Cognitive Experiential Self-Theory (Chaiken, 1980, 1987; Epstein, 2003; McAuliff et al., 2009).

According to Cognitive Experiential Self-Theory, individuals process information both rationally and emotionally. Rational processing involves effortful cognitive activity based on logic and reason, whereas emotional processing prioritises "gut" instincts, emotional interpretations, and heuristic processing (Epstein, 2003; Lieberman, 2002; McAuliff et al., 2009). The use of rational over emotional processing has been linked to a number of factors, including motivation, prior knowledge, cognitive capacity, and complexity of information (Epstein, 2003; Lieberman, 2002; McAuliff et al., 2009). Studies have found that jurors are able to identify flaws in forensic evidence, and forensic bias, when processing information rationally, and are likely to overestimate the strength of weak or flawed forensic evidence when processing information emotionally (Lieberman, 2002; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). Jury instructions and other supplementary materials have been ineffective at prompting jurors to process rationally rather than emotionally, with some studies indicating that the courtroom context likely prompts involuntary emotional processing of information (Daftary-Kapur et al., 2010; Goodman-Delahunty & Hewson, 2010; McQuiston-Surrett & Saks, 2009; Smith et al., 2011). It was proposed that cognitive load, referring to the amount of cognitive effort exerted relative to one's cognitive capacity, may be key to identifying how and why jurors process information either emotionally or rationally (Kleider et al., 2012; Levinson, 2007; Sweller, 1994).

The study therefore sought to determine if jurors' cognitive load could be manipulated, and if such a manipulation would have an effect on jurors' processing of forensic evidence, and recognition of forensic bias. It was hypothesised that jurors burdened with a greater cognitive load would be more prone to overestimating the strength of flawed forensic evidence, and consequently render less reliable verdicts.

5.5.1 Study 3: Findings

As in this thesis' previous research, verdict was not only correlated with likelihood of guilt, but also confidence in the forensic evidence. Contrary to expectations, cognitive load did not significantly correlate with forensic confidence, or verdicts. The mock transcript featured a young man accused of stalking his ex-girlfriend over the course of a year, and was designed to elicit mild gender biases to ascertain whether such bias would factor into how cognitive load may influence juror information processing and decision making. Surprisingly, gender had a significant effect on verdict, with female participants more likely to find the defendant guilty than their male counterparts. Despite this, male and female participants did not differ in their likelihood of guilt estimations within or across cognitive load conditions. To understand this finding, a number of explanations are proposed

One explanation for these findings may have been jurors' interpretation of likelihood of guilt estimates relative to verdicts. Research on the subject has indicated that jurors' standards for likelihood of guilt estimates before finding someone guilty vary wildly, and are influenced by individual difference factors such as gender, race, nature of the crime, and jurors' preconceptions (Dhami, 2008; Reynolds, 2013; Zander, 2000). These studies might explain the discrepancy between differences in male and female participants' verdicts relative to the differences in their likelihood of guilt estimates. This would also imply that female participants were more likely to process information emotionally; however, forensic confidence did not

significantly differ between males and females. Findings indicate that effects of individual differences on juror decision making, including the ability to recognise forensic bias, merit further investigation.

5.5.2 Study 3: Limitations of the Research and Contribution to the Literature

Several factors may have accounted for these results. One such factor is the manipulation of cognitive load. Participants in the moderate and high cognitive load conditions took longer to complete the study, and reported higher mental effort, than participants in the low cognitive load condition, indicating that some manipulation did occur. Participants across cognitive load conditions also differed in likelihood of guilt assessments and forensic confidence scores. However, these differences were not statistically significant, suggesting that cognitive load in the high condition may not have been sufficiently greater than the cognitive load on participants in moderate and low conditions.

Alternatively, the trial stimulus and materials may have induced too significant a cognitive load in all conditions to ensure that there would be a noticeable difference in jurors' information processing. This explanation is somewhat supported by previous literature indicating that forensic evidence, even when low in complexity, is likely to induce emotional processing of information, particularly in the context of a criminal trial (Daftary-Kapur et al., 2010; McQuiston-Surrett & Saks, 2009; Simmonsen, 2012; Smith et al., 2011). The impact of gender on juror verdicts also suggests that differences between cognitive load conditions may not have been significant enough. Furthermore, jurors' self-reported recognition of bias hints at the effects of cognitive load on bias recognition, with participants in moderate and high cognitive load conditions more prone to reporting that witnesses other than the forensic expert were biased, or that the forensic expert was immune to bias. Jurors' self-reported recognition of bias was

voluntary, and compulsory reporting may have provided a greater insight into the effects of cognitive load on jurors' ability to discern and act on forensic and other biases.

Despite these minor concerns, this study has produced several findings that notably contribute to the literature on juror decision making and forensic bias. Firstly, findings yet again stress a relationship between jurors' forensic confidence and verdict. Though this thesis' previous studies demonstrated a similar link, and some of the current literature alludes to it, the strength of that correlation has thus far been under-examined (McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009; Smith et al., 2011). Findings also echo those from previous research on the effects of individual differences such as gender on jurors' information processing and decision making, and demonstrate how these can be accounted for within the Cognitive Experiential Self-Theory framework (Evans, 2008; Kleider et al., 2012; Levinson, 2007; Lieberman, 2002). This study was also one of the first to investigate the effects of cognitive load on juror behaviour. As findings on the interactions between cognitive load and jurors' information processing and decision making were inconclusive, further research on the subject may present a significant opportunity for advancing the understanding of the cognitions underpinning juror behaviour (Kleider et al., 2012; Levinson, 2007). Confirming a link between cognitive load and juror behaviour could have significant practical implications, particularly if a link between load arising from the complexity of evidence and processing style can be established.

Jurors' information processing and decision making in the context of forensic evidence has come under fire in recent years (Blodorn et al., 2012; Edmond, 2015; Goodman-Delahunty & Hewson, 2010; Hawkins & Scherr, 2017; Magnussen et al., 2014; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). It has become increasingly clear that jurors struggle to distinguish between weak and strong forensic evidence and testimony (Howes & Kemp, 2017; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). This mitigates efforts by research and

legal bodies to improve the quality of forensic evidence before it makes it into courtrooms (Howes & Kemp, 2017; NAS, 2009; PCAST, 2016; Simmonsen, 2012). Findings from this thesis' first and second study suggest that jurors can be made to recognise flawed forensic evidence, but that such recognition generally does not influence their estimation of the evidence's strength. If this is at least in part due to cognitive loads placed on jurors sitting through lengthy trials and attempting to interpret vast amounts of information, establishing such a link could enable reform relating to trial procedure to reduce the mental strain on jurors.

The literature on elements unduly influencing juror decision making is comprehensive (Blodorn et al., 2012; Edmond, 2015; Lieberman, 2002; Pozzulo et al., 2010; Wiener et al., 2006). Yet few serious efforts have been made to investigate the effects of cognitive load and fatigue on juror information processing and verdict outcomes (Malavanti, 2014; Nievelstein et al., 2013; Van Knippenberg et al., 1999). Identifying such a relationship could have significant ramifications for trial procedure, and the design and use of supplementary tools and methods to aid jurors in more reliably and accurately evaluating forensic evidence and expert testimony (Lieberman, 2002; McAuliff & Kovera, 2008; Smith et al., 2011). If reducing cognitive load coupled with manipulating jurors to process information rationally can increase the likelihood of jurors recognising and acting on differences in forensic evidence strength, then significant efforts to reduce the strain on jurors at trial should be made. As flawed forensic evidence has, and will continue to be introduced in court, the potential benefits of enabling jurors to more reliably identify and account for flaws in forensic evidence cannot be overstated (Howes & Kemp, 2017; NAS, 2009; PCAST, 2016).

In light of this, further research into the specific relationship between cognitive load and juror decision making will be crucial going forward (Kleider et al., 2012; Malavanti, 2014; McAuliff & Kovera, 2008; Van Knippenberg et al., 1999). Similarly, legal and psychological

research will require a renewed focus on how the courtroom context and criminal trial process affects information processing and decision making, and what changes could be made to address this, given that this study's findings raise questions about the effectiveness of the jury as part of the adversarial court system employed in the United States, and Australia (Brown, 2014; Edmond, 2015; Findley, 2011; Grunewald, 2013; Smith et al., 2011).

5.6 Conclusions of the Research: Is there a Problem with the Adversarial System?

Forensic science and the trial by jury are two central pillars of the current Australian criminal justice system. This is cause for some concern in light of the growing body of literature on the range of issues relating to forensic science and evidence, and the reliability and validity of juror decision making (Kassin et al., 2013; McAuliff et al., 2009; Saks et al., 2003; Smith & Bull, 2011). The increasing use of forensic science in courts has been of particular interest to researchers and academics who have recognised the significant impact of forensic evidence on judicial outcomes (Found & Edmond, 2012; Dror et al., 2006; Risinger et al., 2002). The National Academy of Sciences (NAS) (2009) report is a prominent example of the efforts being made to improve forensic science as a whole, yet also raises questions and concerns regarding the current and future role of forensic evidence in courtrooms.

Forensic science disciplines have made an invaluable contribution to law enforcement (Dror et al., 2006; NAS, 2009). However, flawed forensic science analyses have also contributed to wrongful convictions (NAS, 2009). Authors of the NAS (2009) report attribute these faulty analyses to a number of factors. One such factor relates to the increasingly broad number of forensic science disciplines, and how disparities between well established and newly emerging disciplines cause issues for standardising practices and funding, particularly when different areas of forensic evidence involve vastly different methods and materials (NAS, 2009). This extends to issues relating to certification and accreditation, as these are often not mandatory for a forensic

scientist to operate, or a forensic laboratory to be run. Another significant source of frustration for critics of the forensic sciences relates to issues arising from how forensic evidence is analysed and interpreted, both in laboratories and in court (NAS, 2009).

Forensic science is commonly used in courtrooms to match a sample, in the form of evidence, against a target sample, usually the defendant's fingerprint, hair, or DNA (Edmond et al., 2013; Goodman-Delahunty & Hewson, 2010; NAS, 2009; Saks et al., 2003). However, no forensic method has been shown to consistently and reliably demonstrate such a comparison, the demonstration of which generally relies on a human element in the form of an expert's interpretation (NAS, 2009; Saks et al., 2003). The lack of standardised tools, methods, and measures, and the reliance on a central human component across a number of prominent forensic disciplines present serious problems which need to be addressed (Dror et al., 2006; NAS, 2009; Wells et al., 2013). The PCAST (2016) report found that attempts to improve the state of forensic science have not been successful.

The PCAST (2016) report's aim was to evaluate current forensic methods in order to establish whether they were supported by scientific standards, and to address the need for clarity relating to these standards for the validity and reliability of forensic methods. First, seven feature-comparison methods were evaluated for scientific validity. Though supportive of forensic science and methods involving DNA testing, the report outlined the fallibility of other common forensic disciplines (PCAST, 2016). In particular, bite-mark analyses, fingerprint analyses, and even firearms analyses were found to be highly questionable forensic disciplines prone to effects of confirmation and contextual biases, inadequate proficiency testing, and generally subjective evaluations of evidence, significantly limiting the reliability and validity of findings stemming from such disciplines by scientific standards (PCAST, 2016). Another significant issue that has

not been addressed is the misrepresentation of forensic science and evidence in courts (PCAST, 2016).

The PCAST (2016) report's review of literature demonstrated that expert witnesses consistently overstate the probative value of evidence they present, beyond the scope of what relevant science could justify. These include numerous statements of certainty and error rates not scientifically defensible. An example provided in the report comes from data taken from the Department of Justice (DOJ) and the FBI, who reviewed more than 3,000 criminal cases involving hair analysis evidence and testimony conducted and provided by forensic experts employed by the FBI. According to results released in 2015, FBI examiners had provided misleading and scientifically invalid testimony in more than 95% of cases where that evidence was used to convict the defendant (PCAST, 2016). The report provides a number of recommendations echoing those of the NAS (2009) report, almost all of which are aimed at improving laboratory procedures and forensic disciplines through greater adherence to scientific standards (PCAST, 2016). In contrast, little feedback is provided in relation to how issues associated with forensic evidence ought to be addressed, with all recommendations placing greater expectations on judges to play the role of gatekeepers by determining whether forensic evidence is sufficiently reliable and valid to be admitted into court. However, previous research on the subject has found this to be ineffective in preventing flawed evidence from being introduced in court (Gatowski et al., 2001; Kovera & McAuliff, 2000; McAuliff et al., 2009). The PCAST (2016) report stresses the range of ongoing issues with forensic science and evidence, yet fails to address the role of jurors in identifying and questioning of weak or invalid forensic evidence. This is particularly noteworthy given the literature indicating the prevalence of such evidence in courts, and this thesis' findings on jurors' inability to recognise and evaluate flawed forensic science (Daftary-Kapur et al., 2010; Edmond, 2015; Goodman-Delahunty & Hewson, 2010; McAuliff et al., 2009).

Previous literature has found jurors to be prone to erroneous decision making (Kovera & Levett, 2015; Lieberman, 2002; McAuliff & Kovera, 2008). Studies have found that mock jurors are influenced by extraneous information such as demographic characteristics of victim and the defendant, and descriptions of a crime not relevant to a case (Kleider et al., 2012; Levinson, 2007; McQuiston-Surrett & Saks, 2009; Pozzulo et al., 2010). Jurors also overestimate their understanding of forensic and other evidence (McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009; Smith et al., 2011). Furthermore, emotional arousal has been linked to heuristic processing of forensic evidence and testimony, resulting in jurors' overestimation of evidence strength (Edmond, 2015; Edwards & Bryan, 1997; Krauss et al., 2004; Lieberman, 2002; Wiener et al., 2006). Though supplementary materials have been proposed to improve juror comprehension, information processing, and decision making, the scarce literature on the efficacy of these materials suggests that they have little to no impact, with Smith & Bull (2012) even proposing that supplementary reports impede jurors' rational evaluation of forensic evidence (Shaw & Skolnick, 1995; Simmonsen, 2012). This thesis' research has echoed and reinforced these previous findings, particularly with regard to jurors' emotional processing of forensic evidence and testimony, and the ineffectiveness of supplementary materials (Lieberman, 2002; McAuliff et al., 2009; Smith et al., 2011). Furthermore, this thesis' study outcomes have strongly supported the concept of jurors processing information rationally or emotionally, and that the accuracy and reliability of jurors' information processing and decision making outcomes is influenced by the information processing mode they employ (Chaiken, 1980, 1987; Epstein, 2003; Lieberman, 2002; McAuliff et al., 2009). Findings also indicate that cognitive load, which has scarcely been examined in the context of jurors' processing of forensic evidence and testimony, may explain juror decision making, and that reducing jurors' cognitive load could be key to regulating their use of emotional and heuristic over rational information processing (Kleider et al., 2012;

Levinson, 2007; Sweller, 1994). This raises questions concerning the effectiveness of current jury performance evaluation methods.

The subject of jury competence is not new to legal scholars. Yet an underdeveloped body of evidence concerning jurors' interpretation of forensic science and bias highlights a gap in jury performance literature. Judge-jury agreement is often cited as an indicator of jury competence (Eisenberg et al., 2005). Eisenberg et al. (2005) examined data from 382 court cases and found jurors to be significantly more likely to disagree with a judge's decision to convict than with a judge's decision to acquit. Local variation in judge-jury agreement rates was found to be high, with some data collection sites reporting remarkably low agreement rates of just over 60%, while others reported high rates verging on 90%. While Eisenberg et al. (2005) suggest perceived evidentiary strength as a contributing factor to judge-jury disagreement, a relationship between perceived evidentiary strength and evidence type is not explored. Furthermore, previous research has shown judges to lack the prerequisite knowledge to determine the reliability of forensic evidence, undermining the presumption of judge-jury agreement as an indicator of jury competence in cases involving forensic science (Kovera & Levett, 2015; McAuliff et al., 2009; PCAST, 2016). While Hans and Vidmar (2008) found jurors to generally be sound decision makers, authors also noted a number of vulnerabilities associated with the jury system, including bias in decision making, jurors' well documented difficulties following legal instructions, and concerns relating to the interpretation of complex evidence. In light of this it is clear that jury performance evaluation methods may also require revisiting as the growing complexity of modern trials presents challenges to jurors not accounted for by traditional evaluation methods (Eisenberg et al., 2005; Hans & Eisenberg, 2011; Hans & Vidmar, 2008).

Further research to corroborate and build on this thesis' discoveries will play an important role in developing the currently limited body of knowledge relating to how jurors process

information, and provide invaluable insights into how jurors' evaluations of forensic evidence and testimony may be improved. In addition to work already being conducted to strengthen forensic laboratory procedures, such findings will be critical to ensuring the integrity of the jury-based justice systems going forward.

Notable publications such as the NAS (2009) review and the PCAST (2016) report on forensic science have continued to push for reform in laboratories while neglecting the potential benefit of addressing jurors' comprehensive of forensic evidence. It is therefore concerning, although not unexpected, that wrongful convictions due to weak or flawed forensic evidence still occur. Calls to explore alternative approaches, such as revisiting fundamental aspects of the adversarial system, compared to the increasingly popular, well reputed, and more and more widely adopted inquisitorial system, have been on the rise (DeBarba, 2002; Findley, 2011; Grunewald, 2013; Hodgson, 2010).

In a justice system using the adversarial process, the two parties involved in the case, generally the accuser and accused, are responsible for any investigations, as well as selection and presentation of evidence (DeBarba, 2002; Edmond & Vuille, 2014; Grunewald, 2013). This evidence is presented orally at a trial to an impartial judge, and a lay jury tasked with the role of weighing up strengths and weaknesses of evidence before rendering a verdict at the conclusion of the trial (DeBarba, 2002; Grunewald, 2013). One of the most significant and well documented issues with the adversarial system is the imbalance between the two parties in terms of resources (Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). Most accused individuals have legal representation, and are otherwise provided legal counsel (Grunewald, 2013; Hodgson, 2010). On the other hand the role of accusation is generally passed onto police, and relevant legal bodies, with far greater investigative and legal resources than most accused parties can financially or

otherwise compete with (Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013; Hodgson, 2010). Another glaring problem with the adversarial system stems from its namesake.

Despite technological advances, improvements in ethical guidelines, and adoption of changes in legal procedures, the adversarial process has continued to focus on two opposing parties competing with one another to win over the jury, rather than discover the truth (Boudreau & McCubbins, 2008; Edmond & Vuille, 2014; Grunewald, 2013). The negative effects of this process, including the coaching of witnesses, distortion of information and the way it is presented in court, manipulation of fact finders including forensic experts and jurors, and tampering of evidence, have been extensively documented (Brown, 2014; Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). In conjunction with the growing body of literature on the pitfalls of forensic science and evidence, and jurors' use of information presented in court when making their decisions, the adversarial system seems an increasingly poor choice in the search for truth and justice (Brown, 2014; Grunewald, 2013; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). The inquisitorial system, while not without fault, addresses a number of these concerns.

