


2015

# The Effect of Confirmation Bias on Criminal Investigative Decision Making

Wayne A. Wallace  
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# Walden University

College of Social and Behavioral Sciences

This is to certify that the doctoral dissertation by

Wayne A. Wallace

has been found to be complete and satisfactory in all respects,  
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Walden University  
2015

Abstract

The Effect of Confirmation Bias in Criminal Investigative Decision Making

by

Wayne A. Wallace

MA, The Chicago School of Professional Psychology, 2010

BA, Adams State College, 1986

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

Walden University

March 2015

## Abstract

Confirmation bias occurs when a person believes in or searches for evidence to support his or her favored