In contrast to the adversarial system, the inquisitorial approach places greater emphasis on pre-trial proceedings and investigations than the trial itself (Brown, 2014; Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). Furthermore, contrary to the two parties in question being responsible for any investigations, collection and presentation of evidence, and representation in court, the inquisitorial system assigns these responsibilities to a neutral element, generally a judge or high ranking officer of the law (Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). This neutral figure is in charge of any and all investigations, evidence collection and analysis, and trial procedures, where a judge or panel of judges are expected to take a more proactive role in evidence presentation and cross-examination of experts and witnesses (Brown, 2014; Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). All

evidence is converted to a written form, and the resulting dossier is available in full to all parties involved (Grunewald, 2013). In some instances, the role of jurors is minimal, as they provide an insight into lay peoples' interpretations of evidence, without determining the outcome of the trial (Findley, 2011; Grunewald, 2013). In other instances juries are altogether disregarded (Grunewald, 2013). The use of a neutral figure in charge of all aspects of investigative and trial proceedings addresses many issues related to human error, bias, and related problems arising from the competition inherent in investigations and trials using the adversarial systems (Brown, 2014; Daftary-Kapur et al., 2010; Grunewald, 2013). Literature on judge and juror decision making has also indicated that judges are significantly more conservative in their estimations of guilt, and the strength of particular evidence, as well as their own understanding of evidence (McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009; Simmonsen, 2012). In light of this, and the increasingly broad body of literature highlighting flaws associated with using jurors in modern criminal trials, the inquisitorial system's focus on a more substantive role of judges in investigations, at trial, and in the final outcome, represents a viable alternative to critics of the adversarial system's dependence on lay jurors (Boudreau & McCubbins, 2008; Brown, 2014; Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). The inquisitorial system is however not without its flaws.

Despite its reputation, the inquisitorial system has recently come under scrutiny in Germany after a number of wrongful convictions came to light (Grunewald, 2013). While one such conviction came as a result of false accusations in a sexual assault case without physical evidence, other instances of wrongful convictions were due to issues common to wrongful convictions in the adversarial system, such as flawed or weak forensic evidence, unprofessional and unreliable police work, and coerced as well as false confessions (Brown, 2014; Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). In contrast, false or inaccurate eyewitness identifications have not factored into wrongful convictions, and exonerations have not yet been

based on DNA (Grunewald, 2013). This suggests that the inquisitorial system is more robust than the adversarial system, yet faces similar limitations, such as institutional tunnel vision on the part of investigators and legal practitioners (Brown, 2014; Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). This points to entrenched cultural and systemic issues relating to investigative and legal beliefs and practices, while also highlighting ongoing challenges associated with the increasingly prevalent use of forensic science and evidence (Boudreau & McCubbins, 2008; Edmond & Vuille, 2014; Grunewald, 2013; Hodgson, 2010). Yet the focus on pre-trial investigations with less emphasis on trial proceedings, and the use of smaller juries with less influence over the final outcome, or no juries at all, has evidently reduced, and in some instances entirely eliminated issues that come from an adversarial system where opposing parties are primarily driven by the need to convince a panel of lay jurors of their version of events, rather than seeking out the truth (Brown, 2014; Edmond & Vuille, 2014; Findley, 2011; Grunewald, 2013). In light of this, as well as the growing body of literature on juror decision making, and this thesis' research findings, several recommendations present themselves.

5.7 Recommendations for Future Research

Forensic science has become an integral part of modern law enforcement and legal procedure (Edmond, 2013; Edmond et al., 2016; Giannelli, 2010; Goodman-Delahunty & Hewson, 2010; NAS, 209; PCAST, 2016). Despite increasingly broad recognition of issues and shortcoming associated with the use of forensic evidence, it is likely to only gain greater influence as cases become more complex, and advances in science enable investigators to recover information and evidence not previously considered (Edmond et al., 2016; Freitag & Found, 2017; NAS, 2009; PCAST, 2016). The NAS (2009) and PCAST (2016) reports have made significant contributions in their summaries of past and current research on the range of factors influencing the reliability and validity of forensic evidence collection, analysis, and presentation. Though some of the recommendations made in the NAS (2009) and PCAST (2016) reports have

been adopted, forensic science and evidence has come under further scrutiny as past miscarriages of justice related to flawed forensic evidence have come to light (Giannelli, 2010; NAS, 2009; Page et al., 2012; PCAST, 2016; Wells et al., 2013). Fortunately the body of research addressing problems with forensic science laboratory procedures has continued to develop, with an increasing number of publications proposing clear models for appropriate procedural changes within forensic organisations to curb human error rates, including effects of forensic bias (Freitag & Found, 2017; Howes, 2015; Howes & Kemp, 2017; Newman et al., 2011; PCAST, 2016; Smit et al., 2016). Yet the same cannot be said for research into the link between forensic evidence and juror decision making, as researchers have sought to address human error in forensic laboratories as a root cause, rather than attempt to counteract the effects of flawed evidence entering courtrooms (Freitag & Found, 2017; Howes & Kemp, 2017; PCAST, 2016).

Unreliable forensic evidence continues to enter courtrooms and influence judicial outcomes (Giannelli, 2010; PCAST, 2016; Wells et al., 2013). Though judges have been assigned the unofficial role of gatekeepers, research shows that judges lack the prerequisite knowledge to consistently determine what scientific evidence should be admitted to court (Gatowski et al., 2001; Kovera & Levett, 2015; McAuliff et al., 2009; PCAST, 2016). There have been calls to revise the adversarial system currently employed in Australia and the United States, in order to address investigative issues such as evidence collection and analysis, and problems arising from the presentation of flawed evidence to jurors in court (DeBarba, 2002; Edmond & Vuille, 2014; Grunewald, 2013). Realistically however, such an overhaul of long-standing and socio-culturally ingrained legal practices and procedures is unlikely (DeBarba, 2002; Edmond & Vuille, 2014; Grunewald, 2013). Edmond and Vuille (2014) argue that issues relating to forensic evidence and testimony are present in adversarial and non-adversarial systems, and that steps required to address these are system-specific. As mitigating effects of flawed forensic evidence on judicial outcomes is therefore not simply a case of adopting a non-adversarial system, further research

on how to address effects of bias and human error on evidence presented to jurors, and how jurors interpret such evidence, is vital (Edmond & Vuille, 2014; Howes, 2015; Howes & Kemp, 2017; PCAST, 2016). One factor that may be key to identifying why some jurors process scientific information better than others, and how that gap may be bridged, is scientific literacy (Edmond, 2015; Howes & Kemp, 2017).

5.7.1 The Probative Value of Scientific Literacy

Academics and scholars across legal and psychological domains have, throughout past and current research on the miscommunication of forensic evidence, cited scientific literacy as a potentially noteworthy predictor of forensic evidence comprehension (Edmond, 2015; McAuliff & Kovera, 2008; McAuliff et al., 2009; NAS, 2009; PCAST, 2016; Wheate, 2010). This thesis' findings appear to support this, as jurors with greater scientific literacy reported a lower confidence in the forensic evidence and expert in the thesis' second study. A number of past studies have directly investigated jurors' ability to recognise flaws in scientific evidence, without examining potential differences between participants with low and high scientific literacy (McAuliff & Kovera, 2008; McAuliff et al., 2009). The NAS (2009) and PCAST (2016) reports have also recommended improvement of scientific literacy, albeit with a focus on educating judicial elements such as law enforcement, rather than members of a jury. Efforts to 'educate' jurors have instead resulted in research aiming to determine the prevalence and effects of the CSI effect on juror decision making, and whether dispelling myths about the effectiveness of forensic evidence could counteract the supposed damage done by popular film and television falsely depicting forensic science (Hawkins & Scherr, 2017; Shelton, 2010; Wheate, 2010). This direction however does not address the underlying issue of low scientific literacy in the western world (Howes, 2015; Howes & Kemp, 2017).

The NAS (2009) and PCAST (2016) reports have pointed to inadequate training and education of forensic experts, and members of the legal community and called for more stringent requirements, including the development of more comprehensive education and training programs. Unfortunately, similar recommendations for the general improvement of scientific literacy is likely unreasonable, as the restructuring of Australian secondary education curricula is a challenge that the current Australian Government is already facing (Masters, 2016; Treagust et al., 2015). A call for further research into the role of scientific literacy in the context of forensic science, forensic bias, and juror decision making is warranted, as findings on this subject may provide invaluable evidence in support of revisions to jury selection processes, and possibly even aforementioned changes to education curricula in order to improve the basic scientific knowledge of everyday Australians (Edmond & Vuille, 2014; Howes, 2015; Howes & Kemp, 2017; McAuliff et al., 2009; PCAST, 2016). Another area that warrants greater investigation is that of cognitive processes underlying juror decision making.

5.7.2 How Do Jurors Think? Cognitive Load and Cognitive Experiential Self-Theory

Despite their lack of focus on the subject, the NAS (2009) and PCAST (2016) report make it clear that juror decision making in the context of forensic evidence are a cause for concern. There is a growing disparity between resources committed to research for improving forensic procedures, and research done to determine how to improve juror understanding of evidence in court. This is troubling due to questionable and flawed forensic evidence continuing to enter courts, where it has been found to noticeably influence judicial outcomes (Giannelli, 2010; NAS, 2009; Page et al., 2012; PCAST, 2016; Wells et al., 2013). It is clear that investigations into juror behaviour, including jurors' use of scientific evidence when determining guilt in criminal trials, have greater merit than thus far attributed to them (Edmond, 2015; Hawkins & Scherr, 2017; Kleider et al., 2012). As highlighted by this thesis' findings, one promising direction for juror information processing and decision making research concerns the

underlying cognitive processes directing juror decision making outcomes (Kovera & Levett, 2015; Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009).

The question of how jurors process the information they encounter has been at the heart of juror behaviour research since it began nearly half a century ago (Diamond & Zeisel, 1975; Thomas & Hogue, 1976; Stone, 1969). Yet there have been few significant developments despite dramatic changes in the psychological literature and research relating to how people reason, including the prominent role of heuristics (Chaiken, 1987; Daftary-Kapur et al., 2010; Edmond, 2013; Edwards & Bryan, 1997; Epstein, 2003; Goodman-Delahunty & Hewson, 2010; Lieberman, 2002; Toplak et al., 2014). Research conducted as part of this thesis indicates a need for the commitment of greater resources toward investigations into how jurors process information, and how an understanding of these processes may enable the legal community to enhance juror comprehension and decision making (Goodman-Delahunty & Hewson, 2010; Kovera & Levett, 2015; Lecci & Meyers, 2009; McAuliff & Kovera, 2008; McAuliff et al., 2009). As conducted in this thesis, the review of past and current literature should play a crucial role in informing approaches taken to investigating juror decision making, as some models and paradigms have not aged well, despite still being used by psychologist and legal scholars to explain juror behaviour (Edmond, 2013, 2015; Edmond et al., 2016; Kovera & Levett, 2015; Wiener et al., 2006).

This thesis' findings corroborate previous researchers' conclusions about the merits of using dual processing models of information processing to investigate how jurors evaluate and act on forensic evidence (Kleider et al., 2012; Krauss et al., 2004; Levinson, 2007; Lieberman, 2002; McAuliff & Kovera, 2008; McAuliff et al., 2009; Smith et al., 2011). A renewed focus and directing of efforts toward ensuring that this area of research continues to be developed is critical to informing future legal theory and practice. Similarly, further research into the cognitive

underpinnings of forensic expert, law enforcement, and juror behaviour using methods traditionally reserved for clinical and social psychology research should be promoted, and is likely to yield insights with practical applications for improving the reliability of law administration practices (Busey & Loftus, 2007; Costanzo, 2013; Dror et al., 2006; Giannelli, 2007, 2010; Kassin et al., 2013; Kleider et al., 2012; Lieberman, 2002; McQuiston-Surrett & Saks, 2009; PCAST, 2016; Wells et al., 2013). Such enquiries would also likely support existing efforts to improve jurors' comprehension of forensic evidence, such as Found and Edmond's (2012) forensic report format. This thesis' research outcomes indicate that the format does not improve juror decision making. However, a better understanding of cognitive processes underpinning juror information processing could in future enable experts to adapt the report format to suit specific audiences. To that end, determining the effectiveness of Found and Edmond's (2012) forensic report format in improving comprehension of evidence by target audiences such as opposing or court-appointed experts, and other members of the judiciary, is recommended.

It is clear from the literature that juror decision making is not well understood, and that this, in conjunction with flawed forensic evidence, has led to wrongful convictions (Daftary-Kapur et al., 2010; McAuliff & Kovera, 2008; McAuliff et al., 2009; Simmonsen, 2012). Truly committing to delving into the minds of jurors may very well be the key to making significant strides toward improving the juror-based justice system (Daftary-Kapur et al., 2010; Edmond, 2015; Howes, 2015; Kovera & Levett, 2015; McAuliff et al., 2009; Simmonsen, 2012).

5.8 Summary

Forensic science has become inseparable from contemporary legal proceedings, and will likely only grow in relevance as investigators and court officials come to increasingly rely on evidence that can be ascribed a degree of scientific certainty (Edmond, 2015; Howes & Kemp,

2017; Kassin et al., 2013; PCAST, 2016). Research, and publications such as the NAS (2009) and PCAST (2016) reports have established that forensic science is considerably less reliable than generally perceived, and that steps should be taken to ensure that the confidence of law enforcement, judges, and jurors in forensic evidence is not misplaced (Dror et al., 2006; Edmond et al., 2016; Edmond et al., 2013; Giannelli, 2010; Howes & Kemp, 2017; Kassin et al., 2013; Wells et al., 2013). One immediate focus of research should be to investigate how jurors use forensic evidence in their decision making to achieve practical outcomes for improving the integrity of the justice system (Gatowski et al., 2001; Howes, 2015; Howes & Kemp, 2017; McAuliff et al., 2009; NAS, 2009; PCAST, 2016). As this thesis has time and again highlighted, current knowledge of how jurors process information and make decisions is extremely scarce (Daftary-Kapur et al., 2010; Goodman-Delahunty & Hewson, 2010; Hawkins & Scherr, 2017; Kovera & Levett, 2015; Magnussen et al., 2014; McAuliff & Kovera, 2008; McAuliff et al., 2009; McQuiston-Surrett & Saks, 2009). Many conclusions drawn about the behaviour of modern jurors are based on outdated or limited literature, and investigations using more contemporary psychological theories of cognition, information processing, decision making, and behaviour will be crucial to improving the current body of knowledge (Costanzo, 2013; Daftary-Kapur et al., 2010; Edmond, 2015; Edwards & Bryan, 1997; Goodman-Delahunty & Hewson, 2010; Halverson et al., 1997; Kovera & Levett, 2015; Lieberman, 2002; McAuliff et al., 2009; Shaw & Skolnick, 1995). Most importantly, renewed efforts to improve understanding of how jurors make decisions, in conjunction with ongoing research into how forensic biases may be addressed in forensic laboratories, have the potential to greatly improve general confidence in the legal system, strengthen the quality of forensic evidence admitted to and presented in courts, and dramatically increase the reliability and validity of juror verdicts in a world where forensic evidence will more frequently than ever before be the difference between guilt and innocence.

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Please read the following transcript in its entirety. All characters and details of this case are fictitious. Any resemblance to real persons, living or dead, and real events, is purely coincidental. You may take notes if you wish. If you have any questions please do not hesitate to ask the supervising researcher.

Crown v Colbert

Judge: Shane Colbert, you are charged that on the 18th day of November 2012, in Rundle Mall, located in the city centre of Adelaide in the state of South Australia, you attacked Christopher Bell, causing his death, and acting with reckless indifference to human life, or with the intent to kill or inflict grievous bodily harm, contrary to section 18 of the Crimes Act. Shane Colbert, how do you plead?

Accused: Not guilty, your Honour.

Judge: Members of the jury, Shane Colbert has been charged with murder. The prosecution will begin the trial by outlining their case against Mr Colbert and summarising the evidence of their witnesses. The defence will also outline their case in an opening statement. The standard of proof in a criminal trial is 'beyond reasonable doubt'. Therefore, it is the Crown who carries the burden of proof and the responsibility for proving the charge against the accused. If, by the end of the evidence, you decide that the Crown has not discharged this burden, you must find the accused not guilty. If you are convinced that the Crown has discharged this burden, you must find the accused guilty as charged. In this trial, you may not ask questions and the evidence cannot be replayed for you. You may take notes during the trial, however, you are not required to do so and your notes must not take the place of the evidence. The evidence is what you hear from the witnesses, not necessarily what you have recorded in your notes. Please do not make any decisions until you have heard all of the evidence in this case. At the end of the trial you will be asked to deliberate. You must draw conclusions that are based on the facts alone. We will now hear an opening statement from the Crown.

Prosecutor: The Crown alleges that on the 18th of November 2012, between the hours of 1 am and 2 am, Shane Colbert and Jessica Chamberlain approached Mr Christopher Bell outside the Hotel Richmond, located within Rundle Mall, with Shane Colbert intending to recklessly or deliberately inflict grievous bodily harm, or to kill Mr Bell.

Christopher Bell used to have a relationship with Jessica Chamberlain, who is now engaged to the accused. Mr Bell and Jessica Chamberlain lived together and had a sexual relationship. Six months after Jessica Chamberlain separated from Mr James, she became engaged to the accused. Mr Bell carried on his life as a successful car sales man. We allege that Jessica Chamberlain had told the accused that Mr Bell was a violent man, abusive, a heavy drinker, that even after Jessica Chamberlain and the accused were engaged, Mr Bell had threatened her and constantly made threatening and abusive phone calls to her as he tried to convince her to leave the accused in order to get back together with Mr Bell. We allege that the accused was determined to 'teach Chris Bell a lesson'. We say that on the 18th of November, the accused and Jessica Chamberlain traversed Rundle Mall after having dined out at Lemongrass, on Rundle Street. As the accused and Jessica Chamberlain passed outside Hotel Richmond, we allege that Shane Colbert recognised and approached Mr Bell. After several moments of arguing, Jessica Chamberlain left the altercation, fleeing southbound through Rundle Mall, leaving behind Mr Bell and the accused. It is alleged that the accused then maliciously attacked Mr Bell with a knife, while Jessica Chamberlain waited by her car, located on Hindley Street. On the 18th of November at 2 am, Police, called by Joseph Smithers, arrived to find Chris Bell dead approximately 10 metres west of the Hotel Richmond, in Rundle Mall. There were found to be 3 stab wounds of varying severity on the body and two severe slash wounds to the throat. Mr Bell was murdered, and Shane Colbert, the accused, had the opportunity and motive to commit this crime.

Judge: We will now hear an opening statement from the defence.

Defence: Good evening. As you have just heard, the Crown has charged Shane Colbert with murder. It is true that Shane Colbert's fiancée, Jessica, used to know Chris Bell and she did have a brief relationship with him. She lived with him and she was still in some contact with Chris Bell, even after Jessica got engaged to Shane Colbert. It is true that Mr Bell was not happy about Jessica moving out and getting engaged to Shane Colbert; Chris Bell constantly called Jessica on her home phone and mobile, asking her to leave her fiancée and return to him. This does not, however, make Shane Colbert a murderer. In fact, on the night in question, Shane Colbert did not attack Mr Bell. After dining out on Rundle Street, Shane Colbert and Jessica Chamberlain passed through Rundle Mall in order to return to Jessica's car. Mr Bell recognised Jessica Chamberlain as Shane Colbert and his fiancée passed Hotel Richmond. Mr Bell then approached the couple. At no time, however, did my client, Shane Colbert, attack Chris James. Rather, he left the confrontation, leaving Jessica and Mr Bell, and proceeded to wait by Jessica's car, driving his fiancée home after she came from the confrontation.

Judge: Although you will not hear from some witnesses directly, here is a summary of some of the evidence in this case:

Prosecution Witness #1: Professor David Manderly, forensic pathologist, testified that 'there were 3 stab wounds of varying severity on the body of the victim and two severe slash wounds to the throat. The time of death is estimated at somewhere between midnight and 2am on Sunday 18th November 2012'.

The alleged murder weapon, a switch blade covered in blood, was found approximately 2 meters from Chris Bell's body. It should be noted by the jury that although Fingerprint evidence was collected and processed in this case, the results were inconclusive.

Prosecution Witness #2: Joseph Smithers, a witness to the incident testified that 'a young couple and another man were arguing outside Hotel Richmond on the night of the incident. Both parties raised their voices as the argument appeared to become more heated. A tall figure stormed off whilst the confrontation continued. Moments later, the victim was hunched over, covered in blood, before collapsing, as the culprit ran off'. Under cross-examination, Mr Smithers admitted that he could not be absolutely certain that it was Shane Colbert who ran off, as lighting conditions were poor, and the Hotel Richmond was closed. He also did not see the crime itself being committed.

Prosecution Witness #3: John Watkins testified that as he passed through Rundle Mall on the morning of November 18th, after being out drinking with friends, he spotted 'a man bleeding profusely, sitting slouched over near the Hotel Richmond' and that he recalled seeing 'a tall man rapidly pass him from the direction of the scene a minute earlier'. Under cross-examination, John Watkins admitted not having seen the man's face, and having been severely intoxicated at the time.
Judge-led

Judge: I call Dr Eleanor Scrafton, the court's pattern evidence expert. Please raise your right hand. Do you solemnly swear or affirm to tell the truth, the whole truth and nothing but the truth?
Pattern Evidence expert: I do.

Judge: Please state your full name and occupation.

Pattern Evidence expert: Dr Eleanor Scrafton. I am an independent pattern evidence expert and Director of a private forensic laboratory based in Adelaide.

Judge: Please summarise your educational qualifications and background for the jury.

Pattern Evidence expert: I studied forensic science at the University of Sydney, obtained honours and then went on to complete a PhD, in which I studied the effects of variable lighting and other conditions on the effectiveness of anthropometric facial image comparison using degraded CCTV footage or still images. I then spent five years in the United States with a private laboratory specialising in anthropometric facial comparison using still images and CCTV. I returned to Australia to establish my own laboratory, which analyses still and moving images in support of forensic investigations.

Judge: Dr Scrafton, will you please present your educational material about image comparison that you have prepared.

Pattern evidence

Image comparison and anthropometry explained

First, you will be introduced to some of the language used by scientists when discussing forensic image comparison evidence in court. Image comparison technology offers a useful tool for identifying people when no biological evidence is left at the scene of a crime, and when an image, commonly captured via CCTV, presents a clear picture of an individual's face, and ideally body shape. After pattern evidence such as the image comparison presented today in this court, there may be some disagreement about its meaning. Pattern evidence should be taken as only *one* part of all the evidence presented.

Anthropometry refers to the comparative study of sizes and proportions of the human body. It can be used in certain circumstances to compare an image of a suspect to another image showing the offender in the process of committing the crime. Whilst anthropometric comparison does not have the same success as fingerprint or DNA identification, it is sometimes the only evidence, and is more and more frequently used in today's courts.

Anthropometry is applied on the basis of a number of important ideas. Firstly, the state and condition of bones, bone and facial structure remains largely fixed after an individual is fully grown. Whilst this indicates that anthropometry is not very accurate in cases of comparing images of young people, assuming time has passed between the capturing of the images, it does imply that facial structure stays permanent in adults barring significant injury or surgery. Secondly, there are is an extreme diversity with regard to skeletal structure, predominantly in terms of spatial dimensions present in an individual as well as their face. The permanence coupled with the extreme diversity present within facial bone structures, in terms of the range of scales of sizes and dimension, ensures that one's face, in terms of facial structure, is almost as unique as a fingerprint. Finally, anthropometric measurement is relatively simple, theoretically mitigating the threat of human or technical error.

How is an anthropometric comparison conducted?

The forensic examiner is provided with CCTV or another form of footage, or a still image from such footage. The next stage involves the mapping out of facial landmarks, and noting of prominent features. The forensic examiner then identifies and conducts a significant number of linear measurements, determining distances between different landmarks identified within the image from CCTV footage. In cases of no suspect, a facial image database may be employed to try and find a

specific match, or alternatively a range of possible matches, from which the forensic examiner would select the most accurate image. In cases where there is a suspect, the forensic expert repeats the process of identifying landmarks and features, as well as mapping out linear distances between them. This then allows the forensic investigator to compare the proportions, locations of landmarks and features, and correlations of linear measurements in one image to the other in order to determine whether the individual pictured in the picture from CCTV or other footage is the same as the suspect.

Facial comparison and the law

The use of pattern evidence comparison with emphasis on facial image comparisons is not particularly new, albeit not as old as fingerprint comparison evidence. Identification from photographs or CCTV footage is predominantly used in today's courts in the United States, the United Kingdom, and also Australia. Whilst not as accurate as DNA or fingerprinting, facial image comparison is nonetheless frequently used in a society where video and other image capturing technology plays an increasingly vital part in preventing, as well as recording crime, presenting a vital avenue for the justice system.

Problems with Facial comparison evidence

There are a number of factors to consider when scrutinizing facial image comparison. The quality of the footage can have a considerable effect on the reliability and accuracy of any subsequent analysis and comparison. Furthermore, any image captured via CCTV or any other device is inevitably affected by a wide range of factors including lighting, focal plane, distance to and between objects, the angle at which footage was captured, and how footage from CCTV translates into digital formats used during analysis. Distance from the incident or culprit may also make anthropometric comparison difficult, if not impossible. Whilst a number of image enhancement techniques may serve to mitigate the effects of such factors, they may also exacerbate any initial problems with the image, or may cause further distortions. That being said, the technology is improving every day, and whilst some images are of questionable quality, those used in forensic evidence comparison and admitted to forensic courts are generally deemed relatively reliable.

Judge-led

Judge: The parties may now examine the witness. The Crown may proceed.

Prosecutor: Dr Scrafton, can you tell me what anthropometric comparison revealed in this case?

Pattern Evidence expert: In this case, I was provided with a photograph of the suspect, which I analysed using anthropometric techniques, identifying facial landmarks, linear measurements, and several proportions. I was also provided by police investigators with an image from a CCTV camera located outside the Hotel Richmond, where the incident occurred. Anthropometric analysis and subsequent comparison indicated a very significant degree of similarity between the defendant and the image from the CCTV footage. Therefore, I cannot rule out Mr Colbert as a possible source of the recovered crime scene sample.

Images used in comparison:

Prosecutor: Can you positively identify the accused, Shane Colbert, as the person present in the image captured via CCTV outside of the Richmond Hotel?

Pattern Evidence expert: No. At most I can estimate a very high likelihood that the individual in the picture is in fact the culprit, and it is my professional opinion that it is highly likely. There is of course always possibility that someone with a very similar facial structure may be the person in the footage, however in light of other evidence, I deem it unlikely. Furthermore, the anthropometric comparison, as presented to the court, speaks for itself, I feel.

Prosecutor: Dr Scrafton, have you consulted on a criminal case before, one involving facial image comparison?

Pattern Evidence expert: I personally have done so many times, and my laboratory is regularly consulted on such matters.

Prosecutor: Have you ever used anthropometric comparison and been found to have committed an error?

Pattern Evidence expert: No.

Prosecutor: Thank you, Dr. Scrafton.

Judge: Are there any questions in cross-examination from the defence?

Defence: Yes, your Honour. Dr Scrafton, you stated before that there is always the possibility of a coincidental match. So in this case, is it true, that an individual other than Shane Colbert may have been captured by the footage?

Pattern Evidence Expert: It is possible.

Defence: And isn't it true that the image used in the comparison presented to the court is only considered to be of moderate image quality, and that factors such as lighting conditions, restricted to lights from the Richmond Hotel, and the angle of the shot may have influenced the image sufficiently to make the render the comparison questionable?

Pattern Evidence Expert: No, that is not the case. Whilst the image is certainly not of as high a quality as it could be, images considered of moderate to low quality are frequently presented as evidence, and as part of anthropometric comparison, with high rates of accuracy. Also, whilst lighting and other factors certainly influence how an image appears, considerations are made for such factors, and an examiner's experience and expertise generally serves to overcome such issues.

Defence: Dr. Scrafton, would you agree that human error can occur in anthropometric comparison?

Pattern Evidence expert: Yes, that is possible, though forensic experts are trained, hopefully sufficiently to overcome this.

Defence: Doctor, would you say that facial profiling is a failsafe procedure?

Pattern Evidence expert: In facial profiling, there is always some risk of human or technical error. It cannot be absolutely ruled out that a mistake may occur in the process of facial comparison, either by relying on degraded images, insufficient analysis and comparison, or relying on inexperience. However, forensic laboratories are accredited and all of the scientists are trained to ensure that the chance of that happening is minimised.

Defence: Another question, Doctor. Is it not true that you were aware of some details of the case before conducting your analysis? And were you not aware that police had a suspect in custody, as well as spoken to persons of interest that had reported seeing the crime occur? And that fingerprints had also been lifted from the crime scene?

Pattern Evidence expert: Yes, it is true that I was aware of details of the police investigation, and of the fact that police had a suspect in custody, and was evidently provided with a photograph for analysis. However this information can help by providing information on the conditions in which footage was recorded, and what factors to consider during analysis.

Defence: Yes, thank you Dr Scrafton.

Judge: Although you will not hear from them tonight, other witnesses in the case gave the following evidence:

Defence witness #1: Shane Colbert, the accused, testified that he 'went out for dinner on Rundle Street on the evening of the 17th November', and then walked down Rundle Mall with his fiancée around 1 am on the 18th November. He further testified that a confrontation occurred between Jessica Chamberlain and Chris Bell, and that he left this confrontation, waiting by the car for his fiancée, before driving them home. Under cross-examination, Mr Colbert 'could not estimate the time that he arrived at the car or how long he waited for Jessica Chamberlain.

Defence witness #2: Jessica Chamberlain. Jessica testified that on the night of the 18th of November, she and her fiancé walked down Rundle Mall after having gone out for dinner at Lemongrass, on Rundle Street. She stated that Chris Bell approached the couple as they passed Hotel Richmond, and started an argument, but that the couple did not maintain the conversation, and that Shane Colbert first left to go wait by the car, and that Jessica left when Chris Bell became abusive. During cross-examination she admitted that she could not remember who drove the car on the way home.

Judge: Members of the jury, you have now heard all the relevant and material facts in this case. Now it is my obligation to instruct you on the law, after which you will deliberate and arrive at a verdict. The defendant has been charged with one count of murder.

In this case, Dr Eleanor Scrafton was called as an expert witness. The expert evidence is before you as part of all the evidence to assist you in understanding the facial comparison evidence presented. You should bear in mind that if, having given the matter careful consideration, you do not accept the evidence of the expert, you do not have to act upon it.

Bear in mind that in the Australian legal system, a defendant is presumed innocent and that the burden is on the prosecution to convince you beyond a reasonable doubt that the defendant, Shane Colbert, committed the crime.

The onus is on the Crown to prove that the accused is guilty of murder and that burden never leaves it. It never becomes the responsibility of the accused to prove that he is not guilty or, in this case, to prove that someone else committed the murder. Before you convict you must be satisfied *beyond a reasonable doubt*. If there is a reasonable doubt as to the accused's guilt, then the accused is entitled to the benefit of that doubt. That does not mean that you must be satisfied beyond any doubt whatever, if, indeed you can ever be satisfied of anything to that extent. The accused is not entitled to the benefit of any whimsical, fanciful, or far-fetched doubt which an agile mind might conjure up. Being satisfied beyond reasonable doubt means this—if you regard it as a reasonable possibility that someone else murdered Chris Bell, then the accused must be acquitted. If you consider this possibility so insubstantial and so remote that no reasonable person would take it into account for a moment, then you are satisfied beyond reasonable doubt and the accused must be found guilty. You must now decide whether or not the defendant, Shane Colbert, is guilty as charged.

Crown v Colbert, November 2012

Executive Summary

Shane Colbert has been charged that on the 18th day of November 2012, he attacked Cristopher Bell, causing his death. A member of the South Australia Forensics Laboratory (SAFL) conducted an analysis and examination relating to this matter.

Exhibit(s) submitted for examination:

Item 1 – One still image picturing the face of the individual who inflicted fatal stab wounds upon the victim , low to moderate quality, captured using CCTV, provided by the SAPOL investigative team assigned to the case.

Item 2 – Still image of suspect, provided by the SAPOL investigative team assigned to the case.

Origin of exhibit(s):

Item 1 – The provided still image was captured and taken from CCTV footage recorded by a camera located outside the Hotel Richmond, on the night and at the time of the incident. The footage indicates that the person pictured in the still image caused the death of the victim, Cristopher Bell.

Item 2 – The image of the suspect was provided to the forensic examiner at the same time as the CCTV footage, by the head detective on the SAPOL investigative team assigned to the case. No other images were provided.

Statement of chain of custody of exhibits:

1. Jeff Backers, authorised representative of SAPOL, took possession of item 1 on the 19th of November 2012, and retained custody of item 1, securely stored at SAPOL headquarters in accordance with South Australia Police Property Management Practices, until forwarded to Dr. Eleanor Scrafton for analysis.
2. Dr. Eleanor Scrafton, Director of South Australia Forensic Laboratory, took custody of item 1 and item 2 on the 1st of December, 2012, for the purposes of forensic analysis. When not being analysed, exhibits were safely stored at the SA Forensics Laboratory.
3. Custody of exhibits was given to Jennifer Haighes, forensic evidence management at SAPOL, upon completion of analysis by Dr. Scrafton. Exhibits have been stored at SAPOL headquarters, and not been accessed since having been submitted to Jennifer Haighes.

Information that the examiner was provided with:

Before conducting a forensic analysis, the forensic examiner was informed of details of the case, including time, date, and location, and the source of the evidence. Dr. Scrafton was also informed that a suspect was in custody, and that eye witnesses to the incident had been approached.

Qualifications of the forensic examiner, Dr. Eleanor Scrafton:

- **Director, South Australia Forensics Laboratory, Australian Federal Police, 2010- Current**
- **Assistant Director, Western Regional Crime Laboratory, NY State Police, 2004-2009**
- **Ph.D in Forensic Science, University of Sydney, 2000-2003**
  Dissertation Title: CCTV image quality: The roles of variable lighting and spatial conditions.
- **Bachelor of Forensic Science (Honours), University of Sydney, 1999**
- **Bachelor of Science, University of Sydney, 1995-1998**

Methods and materials:

Item 1 and Item 2 were compared through the use of anthropometric comparison. Anthropometric comparison refers to the comparative study of sizes and proportions of the human body. In the case of this study, 17 (8 unilateral and 9 bilateral) landmarks were selected for inclusion of anthropometric comparison, chosen on the basis of image quality.

Procedures:

Using the selected landmarks, a total of 32 linear measurements and 22 proportions were compared. Linear measurements and facial proportions were scaled for the purposes of comparison.

Results:

It was found that 28 of the 32 linear measurements were significantly correlated (p <0.05) within acceptable margins of error ($\pm$ 2mm). 15 of 22 proportions were also found to significantly correlate. Comparisons of 3 linear measurements and 5 proportions were deemed inconclusive.

Conclusions:

The comparison conducted by Dr. Eleanor Scrafton was between a still image from CCTV footage and a suspect target image provided by SAPOL. Anthropometric comparison was used to compare faces pictured in items provided. Based on anthropometric comparison, the individual pictured in item 1 shares a very high resemblance to the suspect, pictured in item 2. The moderate to low image quality reduced the number of viable linear measurements and proportions used for comparison. Dr. Scrafton was also aware of details relating to the case not relevant to the analysis, and a biasing effect cannot be discounted. Therefore, whilst findings lend strong support to the hypothesis that the faces depicted in items 1 and 2 are of the same individual, any further interpretations should be made with caution.

This statement, consisting of 2 pages signed by me, is true to the best of my knowledge and belief. I understand that if this statement is filed in a court for the purposes of a prosecution pursuant to Section 104 of the Summary Procedure Act and it is, to my knowledge, false or misleading in a material particular, I am guilty of an offence pursuant to provision of the Summary Procedure Act.

Signed: **Signature witnessed by:**

      Dr. Eleanor Scrafton
      Director, South Australia Forensic Lab
Date:

Forensic Evidence Questions
Department of Psychology
The University of Adelaide
Information Processing and Bias in Juror Decision Making

The following questions are concerning how you felt about the forensic evidence in the trial. For each question, indicate how much you agree or disagree by placing an *X* in the appropriate box.

1. The Expert's research was based on good scientific principles.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

2. The Expert's study used appropriate techniques for pattern evidence comparison

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

3. The Expert's testimony was helpful in reaching my verdict.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

4. My verdict was based on an unbiased and objective assessment of witness testimony and evidence.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

5. The Expert's study was scientifically valid.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

6. The Expert did not use appropriate scientific procedures in her study.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

7. The findings from the Expert's study can be used to understand what occurred at the scene of the crime at the time of the incident.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

8. The Expert did not use valid methods of image identification and comparison.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

9. Witness testimony and/or forensic evidence was biased, which influenced my verdict.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

10. The Expert was unbiased and objective.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

11. The scientific evidence that I heard in this trial is reliable.

	Strongly Disagree		Disagree		Don't know		Agree		Strongly Agree

12. Witness testimony was helpful in reaching my verdict.

	Strongly Disagree		Disagree		Don't know		Agree		Strongly Agree

13. I found that one or more witnesses or pieces of evidence during the trial were biased.

	Strongly Disagree		Disagree		Don't know		Agree		Strongly Agree

Questionnaire
Department of Psychology
The University of Adelaide
The Role of Forensic Evidence in Juror Decision Making

Please read each question carefully before answering. If you have any questions, do not hesitate to ask the supervising researcher. Once you have completed all questions, please alert the researcher.

Trial Questions

The following questions relate to the trial about which you have just read. Please read each questions carefully, and ask the supervising researcher if clarification is required. You may refer to any notes you may have recorded during the reading task.

Verdict: Shane Colbert is in your opinion (circle one)
-Guilty
-Not Guilty

How certain are you of his guilt (place an X anywhere on the line):

0%—— 10%——20%——30%—— 40%—— 50%—— 60% ——70%——80%——90% ——100%

Forensic Evidence Questions

The following questions are concerning how you felt about the forensic evidence in the trial. For each question, indicate how much you agree or disagree by placing an *X* in the appropriate box.

1. The Expert's research was based on good scientific principles.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

2. The Expert's study used appropriate techniques for pattern evidence comparison

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

3. The Expert's testimony was helpful in reaching my verdict.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

4. The Expert's study was scientifically valid.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

5. The Expert did not use appropriate scientific procedures in her study.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

6. The findings from Expert's study can be used to understand what occurred at the scene of the crime at the time of the incident.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

7. The Expert did not use valid methods of image identification and comparison.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

8. The Expert was unbiased and objective.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

9. The scientific evidence that I heard in this trial is reliable.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

10. Witness testimony was helpful in reaching my verdict.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

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General Knowledge Questions

The following questions assess knowledge and general perceptions of forensic science. Please read each question carefully, and ask the supervising researcher if clarification is required. You may refer to any notes you may have recorded during the reading task.

1. A still image from CCTV footage can be significantly enhanced and cleared up to identify an individual (circle one)
-True
-False
-I don't know

2. Errors in image comparison can occur as a result of (circle one)
- Errors such as attention deficits, distractions, and erroneous decision-making by the investigator.
- Bias due to irrelevant knowledge that may result in erroneous identification or evaluation by the investigator.
-Both, technical and cognitive errors may influence accuracy of image comparison.
-Errors in pattern evidence comparison does not occur

-I don't know

3. If I just tossed a coin four times and got four heads, the probability of getting a tail when the coin is tossed for the fifth time is (circle one)

-½

-Greater than ½ as tails is far more likely this time

-Less than ½, as I'm obviously on a lucky run

-⅕, as it is the 5th toss

-I don't know

4. An absolute comparison (forensic sample against one suspect) of an image is more accurate than relative comparison (forensic sample against multiple suspects)

-True

-False

-Equal

-I don't know

Demographic Questions

1. Are you an Australian citizen over the age of 18? (circle one)

Yes

No

2. How old are you? (circle one)

18–24

25–34

35–44

45–54

55–64

65+

3. Please select your gender (circle one)

Male

Female

4. Did you study any of the following subjects at high school (years 7-12)? (circle all that apply)

Biology

Physics

Chemistry

Mathematics

I didn't study any of these

5. Did you or are you studying any of the following subjects at tertiary level? (Please indicate how many years)

Biology   Years:

Physics   Years:

Chemistry   Years:

Mathematics   Years:

Law   Years:

I didn't/don't study any of these
6. Which language do you speak most fluently?
English
Other (Please specify):

_____

7. Past jury duty experience (circle one)
None
1 trial
More than 1 trial

8. What suburb (if any) of Adelaide do you reside in?

_____

<u>Follow-Up Questions</u>

Almost done! Please read the following questions carefully before answering. Place indicate your level for each of the following by placing an *X* in the appropriate box. If you have any questions, do not hesitate to ask the supervising researcher.

1. My knowledge of facial comparison and research methodology

☐ No knowledge   ☐ Little knowledge   ☐ Some knowledge   ☐ Fair knowledge   ☐ High knowledge

2. My motivation level during the tasks

☐ No motivation   ☐ Little motivation   ☐ Some motivation   ☐ Fair motivation   ☐ High motivation

I would like to informed on the outcome of this study (circle one)
No
Yes
E-mail:
Contact Nr.:

Please leave any feedback you may have in the space provided. Thank you for participating in this study.

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└───┘

Jackson v Fischer

Judge: Jonathan Fischer, you are charged that on the 18th day of November 2010, on Diagonal Road, located in the Adelaide suburb of Warradale in the state of South Australia, you lost control of your motor vehicle, causing a collision between your vehicle and that of Melanie Jackson, who was in her motor vehicle alone at the time, causing her death, and therefore acting and driving with reckless indifference to human life, contrary to section 319 of the Crimes Act. Jonathan Fischer, how do you plead?

Accused: Not guilty, your Honour.

Judge: Members of the jury, Jonathan Fischer has been charged with reckless driving causing death. The prosecution will begin the trial by outlining their case against Mr Fischer and summarising the evidence of their witnesses. The defence will also outline their case in an opening statement. The standard of proof in a criminal trial is 'beyond reasonable doubt'. Therefore, it is the Crown who carries the burden of proof and the responsibility for proving the charge against the accused. If, by the end of the evidence, you decide that the Crown has not discharged this burden, you must find the accused not guilty. If you are convinced that the Crown has discharged this burden, you must find the accused guilty as charged. In this trial, you may not ask questions and the evidence cannot be replayed for you. You may take notes during the trial, however, you are not required to do so and your notes must not take the place of the evidence. The evidence is what you hear from the witnesses, not necessarily what you have recorded in your notes. Please do not make any decisions until you have heard all of the evidence in this case. At the end of the trial you will be asked to deliberate. You must draw conclusions that are based on the facts alone. If Jonathan Fischer is found guilty, damages will be awarded in reference to claims made by the next of kin of the deceased, Timothy Jackson. We will now hear an opening statement from the Crown.

Prosecutor: We allege that on the 18th of November 2010, between the hours of 5 pm and 6 pm, Jonathan Fischer recklessly veered his motor vehicle into the oncoming lane on Diagonal Road, located in the Adelaide suburb of Warradale, hitting the motor vehicle of the late Melanie Jackson, mother of three, who was at the time returning home after grocery shopping by herself. The incident was fatal for Melanie Jackson, who succumbed to her injuries in the ambulance transporting her to the Flinders Medical Centre.

Jonathan Fischer is 29 years old, and a student at Flinders University. Whilst reportedly a model student, we have reason to believe that Jonathan Fischer had a problem with alcohol. Police reports indicate that some alcohol was indeed in Jonathan Fischer's system, albeit below the legal limit. Though Jonathan Fischer has had his full license for going on five years, he has previously lost his license after a collision with a motor vehicle in 2003, where luckily no one was injured. Forensic evidence will be invaluable in highlighting how the motor vehicles collided, and unquestionably prove that Jonathan Fischer was at fault, and that his reckless driving caused the death of the late Melanie Jackson, mother of three. As this will become more and more evident, you will realize, dear Jury, that claims of compensation made by the husband of the late Melanie Jackson, should be awarded in full.

Judge: We will now hear an opening statement from the defence.

Defence: Good evening. As you have just heard, the Crown has charged Jonathan Fischer with murder. It is true that Jonathan Fischer was travelling to Flinders University on the night of the 10th of November, 2010. It is also true that an accident ensued involving the motor vehicles of Jonathan Fischer, and Melanie Jackson. However we contest that Jonathan Fischer is to be charged with reckless driving causing death. We also contest the claims of compensation made by the late Melanie Jackson's

husband. The death of Melanie Jackson was a tragic accident, and Timothy Jackson and the rest of Melanie Jackson's family and friends have our deepest condolences; however to lash out at Jonathan Fischer, a hard working uni student who was also an unfortunate party involved in this motor vehicle accident is cruel and unjust. The collision of the two motor vehicles was caused by factors not accounted for by the prosecution, which will be brought to light when eye witnesses will present their testimony. We will also claim that Melanie Jackson did not take due care and had therefore a significant role to play in the outcome and severity of the collision, and that fatal injuries as well as significant damages to property could have been avoided, further mitigating the validity of her husband's claims of compensation for damages.

Judge: Although you will not hear from some witnesses directly, here is a summary of some of the evidence in this case:

Prosecution Witness #1: Doctor James Bennet, medical specialist, testified that 'both Melanie Jackson and Jonathan Fischer had sustained a number of injuries. The injuries were indicative of a head-on collision, with sufficient force to propel Melanie Jackson through the windscreen of her motor vehicle, whilst Jonathan Fischer sustained back injuries and a trauma caused by a head injury. The injuries were consistent with a head-on collision, but it was not clear from the injuries how the collision had occurred. The time of death is estimated at somewhere between 6pm and 7pm on Saturday 18th November 2010'.

Prosecution Witness #2: Mathew Blog, a witness to the incident testified that he saw 'a red motor vehicle veer off into an oncoming silver vehicle on Diagonal Road around 5pm or so. I was in shock, it all happened incredibly quickly, and there was a lot of blood, and parts from both cars all over the street, and other people were on the sidewalk and staring, and cars had stopped on both sides, whilst other people were coming out to have a look. But one thing was clear, the red car (vehicle of the accused) definitely ran into the silver car (vehicle of the deceased), and not the other way around.' Under cross-examination, Mr Blog admitted that he could not be absolutely certain that nothing else had prompted the accident, whether anything had happened immediately prior to the accident, or who was behind the wheel of each vehicle at the time the accident occurred, as everything reportedly happened very rapidly, and Mr Blog was not paying attention to the road until the sound of the accident prompted him to look at the scene of the accident.

Prosecution Witness #3: John Watkins, a student at Flinders University, and until recently acquainted with Jonathan Fischer, testified that Jonathan Fischer enjoyed his drinking, and did so at least once or twice a week whilst they were acquainted. Mr Watkins had even told Jonathan Fischer to reduce his drinking for the sake of his health, and that Jonathan Fischer had come to university hungover on a frequent number of occasions in the weeks leading up to the 18th November, 2010. When asked if Mr Watkins thought that Jonathan Fischer may have had to drink before driving, Mr Watkins testified that he would not be surprised in the slightest. Under cross examination Mr Watkins admitted that he and Jonathan Fischer were no longer acquaintances after a drunken physical altercation between the two at a party.

Prosecution Witness #4: Stacey McEwan, a long-time friend of Melanie Jackson, testified that Melanie Jackson was 'an extremely confident driver, and a wonderful mother, who would never do something to put her children or herself in harm's way. She also frequently went on the grocery shopping trip which she was on that day, and the trip was only a short distance from where Melanie Jackson lived. Melanie Jackson also frequently went on charity drives for her local community centre, and participated in a similar event for her children's school earlier that year.

Defence Witness #1: Jonathan Fischer, student, and accused driver of the motor vehicle involved in the accident with Melanie Jackson's motor vehicle, stated that he 'did not remember what happened, and that doctors said that this was common in people involved in car crashes, especially when head trauma was involved'. Jonathan Fischer stated that he had one beer with a friend at home before driving, but that police had cleared him of drink driving as tests at the hospital revealed an almost immeasurable amount of alcohol in Mr. Fischer's blood. Jonathan Fischer also testified that he was a confident driver. Under cross examination Mr. Fischer admitted he had been involved in a motor accident in 2003, and that the accident resulted in the suspension of his license, but that both drivers had been found to be at fault.

Defence Witness #2: Trent Ford, a witness to the incident, testified that he saw 'a collision between two motor vehicles, where a red vehicle veered off into a silver one, but that a young boy, roughly 10 or 12 years old, crossed the road just before the accident occurred, between the two vehicles.' When asked to be more specific, Mr Ford stated that he would estimate that the cars were 50 or 60 metres apart when the child crossed the road roughly 20 metres in front of the red vehicle. There did not appear to be an immediate reaction the child crossing, although the accident occurred seconds thereafter.

Defence Witness #3: Nick Wood, 12 years old, eye witness to the incident, testified that he 'crossed the road in front of the red car, although the car still had a fair bit of time to spare, and that the car wasn't going very quickly.' Nick testified that he 'didn't even notice that a car crash had happened until he heard the screeching of tyres, which made me look to my left to see that an accident had happened, and that the red car had run into an oncoming silver car'. Under cross examination Nick suggested that the red car might have been going at 50 or 60 kilometres per hour, and that he did not know that the speed limit in the area of the accident was 50 kilometres per hour.

Defence Witness #4: Luke Munn, a friend of the accused, testified that 'John Fischer was a smart guy, who excelled at school, and he is no risk taker. Whilst it's true that he liked to drink, so do most people, and that doesn't mean anything, and certainly has nothing to do with his accident. John would never take the chance to drink and drive, even one drink, especially if he was going to uni. He shouldn't be punished for enjoying a drink with his mates.' Under cross-examination Luke admitted that John had gotten into fights before, and that alcohol probably played a role in this. Luke claimed that he did not know the details of John's prior motor vehicle accident, as they were not acquainted in 2003.

Judge-led

Judge: I call Dr Janice Bligh, the court's accident reconstruction expert witness. Please raise your right hand. Do you solemnly swear or affirm to tell the truth, the whole truth and nothing but the truth?

Accident reconstruction expert witness: I do.

Judge: Please state your full name and occupation.

Accident reconstruction expert witness: Dr. Janice Bligh. I am an independent accident reconstruction expert and Director of a private forensic laboratory based in Adelaide.

Judge: Please summarise your educational qualifications and background for the jury.

Accident reconstruction expert witness: I studied forensic science at the University of Sydney after initial completing a degree in mechanical engineering at the same university, obtained honours and then went on to complete a PhD, in which I studied the effects of variable lighting and other conditions

on the effectiveness of vehicular accident reconstruction and skid mark assessment. I then spent five years in the United States with a private laboratory specialising in accident reconstruction with a focus on motor vehicles and variable conditions. I returned to Australia to establish my own laboratory, which analyses still and moving images in support of forensic investigations.

Judge: Dr. Bligh, will you please present your educational material about image comparison that you have prepared.

Accident Reconstruction

First, you will be introduced to the questions accident reconstruction experts aim to answer when looking at a collision involving one or more vehicles. We look at a number of critical elements, including speeds of involved vehicles at impact, which enables us to assess directional kinetic energy involved in the accident, particularly in relation to magnitude of the impact, and how elements such as environmental hazards, seatbelts and other factors may have contributed to the eventual outcome. The impact location refers to the location of the incident, and is another crucial element in our accident reconstruction process. Coupled with pre impact locations of the vehicles, and numerous factors associated with occupying and controlling a motor vehicle, we are able to almost perfectly reconstruct what happened, in order to determine who, if anyone, was at fault, and if extenuating circumstances or factors that have not been accounted for may have been involved in the collision. Nonetheless whilst accident reconstruction can be an incredibly valuable and comprehensive tool, it is important to note that it should be considered as one part of all the evidence presented in court for this case.

The most pertinent factors examined in our analysis include analysis of steering angles, braking and break use immediately prior to the incident, the use of lights and turn signals, as well as most importantly speed and acceleration, as well as the engine rpm, and whether cruise control had been used by either party. Combined with data on weather conditions and environmental hazards, as well as any human elements such as illness, history of driver error, or inebriation we develop a sophisticated representation and reconstruction of events.

Expert accident reconstruction involves the use of both physical measurements and complex computer modelling involving tried and true physics formulas regularly used in contexts involving motion and displacement of objects such as motor vehicles. Skid marks and tyre treads also further enable us to accurately discern changes in factors such as velocity, steering angles, and road conditions, as well as the possibility of environmental hazards. Environmental hazards may refer to any aspect of the environment, which is to say, not just trees or signs, stones bouncing off the road from under wheels, or a round-about, but also people, or animals, or anything that might have influenced the actions of either driver, or the outcome of the incident in any way. Whilst this requires some presumptions and relies on supplementary information such as eye witness testimony, the presence of such hazards is often apparently in the actions of drivers, particularly when unexpected behaviours that can't immediately accounted for appear in the data.

How is accident reconstruction conducted?

As already stated, the first step involves collecting as much relevant data as possible. This includes measurements from the crash site, witness testimony, and information collected from motor vehicle accident reports, whether airbags went off, whether seatbelts were on, where the accident occurred,

the distance and shape of skid marks, steering angles, and whatever else we can find that might help paint a more accurate picture of what actually happened. Next we input most of this information into the relevant computer software, generally one of several commonly used 3D modelling programs also used in the car industry to investigate and test safety measures and effects of impacts on cars from different angles. Then we test various scenarios involving the vehicles in question with the data that we have, to see whether we can find an outcome that reflects what actually occurred. In some clear cut cases this can be an incredibly straight forward process, allowing us to confidently outline who or what was at fault, what elements were involved, and what ultimately happened and in what order. On other occasions it's not so straight forward, and the reconstructions fail to fully account for all of the data we have, and also to meet the expected outcomes that we had set. Generally such cases involve some element that was either unaccounted for, or had not been sufficiently factored in, and we run further analyses and reconstructions until we have a plausible hypothesis of events that transpired.

Accident reconstruction and the law

The use of accident reconstruction and analysis to determine the causes and effects of circumstances that led to a particular incident or collision is not particularly new. In fact, in contrast to some other avenues of forensic science and investigation, accident reconstruction is used quite frequently to explain what led to a particular incident. A heavy reliance on mathematics, physics, and tried and tested formulas, many of which are also used in the automotive industry, means that the basis for forensic investigations and accident reconstructions involving motor vehicles is and has been reliable, and invaluable in clarifying the nature of evidence and circumstances surrounding fairly common accidents involving motor vehicles, especially cars, though also more increasingly motor bikes. Therefore whilst forensic accident reconstruction and analysis is not flawless, it has been a pretty reliable and accurate tool for investigators, and therefore been a central part of the justice system with regard to crime scene investigation and court proceedings related to motor vehicle accidents.

Problems with forensic accident reconstruction

Whilst there aren't many problems with forensic accident reconstruction, the problems that do exist are noteworthy. Firstly, accident reconstruction, whilst using mathematics and physics, involves predicting outcomes based on incomplete information in the hopes that we can determine what that missing information may be. This may involve guesswork, especially in cases where human error, or other human factors, or environmental elements and hazards not accounted for may play a significant role. There are also large numbers of measurement techniques involved in reconstructing various aspects of pre- during and post-collision models. This may result in some inaccuracies or inconsistencies that might arise when different measuring techniques and models that function separately but not together. There are also error rates that also need to be accounted for, which can pose a problem in particularly complex scenarios, but is generally not an issue as long as the error rates are reported and explained, just as is the case in all statistical analyses. Finally the ever changing nature of safety precautions and features in and of motor vehicles means that some calculations may be affected by factors such as materials or features specific to a particular brand or model of motor vehicle that may have a noticeable effect on outcomes. This is more an issue for newer vehicles, but can otherwise be addressed by using appropriate error rates when drawing conclusions based on the accident reconstruction.

Judge-led

Judge: The parties may now examine the witness. The prosecution may proceed.

Prosecutor: Dr. Bligh, can you tell me what accident reconstruction revealed in this case?

Accident reconstruction expert witness: In this case, we were provided with a significant amount of data, and measurements of motor vehicles involved, skid marks, details of the surrounding area, and information such as speed and steering angle, impact depth, debris patterns, and more. We were also provided with the accident report and the police report, though they revealed little that the data we had been provided did not already indicate. A reconstruction of the incident revealed a number of things.

Figure of accident. See exhibit B for further information

Draw diagram of accident. Include street name & direction
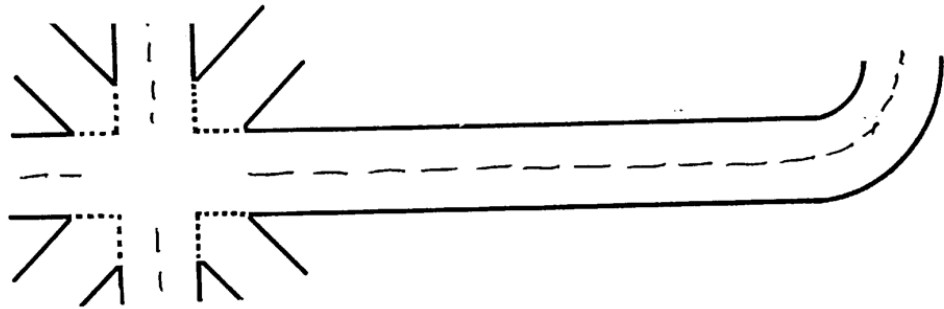
Accident reconstruction expert witness: Firstly, the data unequivocally supported the hypothesis that the collision occurred as a result of Jonathan Fischer's vehicle entering the oncoming lane at close proximity to the oncoming motor vehicle of Melanie Jackson, resulting in an almost unavoidable accident. Mr Fischer's motor vehicle hit the left side of the oncoming vehicle, and the angular impact appeared to result in a fraction of a delay when it came to Melanie Jackson's airbag, meaning that it was too late to protect her from the forward momentum that resulted in fatal injuries. Neither vehicle was going over the speed limit, although Mr Fischer's vehicle was travelling at circa 45 km/h whereas Melanie Jackson was travelling at closer to 35km/h. We can confidently say that we are all but certain that Melanie Jackson's fatal injuries were due to the accident that occurred as a result of Mr Fischer's vehicle entering the wrong lane shortly before colliding with Melanie Jackson's motor vehicle.

Prosecutor: Can you positively identify the accused, Jonathan Fischer, in this court room today?

Accident reconstruction expert witness: If by that you mean identify the person who purportedly drove the motor vehicle?

Prosecutor: Yes, please, for the court.

Accident reconstruction expert witness: Sure, yes. *points in direction of Jonathan Fischer*

Prosecutor: Thank you. Now Dr. Bligh, have you and your team used this technique for any similar incidents before?

Accident reconstruction expert witness: Yes, yes we have. We recently assisted SA Police in an investigation involving a collision between a truck and a car on South Road, and also assisted in an investigation involving a motor vehicle and cyclist, if you can believe it. In both cases, our findings cleared up some contradictory witness testimony, allowing SA Police to move forward with the case.

Prosecutor: Dr. Bligh, finally, have you ever been involved in, or known of a case that employed accident reconstruction, where the reconstruction drew erroneous conclusions?

Accident reconstruction expert witness: Whilst I have not been directly involved in such a case, they do occasionally occur. It would be unreasonable to assume that whilst accident reconstruction relies heavily on mathematics, physics, and science, it does not involve a human element, particularly to fill in the gaps, though practiced accident reconstruction experts usually have some intuitive knack for it.

Prosecutor: Thank you, Dr. Bligh.

Judge: Are there any questions in cross-examination from the defence?

Defence: Yes, your Honour. Dr Bligh, you stated before that there is always the possibility of human error, do you believe that human error may have influenced your findings?

Accident reconstruction expert witness: I do not believe so, at least not with regard to the conclusions we have drawn about the outcome of the accident.

Defence: Ah yes, thank you for bringing that up. Whilst you claim to be confident in explaining the outcome of the accident, I would like you to please have a look at Exhibit A, more specifically the images of the skid marks left by what we presume to be Jonathan Fischer's motor vehicle. Now if you could please elaborate for the court what you believe to have been the cause of this sudden change in direction of Jonathan Fischer's vehicle?

Accident reconstruction expert witness: We included the data in the reconstruction as a loss of control of the motor vehicle on behalf of the defendant, though we have no direct explanation for the cause of such loss of control. Whilst some speculation can play a role in accident reconstruction, it seemed unnecessary in this case, as the Jonathan Fischer clearly lost control, and as a result caused the accident in which Melanie Jackson sustained fatal injuries.

Defence: Dr. Bligh, would you agree that the factor you have not accounted for could have been someone crossing the road, or an animal, and Jonathan Jackson trying to avoid this unknown party, to protect them and himself, as a result losing control of his motor vehicle?

Prosecutor: Objection.

Judge: Overruled. Please proceed, Dr. Bligh.

Accident reconstruction expert witness: Yes, the possibility is there, though breaking rather than swerving out of the way would have been the safest approach.

Defence: Were the brakes employed at any stage leading up to the accident? And at 50 km/h, the speed limit for the area in which the accident occurred, could my client's car have come to a full stop before hitting something that were to cross the road?

Prosecutor: Objection, conjecture.

Judge: I'll allow it, please answer the question, Dr. Bligh.

Accident reconstruction expert witness: The brakes were used in Jonathan Fischer's vehicle, though it is almost impossible to ascertain at what distance to the oncoming vehicle this occurred, and whether it was not related to simply losing control of his vehicle for any other reason. Without an accident reconstruction involving a number of largely arbitrary assumptions, we cannot accurately establish what caused Jonathan Fischer, to move; however it is clear that Jonathan Fischer's actions led to an accident between two motor vehicles resulting in fatal injuries sustained by Melanie Jackson.

Defence: Another question, Doctor. Were you aware of details of the case outside of your expertise, such as the people involved?

Accident reconstruction expert witness: Yes, we were aware of such details, and were provided with police and accident reports, however such information is often very relevant when trying to determine the effects of a particular impact on the body of a person of a certain height, size, and the like.

Defence: Alright, thank you Dr. Bligh.

Judge: The prosecution will now outline their claims for compensation.

Prosecutor: Thank you, your honour. The prosecution will now outline a number of claims for compensation, and aim to explain them and the monetary sums presented to you, the jury. Please see Exhibit C for the detailed presentation of this information.

The first and second claims of compensation are for medical and funeral expenses, which amount to a total of $45,000. This sum was based on the actual expenses that had to be covered by Timothy Jackson during an incredibly trying time, as Timothy had to come to terms with caring for his three children without the emotional and financial support of his late wife.

Following on from that, we request damages to compensate for the loss of income caused by the loss of Melanie Jackson. The Jackson family greatly relied on Melanie Jackson's stable income to support three children. Melanie Jackson worked as a teacher at Brighton Secondary School, earning an estimated $51,000 a year. As she would have been likely to work another fifteen to twenty years, we originally requested damages of $1,000,000 but have revised our request to $750,000 of projected lost income.

Furthermore we request $1,000,000 in damages for the loss of companionship suffered by Timothy Jackson, and the loss of a mother by their three children. Whilst the companionship of a partner, and the invaluable presence and role of a parent whilst growing up is immeasurable, the sum we are seeking would significantly reduce the burden of costs associated with looking after the children, including education, the costs of which are seemingly permanently on the rise. This has also been the case with the general cost of living, promising to put extra strains on a family already suffering from what can only be described as a cruel and for many of us inconceivable loss.

Finally we also originally requested $1,500,000 in punitive damages but have revised our claim to $1,000,000, to be awarded due to the negligence we believe the defendant to have demonstrated, serving as part punishment and to cover costs including legal fees, and similar expenses arising from the circumstances surrounding the incident we believe to have been caused by the defendant.

Judge: Alright, thank you. Now jury, I have some final words before you go on to deliberate. Firstly please recall that this trial commenced after the prosecution and defence presented their opening statement, followed by a number of witnesses by both parties. This was followed by forensic evidence presented by Dr. Janice Bligh, with regard to skid marks, debris, and impact zones in relation to the collision of the two motor vehicles referred to throughout this case. And you just heard the prosecution's claims for compensation, and their arguments for such claims.

Please bear in mind that in the Australian legal system, a defendant is presumed innocent and that the burden is on the prosecution to convince you beyond a reasonable doubt that the defendant, Jonathan Fischer, committed the crime.

The onus is on the defence to prove that the accused is guilty of reckless driving causing death, and that burden never leaves it. It never becomes the responsibility of the accused to prove that he is not guilty or, in this case, to prove that it was not negligent or reckless driving. Before you convict you must be satisfied *beyond a reasonable doubt*. If there is a reasonable doubt as to the accused's guilt, then the accused is entitled to the benefit of that doubt. That does not mean that you must be satisfied beyond any doubt whatever, if, indeed you can ever be satisfied of anything to that extent. The accused is not entitled to the benefit of any whimsical, fanciful, or far-fetched doubt which an agile mind might conjure up. Being satisfied beyond reasonable doubt means this—if you regard it as a reasonable possibility that someone else murdered Chris Bell, then the accused must be acquitted. If you consider this possibility so insubstantial and so remote that no reasonable person would take it into account for a moment, then you are satisfied beyond reasonable doubt and the accused must be found guilty. You must now decide whether or not the defendant, Jonathan Fischer, is guilty as charged. Furthermore, if Jonathan Fischer is found guilty, you must deliberate and determine the amount of compensation that is to be awarded to Timothy Jackson on behalf of the late Melanie Jackson.

Jury Instructions
Department of Psychology
The University of Adelaide
Heuristic-Systematic Reasoning in Juror Decision Making

_____

During the case, you will be exposed to some exhibits. A number of these exhibits are *graphic* and *vivid* photographs of the woman at the location where she was struck. You may find these pictures to be somewhat *upsetting.* In addition, you will hear testimony from a number of witnesses, which may be *graphic in nature and produce a strong emotional reaction* in you. After you hear the evidence, you will be asked to decide any monetary damages to be awarded to the victim. Please read all instructions carefully. If you have any queries or concerns, please do not hesitate to alert the supervising researcher.

Forensic Evidence
Department of Psychology
The University of Adelaide
Heuristic-Systematic Reasoning in Juror Decision Making

The following exhibits are supplementary materials referred to during the trial. Some of these materials include images that may be explicit and/or confronting. You may examine these materials for the duration of the reading task. If you have any questions or concerns, please do not hesitate to alert the supervising researcher.

Exhibit A: Images of Skid Marks and Accident Scene

Figure 1.1 Skid marks created by defendant's vehicle[1]
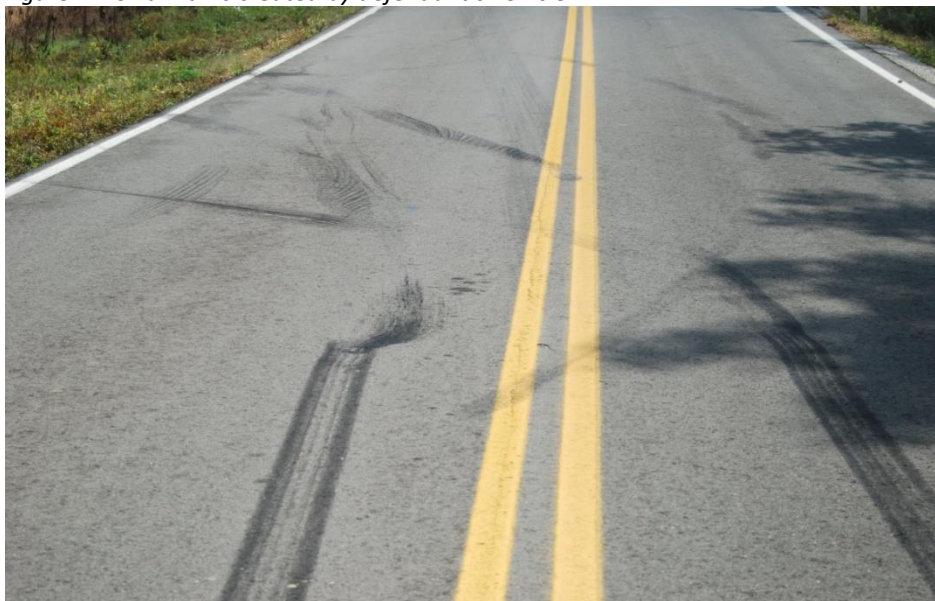
Figure 1.2 Accident site picturing the victim's vehicle (left) and the defendant's vehicle (right)[2]

[1]Copyright © 2017 by VCE Investigate Engineering. Image used with permission.
[2]Copyright © 2017 by Holzer Edwards, Chartered. Image used with permission.

Figure 2.1 Motor Vehicle Accident Report of Incident

Driver's Name: _____Date & Time of Accident _____ _____

Where did accident happen?   City   State   Street Address
_____
Is there a police report? _____   What Police Dept.: _____ Report Number: _____
# of passengers in your vehicle including driver _____   # of witnesses obtained _____   (Please have witnesses & psgrs. write statements)

OUR VEHICLE INFORMATION:
Veh #_____Year, Make & Model: _____ Plate #: _____Vin #: _____ _____
What area of your vehicle was struck: Was vehicle damaged?:   Any vehicles towed?

SECTION TO BE COMPLETED BY DRIVER
Describe the accident in detail, naming streets, roads, whether a one way, two way, intersection, weather conditions etc. Continue on back.
_____
_____
_____

Draw diagram of accident. Include street
name & direction

| CITATION ISSUED? TO WHOM?   INJURIES? WHOM? |

Claimant Information:
Owner's Name: Driver's Name:
_____

Owner's Address
_____

Owner's Telephone #
_____

Plate #   Driver's Lic. #:
_____

Year , Make & Model: No. of Passengers including Driver:
_____

Ins. Company Name & Address: Policy #:
SUPERVISOR'S ACCIDENT REVIEW (Preventable or Not & Corrective Actions) MUST BE COMPLETED If preventable, how could it have been prevented?

Driver's Signature _____ Date _____

Supervisor's Signature _____ Date _____

Exhibit C: Alleged Damages Report

Figure 3.1 Report of alleged damages to be awarded to victim

| Item | Alleged Damages | | Damage Causation | Insurance Coverage |
	Original Claim	Final Claim		
Medical Expenses	$ 30,000	$ 30,000	TBD	20% ($6,000)
Funeral Expenses	$ 15,000	$ 15,000	TBD	None
Loss of Income (deceased)	$ 1,000,000	$ 750,000	TBD	None
Loss of companionship	$ 1,000,000	$ 1,000,000	TBD	N/A
Punitive damages	$ 1,500,000	$ 1,000,000	N/A	N/A
Total	$ 3,545,000	$ 2,795,000		-

Forensic Report
Department of Psychology
The University of Adelaide
Heuristic-Systematic Reasoning in Juror Decision Making

Jackson v Fischer, November 2010

Executive Summary

Jonathan Fischer has been charged that on the 10th day of November 2010, he lost control of his motor vehicle on Diagonal Road, in the Adelaide suburb of Warradale, causing a collision resulting in the death of Melanie Jackson, therefore driving with reckless indifference to human life. Members of the South Australia Forensics Laboratory (SAFL) conducted an analysis and examination relating to this matter.

Exhibit(s) submitted for examination:

Item 1 – Several still images depicting the car wreckages, debris patterns, and the scene of the accident, including relevant measurements.

Item 2 – Accident report completed shortly after incident, detailing a range of information including details of accident, and personal information.

Item 3 – Police report containing personal information of involved parties including criminal history, motor vehicle history, alcohol blood %, and medical history.

Origin of exhibit(s):

Item 1 – Images of accident scene and car wreckages were captured on location but police officers, and members of the SAPOL forensic investigation team.

Item 2 – The Accident report detailing aspects of the incident, as well as personal information of parties involved was provided by the head detective on the SAPOL investigative team assigned to the case.

Item 3 – The police report detailing further personal information of parties involved was provided by the head detective on the SAPOL investigative team assigned to the case.

Statement of chain of custody of exhibits:

4. Jeff Backers, authorised representative of SAPOL, took possession of items 1,2 and 3 on the 19th of November 2010, and retained custody of items 1,2 and 3, securely stored at SAPOL headquarters in accordance with South Australia Police Property Management Practices, until forwarded to Dr. Bligh for analysis.
5. Dr. Bligh, Director of South Australia Forensic Laboratory, took custody of item 1, item 2 and item 3 on the 1st of December, 2010, for the purposes of forensic analysis. When not being analysed, exhibits were safely stored at the SA Forensics Laboratory.

6. Custody of exhibits was given to Jennifer Haighes, forensic evidence management at
    SAPOL, upon completion of analysis by Dr. Bligh. Exhibits have been stored at SAPOL
    headquarters, and not been accessed since having been submitted to Jennifer Haighes.

Information that the examiner was provided with:

Before conducting a forensic analysis, the forensic examiner was informed of details concerning the
context of the accident, and provided accident and police reports.

Qualifications of the forensic examiner, Dr. Katherine Price:

- **Director, South Australia Forensics Laboratory, Australian Federal Police, 2010-
  Current**
- **Assistant Director, Western Regional Crime Laboratory, NY State Police, 2004-2009**
- **Ph.D in Forensic Science, University of Sydney, 2000-2003**
  Dissertation Title: Vehicular accident reconstruction and skid mark assessment: The roles of
  variable lighting and spatial conditions.
- **Bachelor of Forensic Science (Honours), University of Sydney, 1999**
- **Bachelor of Science, University of Sydney, 1995-1998**
- **Bachelor of Mechanical Engineering, University of Sydney, 1991-1994**
-

Methods and materials:

Data from Item 1 and Item 2 were input into MADYMO 3D crash simulation and modelling software.
Assumptions input to account for air and road surface temperatures, and lighting conditions.

Procedures:

Several simulations were run using available data, and several variables in assumptions to explain
steering angle, break usage, impact, and final static position and form of motor vehicles, and debris
patterns.

Results:

It was found that based on information provided, the motor vehicle of Jonathan Fischer collided with
the motor vehicle of Melanie Jackson after veering off at an angle of 50 degrees at a proximity of 20
metres, Jonathan Fischer travelling at 49 km/h until immediately prior to the collision, and Melanie
Jackson travelling at 30 km/h until collision, CI of 95%.

Conclusions:

The comparison conducted by the forensic laboratory and team led by Dr. Janice Bligh involved the use of comprehensive data recorded by police and forensic analysts at the scene of the accident, and post-accident using standard imaging technology. Dr. Bligh was also provided with accident reports and police reports. Data was collated and input into MADYMO 3D crash simulation software, which was then used to run several simulations. Findings indicated that Jonathan Fischer's vehicle veering into the oncoming vehicle was the cause of the accident. Limited information was provided to account for the sudden change in direction by Jonathan Fischer's vehicle. Whilst findings lend strong support to the notion that Jonathan Fischer was at fault, some limitations with regard to the cause of direction change of Jonathan Fischer's vehicle mean that any further interpretations should be made with some caution.

This statement, consisting of 3 pages signed by me, is true to the best of my knowledge and belief. I understand that if this statement is filed in a court for the purposes of a prosecution pursuant to Section 104 of the Summary Procedure Act and it is, to my knowledge, false or misleading in a material particular, I am guilty of an offence pursuant to provision of the Summary Procedure Act.

Signed: **Signature witnessed by:**

Dr. Janice Bligh **Jennifer Haighes**
Director, South Australia Forensic Lab

Date: 4th January, 2011

Jury Instructions
Department of Psychology
The University of Adelaide
Heuristic-Systematic Reasoning in Juror Decision Making

During this case you will be exposed to some exhibits. A number of these exhibits are photographs of the location where the woman was struck. In addition, you will hear testimony from a number of witnesses. After you hear the evidence, you will be asked to *mathematically calculate* any monetary damages to be awarded to the victim. The calculations will not be difficult, but may require some *addition and multiplication.* Please read all instructions carefully. If you have any queries or concerns, please do not hesitate to alert the supervising researcher.

Forensic Evidence
Department of Psychology
The University of Adelaide
Heuristic-Systematic Reasoning in Juror Decision Making

The following exhibits are supplementary materials referred to during the trial. You may examine these materials for the duration of the reading task. For Exhibit B, please refer to the trial transcript, and input any and all missing information. If you have any questions or concerns, please do not hesitate to alert the supervising researcher.

Exhibit A: Images of Skid Marks and Vehicle Wreckages

Figure 1.1 3D Computer Reconstruction of Accident[3]

Figure 1.2 Skid marks produced by defendant's motor vehicle[4]

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[3]Copyright © 2017 by Claudio Gedda. Image used with permission.
[4]Copyright © 2017 by VCE Investigate Engineering. Image used with permission.

Figure 2.1 Report of alleged damages to be awarded to victim. Please refer to transcript for information.

| Item | Alleged Damages | | Damage Causation | Insurance Coverage |
	Original Claim	Final Claim		
Medical Expenses	$	$	TBD	20% ($)
Funeral Expenses	$	$	TBD	None
Loss of Income (deceased)	$	$	TBD	None
Loss of companionship	$	$	TBD	N/A
Punitive damages	$	$	N/A	N/A
Total	$	$		-

Exhibit C: Motor Vehicle Accident Report

Figure 3.1 Motor Vehicle Accident Report of Incident

Driver's Name: _____Date & Time of Accident _____ _____

Where did accident happen?   City   State   Street Address
_____
Is there a police report? _____   What Police Dept.: _____   Report Number: _____
# of passengers in your vehicle including driver _____   # of witnesses obtained _____   (Please have witnesses & psgrs. write statements)

OUR VEHICLE INFORMATION:
Veh #_____Year, Make & Model: _____Plate #: _____Vin #: _____
What area of your vehicle was struck: _____   Was vehicle damaged?: _____   Any vehicles towed? _____

SECTION TO BE COMPLETED BY DRIVER
Describe the accident in detail, naming streets, roads, whether a one way, two way, intersection, weather conditions etc. Continue on back.
_____
_____
_____

Draw diagram of accident. Include street
name & direction

| CITATION ISSUED? TO WHOM?   INJURIES? WHOM? |

Claimant Information:
Owner's Name: _____   Driver's Name: _____

Owner's Address _____

Owner's Telephone # _____

Plate # _____   Driver's Lic. #: _____

Year , Make & Model: _____   No. of Passengers including Driver: _____

Ins. Company Name & Address: _____   Policy #: _____
SUPERVISOR'S ACCIDENT REVIEW (Preventable or Not & Corrective Actions) MUST BE COMPLETED If preventable, how could it have been prevented?

Driver's Signature _____ Date _____

Supervisor's Signature _____ Date _____

Questionnaire
Department of Psychology
The University of Adelaide
Heuristic-Systematic Reasoning in Juror Decision Making

Please read each question carefully before answering. If you have any questions, do not hesitate to ask the supervising researcher. Once you have completed all questions, please alert the researcher.

<u>Trial Questions</u>

The following questions relate to the trial about which you have just read. Please read each questions carefully, and ask the supervising researcher if clarification is required. You may refer to any notes you may have recorded during the reading task.

Verdict: Jonathan Fischer is in your opinion (circle one)
-Guilty
-Not Guilty

How certain are you of his guilt (place an X anywhere on the line):

0%——10%——20%——30%——40%——50%——60%——70%——80%——90%——100%

How negligent do you think the defendant was?

☐ Not at all   ☐ Slightly   ☐ Unsure   ☐ Somewhat   ☐ Very negligent

How negligent do you think the victim was?

☐ Not at all   ☐ Slightly   ☐ Unsure   ☐ Somewhat   ☐ Very negligent

Damages awarded? (Assume you are deliberating on this case with other jury members, and a majority of other members have found the defendant liable, so you must award damages) Damages awarded should reflect what you deem fair given the information you have been provided with, and should range from $1 to a maximum of monetary damages sought by the prosecution during the trial.

Medical Expenses

$_____

Funeral Expenses

$_____

Lost income (lifetime)

$_____

Pain of the loss of a loved one

$_____

Punitive Damages

$_____

Forensic Evidence Questions

The following questions are concerning how you felt about the forensic evidence in the trial. For each question, indicate how much you agree or disagree by placing an *X* in the appropriate box.

1. The Expert's research was based on good scientific principles.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

2. The Expert's study used appropriate techniques for pattern evidence comparison

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

3. The Expert's testimony was helpful in reaching my verdict.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

4. My verdict was based on an unbiased and objective assessment of witness testimony and evidence.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

5. The Expert's study was scientifically valid.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

6. The Expert did not use appropriate scientific procedures in her study.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

7. The findings from the Expert's study can be used to understand what occurred at the scene of the crime at the time of the incident.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

8. The Expert did not use valid methods of image identification and comparison.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

9. Witness testimony and/or forensic evidence was biased, which influenced my verdict.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

10. The Expert was unbiased and objective.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

11. The scientific evidence that I heard in this trial is reliable.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

12. Witness testimony was helpful in reaching my verdict.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

13. I found that one or more witnesses or pieces of evidence during the trial were biased.

☐ Strongly Disagree   ☐ Disagree   ☐ Don't know   ☐ Agree   ☐ Strongly Agree

14. If you reported that you felt aspects of the trial were biased, please write a brief list of what you may have considered bias, and how it affected your verdict, in the box below.

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Need for Cognition Questions

The following questions relate to your general and everyday enjoyment and approach to thinking. Please read each question carefully, and ask the supervising researcher if clarification is required.

1. I would prefer complex to simple problems.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

2. I like to have the responsibility of handling a situation that requires a lot of thinking.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

3. Thinking is not my idea of fun.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

5. I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

6. I find satisfaction in deliberating hard and for long hours.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

7. I only think as hard as I have to.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

8. I prefer to think about small, daily projects than long-term ones.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

9. I like tasks that require little thought once I've learned them.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

10. The idea of relying on thought to make my way to the top appeals to me.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

11. I really enjoy a task that involves coming up with new solutions to problems.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

12. Learning new ways to think doesn't excite me very much.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

13. I prefer my life to be filled with puzzles that I must solve.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

14. The notion of thinking abstractly is appealing to me.

☐ Not at all like me   ☐ Mostly unlike me   ☐ Unsure   ☐ Like me   ☐ Very like me

15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.

☐ Not at all like me ☐ Mostly unlike me ☐ Unsure ☐ Like me ☐ Very like me

16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.

☐ Not at all like me ☐ Mostly unlike me ☐ Unsure ☐ Like me ☐ Very like me

17. It's enough for me that something gets the job done; I don't care how or why it works.

☐ Not at all like me ☐ Mostly unlike me ☐ Unsure ☐ Like me ☐ Very like me

18. I usually end up deliberating about issues even when they do not affect me personally.

☐ Not at all like me ☐ Mostly unlike me ☐ Unsure ☐ Like me ☐ Very like me

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Demographic Questions

1. Are you an Australian citizen aged 18 or over? (circle one)
Yes
No

2. How old are you? (circle one)
18–24
25–34
35–44
45–54
55–64
65+

3. Please select your gender (circle one)
Male
Female

4. Did you study any of the following subjects at high school (years 7-12)? (circle all that apply)
Biology
Physics
Chemistry
Mathematics
I didn't study any of these

5. Did you or are you studying any of the following subjects at tertiary level? (Please indicate how many years)
Biology   Years:
Physics   Years:
Chemistry   Years:
Mathematics   Years:

Law   Years:
I didn't/don't study any of these

6. Which language do you speak most fluently?
English
Other (Please specify):

_____

7. Past jury duty experience (circle one)
None
1 trial
More than 1 trial

8. What suburb (if any) of Adelaide do you reside in?

_____

Follow-Up Questions

Almost done! Please read the following questions carefully before answering. Place indicate your level for each of the following by placing an *X* in the appropriate box. If you have any questions, do not hesitate to ask the supervising researcher.

1. My knowledge of facial comparison and research methodology

☐ No knowledge   ☐ Little knowledge   ☐ Some knowledge   ☐ Fair knowledge   ☐ High knowledge

2. My motivation level during completion of the study

☐ No motivation   ☐ Little motivation   ☐ Some motivation   ☐ Fair motivation   ☐ High motivation

3. I felt emotionally involved or attached to aspects of the trial

☐ Not at all true   ☐ Slightly true   ☐ Somewhat true   ☐ Fairly true   ☐ Very true

4. The completion of the study required a lot of mental effort

☐ Strongly disagree   ☐ Disagree   ☐ Unsure   ☐ Agree   ☐ Strongly agree

5. Have you ever been involved/personally been deeply affected by an automobile accident? (circle one)
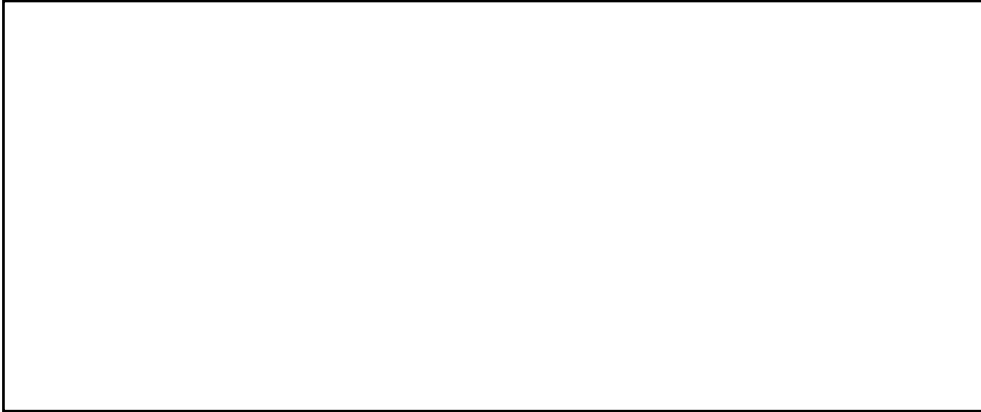Yes
No

I would like to be informed on the outcome of this study (circle one)
Yes
No
E-mail:

Please leave any feedback you may have in the space provided. Thank you for participating in this study.

Forensic Evidence Evaluation Bias Scale
Department of Psychology
The University of Adelaide
Information Processing and Bias in Juror Decision Making

For each of the following questions, please check the box that best reflects your views. Please be honest with your responses, all answers will remain confidential.

1. Every crime can be solved with forensic science.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

2. Every criminal leaves some physical evidence behind at every crime scene.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

3. If forensic evidence suggests a defendant is guilty, this should be enough to convict even if other evidence (e.g. eyewitness testimony, alibi) suggest otherwise.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

4. Forensic evidence always eventually identifies the guilty person.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

5. Forensic evidence always provides a conclusive answer.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

6. Science is the most reliable way to identify the perpetrators of crimes.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

7. If no forensic evidence is recovered from a crime scene, it means the investigators did not look hard enough.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

8. If there is no forensic evidence presented in a particular case, then the jury should not convict.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

9. Police should not charge someone with a serious crime unless forensic evidence is available to prove their guilt.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

10. If no forensic evidence is recovered from a crime scene, the defendant is probably innocent.

☐ Strongly Disagree ☐ Disagree ☐ Don't know ☐ Agree ☐ Strongly Agree

Prosecutor Simpson: If it pleases the court my name is Frances Simpson and I appear for the prosecution.

Counsel Taylor: If it pleases the court my name is Nikki Taylor and I appear for the defence.

Judge Walker: Thank you Counsel. Please read the charge to the accused.

Judge's Associate: Brett Baker, you have been charged under section 19AA of the Criminal Law Consolidation Act, 1935 of the unlawful stalking of Melanie Cook between January 2010 and December 2010. How do you plead?

Brett Baker: Not guilty.

Judge Walker: Ms Cook you may now commence your case.

Prosecutor Simpson: Thank you, Your Honour.

It is the prosecution's duty to prove that the accused, Mr Brett Baker, committed the offence of unlawful stalking that he is charged with. A person stalks another person if on at least two separate occasions, the person follows the other person or loiters outside the place of residence of the other person or some other place frequented by the other person. There must also be present, the intent to carry out such an act.

The prosecution will prove that Mr Baker on many occasions between January 2010 and December 2010 physically committed the offence of stalking by persistently following Ms Melanie Cook and loitering outside both her private home and place of employment. We will also prove he had the intention to stalk Ms Cook and that this can be inferred from the circumstances. Ms Cook will give evidence to explain how often Mr Baker stalked her and her friend, Ms Brooks, will corroborate this evidence. I will now call Ms Cook as my first witness.

Judge's Associate: Please state your full name.

Witness Cook: My name is Melanie Annabelle Cook.

Prosecutor Simpson: Can you please tell the court how your association with the accused commenced?

Witness Cook: We used to go out steadily for about 12 months or so in 2009. I broke off our relationship at a New Year's Eve party in 2009 because of his behaviour.

Prosecutor Simpson: Can you please explain what you mean by "his behaviour"?

Witness Cook: Yes! He was becoming very possessive and paranoid. He was very jealous and wouldn't let me talk privately with any one, not even my female friends.

Prosecutor Simpson: What prompted you to finally break off the relationship?

Witness Cook: He had too much to drink and started to argue with me because I was talking to some of my friends when he went off to the toilets. Brett pushed one of my male friends and then punched him for no reason. I immediately said to him. "That's it, I'm not going out with you." He was angry at first but then tried to apologise. This type of thing had happened in the past and I was tired of it. I wanted the relationship to stop.

Prosecutor Simpson: Ms Cook, could you describe your relationship with the accused since New Year's Eve?

Witness Cook: I no longer wanted go out with him or to see him again. In fact, I was becoming scared of him.

Prosecutor Simpson: Why were you becoming scared?

Witness Cook: He was obsessive. He tried to stop me leaving. He rang me up in the morning to apologise. I spoke to him nicely but made it quite clear that I didn't want to see him again.

Prosecutor Simpson: And what did he do when you told him that?

Witness Cook: (crying) He kept ringing over and over. I answered the phone two or three times but eventually took if off the receiver. He came around about 3pm that afternoon. I was a mess. I spoke to him through the door and told him to leave.

Prosecutor Simpson: Did he leave?

Witness Cook: Not immediately. He just wandered up and down the front of the house or sat in his car. Eventually my friend and flatmate, Jessica Brooks, went outside and asked him to go away. She said I would call the police if he didn't leave.

Counsel Taylor: Objection Your Honour that is hearsay. Ms Cook cannot give evidence about what was said by Ms Brooks in her absence.

Judge Walker: Yes, that is correct. I direct the jury not to take that statement into account.

Prosecutor Simpson: When did the accused leave?

Witness Cook: A few minutes later but he rang up continuously for the remainder of the night.

Prosecutor Simpson: And on what occasions have you seen the accused since that day?

Witness Cook: Almost daily. He either rings or sits in his car outside of the house. It is very scary.

Prosecutor Simpson: Do you in any way welcome his telephone calls or invite him over to your place?

Witness Cook: No! I never have since New Year's Eve. I just wish he would stop making my life hell. I wish he'd get a life. My mother and father were worried about my safety and went to the police. A police officer came over to my house last year and commenced investigations. I never wanted it to go this far. I just wanted Brett to grow up and stop annoying me. I was scared to stay in the house alone, especially at night.

Prosecutor Simpson: Thank you Ms Cook. There will be no more questions. That concludes my examination, Your Honour.

Counsel Taylor: Ms Cook, would you say you had a good relationship with Mr Baker before New Year's Eve?

Witness Cook: Yes, up until....

Counsel Taylor: Could you please just direct your answers to the question. ...What car do you drive Ms Cook?

Prosecutor Simpson: Objection Your Honour, I can't see the relevance of that question to the issue.

Judge Walker: I can't at this stage either Counsel.

Counsel Taylor: I am going to establish that Ms Cook, in fact, drives Mr Baker's car and has never returned it.

Judge Walker: I will allow the question.

Counsel Taylor: I will repeat the question. What car do you drive Ms Cook?

Witness Cook: A 1998 Toyota Corolla.

Counsel Taylor: And who does it belong to?

Witness Cook: It's mine. It's got my sticker that says "49% bitch, 51% sweetheart. Don't push it" on the rear window.

Counsel Taylor: *Hands piece of paper to Ms Cook* Ms Cook is this the registration certificate for the licence number of the car you drive?

Witness Cook: Yes.

Counsel Taylor: Who is shown on the document as being the registered owner of the vehicle?

Witness Cook: Brett Baker.

Counsel Taylor: Miss Cook, I repeat the question. Who owns the 1998 Toyota Corolla you drive?

Witness Cook: I do. Brett gave it to me.

Counsel Taylor: Then why isn't it registered in your name?

Witness Cook: With all the pressure I have been under I haven't been able to get around to it yet.

Counsel Taylor: But it has been over a year since you claimed to have broken up with Mr Baker. The car would be unregistered now. Is it?

Witness Cook: Yes!

Counsel Taylor: Well how is that possible?

Witness Cook: I don't know!

Counsel Taylor: I will tell you. Mr Baker paid for a year's registration and put the label on the car for you.

Witness Cook: I didn't know that.

Counsel Taylor: I think you did and I also believe you encouraged him to do that. What do you say to that?

Witness Cook: I did not!

Counsel Taylor: I also put it to you that you have promised to return the car to Mr Baker but keep making it difficult for him to take possession of it.

Witness Cook: That's not true, he gave it to me.

Counsel Taylor: I also put it to you that you have invited Mr Baker over to your house on many occasions to pick up the car but deliberately keep him waiting so you can accuse him of stalking.

Witness Cook: That's not true, either.

Counsel Taylor: I put it to you that on every occasion he went to your home that he did so at your invitation!

Witness Cook: No…

Counsel Taylor: No further questions your Honour.

Prosecutor Simpson: Ms Cook, does the accused acknowledge your ownership of the vehicle?

Witness Cook: Yes! He let me put my sticker on it. In fact when I broke up with him I offered to give it back but he said no. He said that it was a present and he didn't want it back.

Prosecutor Simpson: How do you account for the renewal of registration? That is, how did the rego sticker get on your car?

Witness Cook: I really don't know. I was about to get in my car one morning when I noticed it had been renewed. I was about to do it that week, in fact. I suspect Brett put it there in the middle of the night.

Prosecutor Simpson: Did you give him permission to renew the registration?

Witness Cook: No!

Prosecutor Simpson: Have you ever invited Brett over to pick up the car?

Witness Cook: No, I have not.

Prosecutor Simpson: Does the accused have a set of keys for your car?

Witness Cook: I suppose he must because it would have been locked when he told me the new registration label was placed on the window screen. I lock the car when I am not in it.

Prosecutor Simpson: Could the accused have had the opportunity to take your car at any time since January 2010?

Witness Cook: Yes, it is often parked outside in the street in front of my house or in the car park near my work. Brett knows where I park it when I am at work.

Prosecutor Simpson: Since January 2010 have you encouraged Mr Baker to phone you or come over to your house for a visit?

Witness Cook: No, his visits and telephone calls are uninvited.

Prosecutor Simpson: No more questions. Thank you Ms Cook.

Judge Walker: Thank you Ms Cook. You may now step down and leave the witness box.

Prosecutor Simpson: I will now call my second witness, Jessica Brooks.

Judge's Associate: Please state your full name.

Witness Brooks: My name is Jessica Linda Brooks.

Prosecutor Simpson: Can you please tell the court about your relationship with Ms Cook.

Witness Brooks: She is my flat-mate. She is also a very close friend.

Prosecutor Simpson: How long have you known Ms Cook?

Witness Brooks: I have known Melanie for over 10 years. We went to high school together.

Prosecutor Simpson: What is your relationship with the accused?

Witness Brooks: He was a friend when he went out with Melanie but I don't want to have anything to do with him now. In fact, I find him scary and I'm frightened of him.

Prosecutor Simpson: Can you please explain?

Witness Brooks: He just hangs around near the house for no reason.

Prosecutor Simpson: To the best of your knowledge has Ms Cook ever invited Brett over to your house over the past 18 months or encouraged him to telephone?

Witness Brooks: Absolutely not! I have heard her yell at him over the phone and cry when he walks up and down in front of the house.

Prosecutor Simpson: How did Melanie acquire her car?

Witness Brooks: Brett gave it to her as a present. I can remember her coming home one day all excited to tell me about it. In fact she went out and bought some pink seat covers from Target the very next day. She even got an Elvis to put on the dash!

Prosecutor Simpson: When was the last time you spoke to the accused, Brett Baker?

Witness Brooks: Well over a year ago. I tried to advise him to leave Melanie alone but it was a waste of time. I reckon he is just a plain old stalker who will only stop annoying Melanie when they put him in gaol.

Counsel Taylor: Objection.

Prosecutor Simpson: I withdraw the question. No more questions, Your Honour.

Judge Walker: Your witness, Ms Taylor.

Counsel Taylor: Is Melanie Cook a close friend of yours?

Witness Brooks: Yes, very close.

Counsel Taylor: You would do anything for her, wouldn't you?

Witness Brooks: Yes, I would.

Counsel Taylor: That would include saying things in court that supports her version of events?

Witness Brooks: No! I would only tell the truth to a court.

Counsel Taylor: You don't like Mr Baker, do you?

Witness Brooks: No, I don't. I did but not now after what he's done.

Counsel Taylor: No more questions Your Honour.

Prosecutor Simpson: Just one last question, Your Honour. Ms Brooks, is the evidence you have given to this court the truth as you believe it?

Witness Brooks: Yes, it is. I only want justice to be done.

Prosecutor Simpson: Thank you Ms Brooks, no more questions.

Judge Walker: Thank you for your evidence Ms Brooks. You may now step down.

Prosecutor Simpson: That concludes the Prosecution's case, Your Honour.

Judge Walker: Ms Taylor, are you ready to commence the defence's case?

Counsel Taylor: I would like to call the accused, Mr Baker, as my witness.

Judge's Associate: Please state your full name.

Witness Baker: My name is Brett Arnold Baker.

Counsel Taylor: What is your relationship with Ms Melanie Cook?

Witness Baker: We are close friends.

Counsel Taylor: Did you ever have a close and intimate relationship?

Witness Baker: Yes, in 2009, but we decided to part but remain close friends.

Counsel Taylor: When did you terminate this close relationship with Ms Cook?

Witness Baker: There was no single day. It just occurred over a period of time starting early in 2010.

Counsel Taylor: Would you like to renew that personal relationship with Ms Cook?

Witness Baker: Well, I would have before this. This is crazy.

Counsel Taylor: Have you phoned Ms Cook or called round her place to see her since January 2010?

Witness Baker: Yes. I am interested to see how she is going. As I said we are close friends.

Counsel Taylor: Has Ms Cook ever invited you over to her house since January 2010?

Witness Baker: Yes, on a number of occasions. She specifically has asked me to come around and say hello.

Counsel Taylor: Do you own a car?

Witness Baker: I have two cars actually, a 1996 Holden Commodore and a 1998 Toyota Corolla.

Counsel Taylor: Where are they now?

Witness Baker: The Commodore should be in the Market car park right now as I drove it to the court today. Melanie has the Toyota. I lent it to her some time ago.

Counsel Taylor: Are you sure you only loaned it to her?

Witness Baker: Yes, I still have the car's registration in my name. I paid for the last 12 months' rego only a short time ago.

Counsel Taylor: Why does Ms Cook still have possession of the vehicle?

Witness Baker: As I have said she is still a friend of mine and she needs the car.

Counsel Taylor: Have you asked for it back?

Witness Baker: Yes, my sister's car needs repairing and she wants to borrow the Toyota. I asked Melanie to give it back to me and she has agreed.

Counsel Taylor: Then why haven't you taken possession of it?

Witness Baker: Every time I go round there it's either locked in the garage or it has a wheel lock on it that I don't have a key for.

Counsel Taylor: How many times has Ms Cook offered to give the car back?

Witness Baker: Probably about once or twice a week.

Counsel Taylor: When was the last time you called around to see Ms Cook?

Witness Baker: Some time in December last year. I stopped going when the police came and saw me and accused me of stalking. I was shocked.

Counsel Taylor: Why do you think this allegation has been made against you?

Witness Baker: It came as a big surprise to me especially as she has invited me around her place so many times to collect the car.

Counsel Taylor: What are your intentions when visiting Ms Cook?

Witness Baker: They have always been friendly visits with the view to saying hello and collecting the car.

Counsel Taylor: No more questions, Your Honour.

Prosecutor Simpson: Mr Baker, how long is it since you last held Melanie's hand?

Witness Baker: I don't know, some time ago I suspect.

Prosecutor Simpson: When was the last time you spoke to her personally face to face?

Witness Baker: I'm not sure, some time last year.

Prosecutor Simpson: Well I am going to suggest to you that you have not touched Ms Cook since New Year's Eve in 2009 or spoken to her face to face since early January 2010. Don't you think that is a strange way for close friends to behave?

Witness Baker: It is if you put it like that.

Prosecutor Simpson: Have you visited Ms Cook uninvited, or at inappropriate hours, such as late at night?

Witness Baker: No, of course not.

Prosecution Simpson: Why not take the car back?

Witness Baker: I didn't want her to think it had been stolen. I knew she'd come up with some bullshit allegation like she is now!

Prosecutor Simpson: I put it to you that the friendship between you and Ms Cook is in your mind only and not in hers. She won't even answer the door when you knock.

Witness Baker: I haven't always knocked on the door.

Prosecutor Simpson: I also put it to you that you gave the Toyota to Ms Cook and you have no legal right to take it back now and Ms Cook has pointed this out to you on a number of occasions in early 2010.

Witness Baker: No! It was only a loan.

Prosecutor Simpson: If Ms Cook is procrastinating so much about returning the car then why didn't you go to the police and make a complaint?

Witness Baker: As I said she is a friend.

Prosecutor Simpson: No more questions, Your Honour.

Judge Walker: Do you want to re-examine the witness, Counsel?

Counsel Taylor: If it please the court, Your Honour. Mr Baker, who owns the Toyota motor vehicle?

Witness Baker: I do, it's registered in my name.

Counsel Taylor: Why have you tried to contact Ms Cook so many times at her home?

Witness Baker: To get my car back after she invited me to do so.

Counsel Taylor: No more questions Your Honour. That concludes the case for the defence.

Judge Walker: I call Dr. Cindy Pointer, the court's pattern evidence expert. Please state your full name and occupation.

Dr. Pointer: Dr. Cindy Pointer. I am an independent pattern evidence expert and Director of a private forensic laboratory based in Adelaide.

Judge Walker: Please summarise your educational qualifications and background for the jury.

Dr. Pointer: I studied forensic science at the University of Sydney, and went on to complete a PhD on improving the quality of degraded CCTV footage or still images. I then established my own laboratory, which analyses still and moving images in support of forensic investigations.

Judge Walker: Dr. Pointer, will you please present your educational material about image comparison that you have prepared.

Dr. Pointer: First, you will be introduced to some of the language used when discussing forensic image comparison evidence in court. Image comparison technology offers a useful tool for identifying people when an image, commonly captured via CCTV, presents a clear picture of an individual's face, and ideally body shape. Pattern evidence should however be taken as only *one* part of all the evidence presented.

Anthropometry refers to the study of sizes and proportions of the human body. It is used in certain circumstances to compare an image of a suspect to another image showing the offender in the process of

committing the crime. Whilst anthropometric comparison does not have the same success as fingerprint or DNA identification, it is sometimes the only evidence, and is more and more frequently used in today's courts.

There is extreme diversity with regard to skeletal structure, predominantly in terms of spatial dimensions present in an individual as well as their face. The permanence coupled with the diversity present within facial bone structures ensures that one's facial structure is almost as unique as a fingerprint.

The forensic examiner is provided with CCTV footage, or a still image. The forensic examiner conducts a significant number of linear measurements, determining distances between different landmarks. This allows the investigator to compare the proportions, locations of landmarks and features, and correlations of linear measurements in one image to one of the suspect to determine whether the individual in the CCTV or other footage is the same as the accused.

Whilst not as accurate as DNA or fingerprinting, facial image comparison is nonetheless frequently used in a society where video and other image capturing technology plays an increasingly vital part in preventing, as well as recording crime.

Judge Walker: The parties may now examine the witness.

Prosecutor Simpson: Dr. Pointer, what anthropometric comparison was made in this case?

Dr. Pointer: In this case, I was provided with a photograph of the suspect, which I analysed using anthropometric techniques, and seven instances of footage from a CCTV camera located outside and facing Ms Cook's place of residence.

Prosecutor Simpson: At what time of the day did the recorded footage take place? And what did it show?

Dr. Pointer: Five instances of the footage were recorded during the day, and two were recorded late at night, between the hours of midnight and 2 am, on seven different days between February and December 2010. It appeared to show a man lurking outside Ms Cook's residence.

Counsel Taylor: Objection Your Honour, Dr. Pointer is not qualified to deem someone to be lurking.

Judge Walker: I have to agree here. Please stick to the facts.

Prosecutor Simpson: Dr. Pointer, what did your analysis reveal?

Dr. Pointer: Anthropometric analysis and comparison indicated a very significant degree of similarity between Brett Baker and the person appearing in the CCTV footage.

Prosecutor Simpson: Can you positively identify the accused, Brett Baker, as the person present in the footage captured via CCTV outside of Ms Cook's home?

Dr. Pointer: No. I can estimate a high likelihood that the individual in the picture is in fact the Brett Baker, and it is my professional opinion that it is highly likely. Given the testimony I think the evidence speaks for itself.

Prosecutor Simpson: Thank you, Dr. Pointer.

Judge Walker: Are there any questions in cross-examination from the defence?

Counsel Taylor: If it pleases the Court. Dr. Pointer, you stated that there is always the chance of a coincidental match. So in this case, is it true that a person other than Brett Baker may have been captured by the footage?

Dr. Pointer: It is possible.

Counsel Taylor: Did any of the footage contain other individuals passing through the area?

Dr. Pointer: Yes, though only during instances of footage recorded during the day.

Counsel Taylor: Dr. Pointer, Brett Baker has also admitted to being outside Ms Cook's residence per Ms Cook's invitation numerous times throughout the year, does your analysis do anything to dispute that fact?

Dr. Pointer: Well, the times at which he appeared in the footage provided seemed quite late, and his movements suspicious.

Counsel Taylor: Suspicious?

Dr. Pointer: Like he wasn't meant to be there. In the footage provided Mr Baker regularly paced back and forth outside Ms Cook's property before leaving.

Counsel Taylor: Dr. Pointer, is it not true that the quality of CCTV footage can be significantly influenced by lighting conditions within the recorded footage, such as whether footage was recorded during the day or at night? Does the degradation of footage in such a manner raise some concerns regarding your identification of the individual in the footage?

Dr. Pointer: It is true that night time conditions and other factors can influence the quality of footage, or an image from a footage. However I have received extensive training in the field and stand by my analysis.

Counsel Taylor: Another question, Doctor. Is it not true that you were aware of some details of the case before conducting your analysis? And were you not aware that police had a suspect, as well as spoken to witnesses?

Dr. Pointer: Yes, it is true that I was made aware of details surrounding the police investigation. This allowed me to get a better idea of what I was examining in the footage.

Counsel Taylor: No further questions, Your Honour.

Judge Walker: Ms Simpson, would you like to re-examine the witness?

Prosecutor Simpson: Just one question, Your Honour. Dr. Pointer, now that you are face to face with the defendant in this courtroom, do you believe the person in the footage could have been Brett Baker?

Dr. Pointer: Yes, I believe the person in the footage was Brett Baker.

Prosecutor Simpson: Thank you, Dr. Pointer. No further questions.

Judge Walker: Are you prepared to give your closing address, Mr Simpson?

Prosecutor Simpson: The prosecution has the burden to prove guilt beyond reasonable doubt. To do this I must prove that the accused had the intent to stalk Ms Cook and that he physically committed the crime of stalking.

As Ms Cook said under oath, evidence supported by Ms Brooks, that she had broken off her relationship with Mr Baker on New Year's Eve 2009 and asked him not to contact her again. He did not follow that advice. His subsequent attention was uninvited and, his visits to her home and telephone calls, clearly constitute the physical element of the offence of unlawful stalking as I outlined in my opening address.

Both prosecution witnesses have said, under oath, that the accused has never been invited to their house after January 2010. He was also told not to come around yet he still did. The accused clearly had intent to contact Ms Cook in a desperate bid to re-build a failed relationship. All of this is supported by the evidence provided by the court's expert witness.

Both prosecution witnesses also testified under oath that Mr Baker gave the Toyota to Ms Cook as a present. The ownership issue is an excuse dreamed up by the accused to explain why he kept Ms Cook under close surveillance.

You should find the accused guilty as charged.

Judge Walker: Defence Counsel, are you ready for your closing address.

Counsel Taylor: Ms Cook is a 'wannna-be bad girl', ladies and gentlemen. Pink seat covers in her hatch-back, listening to the beat of the 90's and dreaming of times with Brett. The prosecution has the burden to prove guilt beyond reasonable doubt. If there is any element of doubt regarding Mr Baker's guilt, he must be given that benefit of doubt and you have an obligation to deliver a verdict of not guilty.

The prosecution has been unable to prove the two elements of the offence of stalking. Mr Baker had no intent to stalk Ms Cook. She had invited him over on many occasions to collect his Toyota but always made it impossible for him to do so. She, in effect, caused him to lawfully wait outside her house because she would not hand the vehicle over to him. Ms Cook wants to see Brett pay. The forensic expert's testimony does not dispute this, as Brett would have likely been capture by footage during the day, whereas the quality and accuracy of the expert's conclusions regarding the night footage are dubious at best, and criminally inaccurate at worst.

There has been no stalking as Ms Cook invited the accused to her house. This is further proven by the fact that Ms Cook acknowledges that the Toyota's registration is still in my client's name. Surely, if she was genuine in her claims she would have arranged for the transfer of registration or make attempts to do so. I ask you to discount completely the evidence of Ms Brooks. She is in the front passenger seat and along for the ride.

Clearly the prosecution has not proven its case and I ask you to find the accused not guilty.

That concludes my closing address, Your Honour.

Judge Walker: That concludes the cases for the prosecution and the defence. It is now my responsibility to sum up the case.

 You, as the jury, are ultimately in charge of the facts. Anything I say is to assist you. You may disagree with me. You are however bound by what I say is the law. You are charged with the responsibility of determining the guilt of the accused. You must weigh up the conflicting evidence presented by the three witnesses, decide which facts you find proven beyond reasonable doubt if any, and reach a verdict of guilty or not guilty.

 In many respects your decision will depend upon your view of the credibility of the conflicting witnesses, the forensic evidence, and the inherent plausibility of the stories they told.

I now ask you to retire to reach a verdict.

RESOLUTION OF A CRIMINAL CASE

A Trial

R v
DREAMER

Brent Dreamer has been charged with unlawful stalking, an offence pursuant to Section 19AA of the *Criminal Law Consolidation Act, 1935*. He was found to have a case to answer at a preliminary hearing held at the Adelaide Magistrates Court and has elected trial by jury. The trial is conducted in the District Court before Judge Boomer.

PARTICIPANTS
Judge Boomer
The accused - Brent Dreamer
Judge's Associate
Prosecution - Mr/Ms Driver
Defence Counsel - Mr/Ms Shield
Prosecution Witness - Molly Simpson
Prosecution Witness - Jessica Clancy
Defence Witness - Brent Dreamer

Judge Boomer :   Good morning.

Prosecutor Driver : If it pleases the court my name is Francis Driver and I appear for the prosecution.

Counsel Shield : If it pleases the court my name is Nick/Niki Shield and I appear for the defence.

Judge Boomer: Thank you Counsel.   Please read the charge to the accused.

The accused, Brent Dreamer, stands in the dock and faces the Bench.

Judge's Associate: Brent Dreamer, you have been charged under section 19AA of the Criminal Law Consolidation Act, 1935 of the unlawful stalking of Molly Simpson between January 2000 and December 2000. How do you plead?

Brent Dreamer: Not guilty

Ms Driver you may now commence your case.

Prosecutor Driver : Thank you, Your Honour.

It is the prosecution's duty to prove that the accused, Mr Brent Dreamer, committed the offence of unlawful stalking that he is charged with. This burden must be met to a very strict standard of proof. You, ladies and gentleman of the jury, must decide the facts and you must be satisfied that the accused is guilty beyond reasonable doubt. If an element of doubt exists you must find the accused not guilty.

Mr Dreamer is accused of unlawful stalking. A person stalks another person if on at least two separate occasions, the person follows the other person or loiters outside the place of residence of the other person or some other place frequented by the other person. There must also be present, the intent to carry out such an act.

The prosecution will prove that Mr Dreamer on many occasions between January 2000 and December 2000 physically committed the offence of stalking by persistently following Ms Molly Simpson and loitering outside both her private home and place of employment. We will also prove he had the intention to stalk Ms Simpson and that this can be inferred from the circumstances.

Ms Simpson will give evidence to explain how often Mr Dreamer stalked her and her friend, Ms Clancy, will corroborate this evidence. I will now call Ms Simpson as my first witness.

Witness Simpson : My name is Molly Annabelle Simpson.

Prosecutor Driver : Do you know the accused, Mr Dreamer?

Witness Simpson : Yes I do.

Prosecutor Driver : Can you please tell the court how your association with the accused commenced?

Witness Simpson : We used to go out steadily for about 12 months or so in 1999.

Prosecutor Driver : You said "used" to. Can you clarify what you mean?

Witness Simpson : I broke off our relationship at a New Year's Eve party in 1999 because of his behaviour.

Prosecutor Driver : Can you please explain what you mean by "his behaviour"?

Witness Simpson : Yes! He was becoming very possessive and paranoid. He was very jealous and wouldn't let me talk privately with any one, not even my female friends.

Prosecutor Driver : What prompted you to finally break off the relationship?

Witness Simpson : He had too much to drink and started to argue with me because I was talking to some of my friends when he went off to the toilets.

Prosecutor Driver : And what happened?

Witness Simpson : Brent pushed one of my male friends and then punched him for no reason. I immediately said to him. "That's it, I'm not going out with you."

Prosecutor Driver : And then what happened?

Witness Simpson : He was angry at first but then tried to apologise. This type of thing had happened in the past and I was tired of it. I wanted the relationship to stop.

Prosecutor Driver : And how did you get home that evening?

Witness Simpson : I wanted to find my own way home but Brent wouldn't let me. In the end I phoned my father and he came and picked me up.

Prosecutor Driver : Have you seen Brent at your home since that date?

Counsel Shield : I object Your Honour, the prosecution is trying to lead the witness.

Judge Boomer : I have to agree with Counsel Ms Driver. It is a point in issue. Perhaps you could rephrase the question without prompting the answer.

Prosecutor Driver : If you please Your Honour. Ms Simpson, could you describe your relationship with the accused since New Year's Eve?

Witness Simpson : I no longer wanted go out with him or to see him again. In fact, I was becoming scared of him.

Prosecutor Driver : Why were you becoming scared?

Witness Simpson : He was obsessive. He tried to stop me leaving. He rang me up in the morning to apologise. I spoke to him nicely but made it quite clear that I didn't want to see him again.

Prosecutor Driver : And what did he do when you told him that?

Witness Simpson : (crying) He kept ringing over and over. I answered the phone two or three times but eventually took if off the receiver.

Prosecutor Driver : And then what happened?

Witness Simpson : He came around about 3pm that afternoon. I was a mess. I spoke to him through the door and told him to leave.

Prosecutor Driver : Did he leave?

Witness Simpson : Not immediately. He just wandered up and down the front of the house or sat in his car. Eventually my friend and flatmate, Jessica Clancy, went outside and asked him to go away. She said I would call the police if he didn't leave.

Counsel Shield : Objection Your Honour, that is hearsay. Ms Simpson cannot give evidence about what was said by Ms Clancy in her absence.

Judge Boomer : Yes, that is correct. I direct the jury not to take that statement into account. What was actually said will depend on Ms Clancy's evidence.

Prosecutor Driver : When did the accused leave?

Witness Simpson : A few minutes later but he rang up continuously for the remainder of the night.

Prosecutor Driver : And on what occasions have you seen the accused since that day?

Witness Simpson : Almost daily. He either rings or sits in his car outside of the house. It is very scary.

Prosecutor Driver : Do you in any way welcome his telephone calls or invite him over to your place?

Witness Simpson : No! I never have since New Year's Eve. I just wish he would stop making my life hell. I wish he'd get a life.

Prosecutor Driver : And when did the police become involved?

Witness Simpson : My mother and father were worried about my safety and went to the police. A police officer came over to my house last year and commenced investigations.

Prosecutor Driver : What is your response to the police action against the accused?

Witness Simpson : I never wanted it to go this far. I just wanted Brent to grow up and stop annoying me. I was scared to stay in the house alone, especially at night.

Prosecutor Driver : Thank you Ms Simpson. There will be no more questions.

 That concludes my examination, Your Honour.

Judge Boomer : Do you wish to cross examine Ms Shield?

Counsel Shield : Thank you Your Honour. Ms Simpson, would you say you have had a good relationship with Mr Dreamer before New Year's Eve?

Witness Simpson : Yes, up until ....

Counsel Shield : Could you please just direct your answers to the question. ...What car do you drive Ms Simpson?

Prosecutor Driver : Objection Your Honour, I can't see the relevance of that question to the issue.

Judge Boomer : I can't at this stage either Counsel.

Counsel Shield : I am going to establish that Ms Simpson, in fact, drives Mr Dreamer's car and has never returned it.

Judge Boomer : I will allow the question.

Counsel Shield : I will repeat the question. What car do you drive Ms Simpson?

Witness Simpson : A 1992 Toyota Corolla.

Counsel Shield : And who does it belong to?

Witness Simpson : It's mine. It's got my sticker that says "49% bitch, 51% sweetheart. Don't push it" on the rear window

Counsel Shield: May the witness be shown this document? It's a current registration certificate issued by the Department of Road Transport.

Judge Boomer: Do you have any objections, Ms Driver?

Prosecutor Driver : No, Your Honour

Counsel Shield: Ms Simpson is that the registration certificate for the licence number of the car you drive?

Witness Simpson: Yes.

Counsel Shield: Who is shown on the document as being the registered owner of the vehicle?

Witness Simpson: Brent Dreamer

Counsel Shield: Your Honour I wish to tender that document as evidence.

Judge Boomer: Yes. Please mark it as Exhibit D1

Counsel Shield: Miss Simpson, I repeat the question. Who owns the 1992 Toyota Corolla you drive?

Witness Simpson: I do. Brent gave it to me.

Counsel Shield: Then why isn't it registered in your name?

Witness Simpson: With all the pressure I have been under I haven't been able to get around to it yet.

Counsel Shield: But it has been over a year since you claimed to have broken up with Mr Dreamer. The car would be unregistered now. Is it?

Witness Simpson: Yes!

Counsel Shield: Well how is that possible?

Witness Simpson: I don't know!

Counsel Shield: Well I will tell you. Mr Dreamer paid for a year's registration and put the label on the car for you.

Witness Simpson: I didn't know that.

Counsel Shield: I think you did and I also believe you encouraged him to do that. What do you say to that?

Witness Simpson: I did not!

Counsel Shield: I also put it to you that you have promised to return the car to Mr Dreamer but keep making it difficult for him to take possession of it.

Witness Simpson: That's not true, he gave it to me.

Counsel Shield: I also put it to you that you have invited Mr Dreamer over to your house on many occasions to pick up the car but deliberately keep him waiting so you can accuse him of stalking.

Witness Simpson: That's not true, either.

Counsel Shield: I put it to you that on every occasion he attended at your home that he attended at your invitation!

Witness Simpson: No

Counsel Shield: No further questions your honour.

Prosecutor Driver: Ms Simpson, who does the 1992 Toyota Corolla belong to?

Witness Simpson: It's mine.

Prosecutor Driver: How did you obtain it?

Witness Simpson: Brent Dreamer gave it to me as a present in 1999.

Prosecutor Driver: Why didn't you register it in your name?

Witness Simpson: I had intended to but all of the problems of the past year or so have occupied my time.

Prosecutor Driver: Does the accused acknowledge your ownership of the vehicle?

Witness Simpson: Yes! He let me put my sticker on it. In fact when I broke up with him I offered to give it back but he said no. He said that it was a present and he didn't want it back.

Prosecutor Driver: How do you account for the renewal of registration? That is, how did the rego sticker get on your car?

Witness Simpson: I really don't know. I was about to get in my car one morning when I noticed it had been renewed. I was about to do it that week, in fact. I suspect Brent put it there in the middle of the night.

Prosecutor Driver: Did you give him permission to renew the registration?

Witness Simpson: No!

Prosecutor Driver: Have you ever invited Brent over to pick up the car?

Witness Simpson: No, I have not.

Prosecutor Driver: Does the accused have a set of keys for your car?

Witness Simpson: I suppose he must because it would have been locked when he told me the new registration label was placed on the window screen. I lock the car when I am not in it.

Prosecutor Driver: Could the accused have had the opportunity to take your car at any time since January 2000?

Witness Simpson: Yes, it is often parked outside in the street in front of my house or in the car park near my work. Brent knows where I park it when I am at work.

Prosecutor Driver: Since January 2000 have you encouraged Mr Dreamer to phone you or come over to your house for a visit?

Witness Simpson: No, his visits and telephone calls are uninvited.

Prosecutor Driver: No more questions. Thank you Ms Simpson.

Judge Boomer: Thank you Ms Simpson. You may now step down and leave the witness box.

Prosecutor Driver: I will now call my second witness, Jessica Clancy.

Judge's Associate: Please state your full name.

Witness Clancy: My name is Jessica Linda Clancy.

Judge Boomer: You may be seated

Prosecutor Driver: Can you please tell the court about your relationship with Ms Simpson.

Witness Clancy: She is my flat-mate. She is also a very close friend.

Prosecutor Driver: How long have you known Ms Simpson?

Witness Clancy: I have known Molly for over 10 years. We went to high school together.

Prosecutor Driver: Are you familiar with the accused, Brent Dreamer?

Witness Clancy: Yes! He was Molly's boyfriend until the New Year's Eve party in 1999.

Prosecutor Driver: What is your relationship with the accused?

Witness Clancy: He was a friend when he went out with Molly but I don't want to have anything to do with him now. In fact, I find him scary and I'm frightened of him. Page 11 of 20

Prosecutor Driver: Can you please explain?

Witness Clancy: He just hangs around near the house for no reason.

Prosecutor Driver: To the best of your knowledge has Ms Simpson ever invited Brent over to your house over the past 18 months or encouraged him to telephone?

Witness Clancy: Absolutely not! I have heard her yell at him over the phone and cry when he walks up and down in front of the house.

Prosecutor Driver: How did Molly acquire her car?

Witness Clancy: Brent gave it to her as a present. I can remember her coming home one day all excited to tell me about it.

Prosecutor Driver: Are you sure?

Witness Clancy: Absolutely! In fact she went out and bought some pink seat covers from Target the very next day. She even got an Elvis to put on the dash!

Prosecutor Driver: When was the last time you spoke to the accused, Brent Dreamer?

Witness Clancy: Well over a year ago. I tried to advise him to leave Molly alone but it was a waste of time. I reckon he is just a plain old stalker who will only stop annoying Molly when they put him in gaol.

Counsel Shield: Objection

Prosecutor Driver: I withdraw the question. No more questions, Your Honour.

Judge Boomer: Your witness, Ms Shield.

Counsel Shield: Is Molly Simpson a close friend of yours?

Witness Clancy: Yes, very close.

Counsel Shield: You would do anything for her, wouldn't you?

Witness Clancy: Yes, I would.

Counsel Shield: That would include saying things in court that supports her version of events?

Witness Clancy: No! I would only tell the truth to a court.

Counsel Shield: You don't like Mr Dreamer, do you?

Witness Clancy: No, I don't. I did but not now after what he's done.

Counsel Shield: No more questions Your Honour

Judge Boomer: Would you like to re-examine the witness Ms Driver?

Prosecutor Driver: Just one question, Your Honour. Ms Clancy, is the evidence you have given to this court the truth as you believe it?

Witness Clancy: Yes, it is. I only want justice to be done.

Prosecutor Driver: Thank you Ms Clancy, no more questions

Judge Boomer: Thank you for your evidence Ms Clancy. You may now step down.

Prosecutor Driver: That concludes the Prosecution's case, Your Honour.

Judge Boomer: Mr/Ms Shield, are you ready to commence the defence's case?

Counsel Shield: I would like to call the accused, Mr Dreamer, as my witness.

Judge's Associate: Please take the Bible in your hand.   Do you swear that you will tell the truth, the whole truth and nothing but the truth, so help you God? Say "I swear".

Witness Dreamer: I swear!

Judge's Associate: Please state your full name.

Witness Dreamer: My name is Brent Zalon Dreamer.

Judge Boomer: You may be seated

Counsel Shield: What is your relationship with Ms Molly Simpson?

Witness Dreamer: We are close friends.

Counsel Shield: Did you ever have a close and intimate relationship?

Witness Dreamer: Yes, in 1999, but we decided to part but remain close friends.

Counsel Shield: When did you terminate this close relationship with Ms Simpson?

Witness Dreamer: There was no single day. It just occurred over a period of time starting early in 2000.

Counsel Shield: Would you like to renew that personal relationship with Ms Simpson?

Witness Dreamer: Well, I would have before this. This is crazy.

Counsel Shield: Have you phoned Ms Simpson or called round her place to see her since January 2000?

Witness Dreamer: Yes. I am interested to see how she is going. As I said we are close friends.

Counsel Shield: Has Ms Simpson ever invited you over to her house since January 2000?

Witness Dreamer: Yes, on a number of occasions. She specifically has asked me to come around and say hello.

Counsel Shield: Do you own a car?

Witness Dreamer: I have two cars actually, a 1996 Holden Commodore and a 1992 Toyota Corolla.

Counsel Shield: Where are they now?

Witness Dreamer: The Commodore should be in the Market car park right now as I drove it to the court today. Molly has the Toyota. I lent it to her some time ago.

Counsel Shield: Are you sure you only loaned it to her?

Witness Dreamer: Yes, I still have the car's registration in my name. I paid for the last 12 months' rego only a short time ago.

Counsel Shield: Why does Ms Simpson still have possession of the vehicle?

Witness Dreamer: As I have said she is still a friend of mine and she needs the car.

Counsel Shield: Have you asked for it back?

Witness Dreamer: Yes, my sister's car needs repairing and she wants to borrow the Toyota. I asked Molly to give it back to me and she has agreed.

Counsel Shield: Then why haven't you taken possession of it?

Witness Dreamer: Every time I go round there it's either locked in the garage or it has a wheel lock on it that I don't have a key for.

Counsel Shield: How many times has Ms Simpson offered to give the car back? Page 14 of 20

Witness Dreamer: Heaps of times.

Counsel Shield: Can you be more precise?

Witness Dreamer: Probably about once or twice a week.

Counsel Shield: When was the last time you called around to see Ms Simpson?

Witness Dreamer: Some time in December last year. I stopped going when the police came and saw me and accused me of stalking. I was shocked.

Counsel Shield: Why do you think this allegation has been made against you?

Witness Dreamer: It came as a big surprise to me especially as she has invited me around her place so many times to collect the car.

Counsel Shield: What are your intentions when visiting Ms Simpson?

Witness Dreamer: They have always been friendly visits with the view to saying hello and collecting the car.

Counsel Shield: No more questions, Your Honour.

Judge Boomer: Do you wish to cross-examine the witness, Mr/Ms Driver?

Prosecutor Driver: Yes please, Your Honour. Mr Dreamer, how long is it since you last held Molly's hand?

Witness Dreamer: I don't know, some time ago I suspect.

Prosecutor Driver: When was the last time you spoke to her personally face to face?

Witness Dreamer: I'm not sure, some time last year.

Prosecutor Driver: Well I am going to suggest to you that you have not touched Ms Simpson since New Year's Eve in 1999 or spoken to her face to face since early January 2000. Don't you think that is a strange way for close friends to behave?

Witness Dreamer: It is if you put it like that.

Prosecution Driver: Why not take the car back?

Witness Dreamer: I didn't want her to think it had been stolen. I knew she'd come up with some bullshit allegation like she is now!

Prosecutor Driver: I put it to you that the friendship between you and Ms Simpson is in your mind only and not in hers. She won't even answer the door when you knock.

Witness Dreamer: I haven't always knocked on the door.   Page 15 of 20

Prosecutor Driver: I also put it to you that you gave the Toyota to Ms Simpson and you have no legal right to take it back now and Ms Simpson has pointed this out to you on a number of occasions in early 2000.

Witness Dreamer: No! It was only a loan.

Prosecutor Driver: If Ms Simpson is procrastinating so much about returning the car then why didn't you go to the police and make a complaint?

Witness Dreamer: As I said she is a friend.

Prosecutor Driver: No more questions, Your Honour.

Judge Boomer: Do you want to re-examine the witness, Counsel?

Counsel Shield: If it please the court, Your Honour.

Mr Dreamer, who owns the Toyota motor vehicle?

Witness Dreamer: I do, it's registered in my name.

Counsel Shield: Why have you tried to contact Ms Simpson so many times at her home?

Witness Dreamer: To get my car back after she invited me to do so.

Counsel Shield: No more questions Your Honour. That concludes the case for the defence.

Sheriff's Officer escorts the witness back to the dock.

Judge Boomer: Are you prepared to give your closing address, Mr/Ms Driver?

Prosecutor Driver: The prosecution has the burden to prove guilt beyond reasonable doubt. To do this I must prove that the accused had the intent to stalk Ms Simpson and that he physically committed the crime of stalking.

As Ms Simpson said under oath, evidence supported by Ms Clancy, that she had broken off her relationship with Mr Dreamer on New Year's Eve 1999 and asked him not to contact her again. He did not follow that advice. His subsequent attention was uninvited and, his visits to her home and telephone calls, clearly constitute the physical element of the offence of unlawful stalking as I outlined in my opening address.

Both prosecution witnesses have said, under oath, that the accused has never been invited to their house after January 2000. He was also told not to come around yet he still did. The accused clearly had intent to contact Ms Simpson in a desperate bid to re-build a failed relationship.

Both prosecution witnesses also testified under oath that Mr Dreamer gave the Toyota to Ms Simpson as a present. The ownership issue is merely an excuse dreamed up by the accused to explain why he kept Ms Simpson under close surveillance.

You should find the accused guilty as charged.

Judge Boomer: Defence Counsel, are you ready for your closing address.

Counsel Shield: May it please the Court Your Honour. Let me commence by painting a picture of Ms Simpson. Ms Simpson is a 'wannna-be bad girl', ladies and gentlemen. Pink seat covers in her hatch-back, listening to the beat of the 80's and dreaming of times with Brent. I remind you that the prosecution has the burden to prove guilt beyond reasonable doubt. It there is any element of doubt regarding Mr Dreamer's guilt, he must be given that benefit of doubt and you have an obligation to deliver a verdict of not guilty.

The prosecution has been unable to prove the two elements of the offence of stalking. Mr Dreamer had no intent to stalk Ms Simpson. She had invited him over on many occasions to collect his Toyota but always made it impossible for him to do so. She, in effect, caused him to lawfully wait outside her house because she would not hand the vehicle over to him. Ms Simpson wants to see Brent pay.

There has been no stalking as Ms Simpson invited the accused to her house. This is further proven by the fact that Ms Simpson acknowledges that the Toyota's registration is still in my client's name. Surely, if she was genuine in her claims she would have arranged for the transfer of registration or make attempts to do so.

I ask you to discount completely the evidence of Ms Clancy. She is in the front passenger seat and along for the ride.

Clearly the prosecution has not proven its case and I ask you to find the accused not guilty.

That concludes my closing address, Your Honour.

Judge Boomer: That concludes the cases for the prosecution and the defence. It is now my responsibility to sum up the case.

You, as the jury, are ultimately in charge of the facts. Anything I say is to assist you. You may disagree with me. You are however bound by what I say is the law. You are charged with the responsibility of determining the guilt of the accused. You must weigh up the conflicting evidence presented by the three witnesses, decide which facts you find proven beyond reasonable doubt if any, and reach a verdict of guilty or not guilty.

The case in many regards is a simple one. There is little contention that Mr Dreamer did attend at Ms Simpson's house on a number of occasions since New Years and the end of their relationship. On his own evidence, Mr Dreamer attended at Ms Simpson's home on a number of occasions. I direct you that if you find he did go to the house that this is sufficient to satisfy the physical element of the offence of stalking. It seems to me the real issue in this case is whether you can be satisfied beyond reasonable doubt that Mr Dreamer intended to stalk Ms Simpson. This is the mental element required.

To be satisfied of this you will need to consider the conflicting claims of Mr Dreamer and Ms Simpson about the reason for his attendance at her home.

You will need to exclude as a possibility that Mr Dreamer was attending at her home at her invitation to collect a car that he loaned her in order to find him guilty. This will require consideration of the issue about the ownership and registration of the vehicle and Ms Simpson's claim it was a gift.

In many respects your decision will depend upon your view of the credibility of the conflicting witnesses and the inherent plausibility of the stories they told.

I now ask you to retire to reach a verdict.

<div align="center">

Preliminary Verdict Request
Department of Psychology
The University of Adelaide
Information Processing and Bias in Juror Decision Making

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The following text was displayed immediately after each testimony for participants prompted to review some or all testimony.

You will now be shown the most recent testimony a second time. Please review it at your own leisure.

When you have done so, please complete the questions on the following page. Please answer honestly and truthfully. There are no right or wrong answers, and all answers will remain confidential. The trial transcript will continue afterward.

You will now be shown all the testimony presented so far a second time. Please review it at your own leisure.

When you have done so, please complete the questions on the following page. Please answer honestly and truthfully. There are no right or wrong answers, and all answers will remain confidential. The trial transcript will continue afterward.

The following text was displayed immediately after participants prompted to review testimony were presented with the testimony or testimonies in question for review.

If you were required to provide a preliminary verdict at this point, given the evidence provided so far, how would you find the defendant? (select one)

-Guilty
-Not Guilty

What do you currently believe to be the likelihood of the defendant's guilt? (place an X anywhere on the line):

0%——10%——20%——30%——40%——50%——60%——70%——80%——90%——100%

Did you take your time and review the testimony? (select one)

-I reviewed most/all of it
-I reviewed some of it
-No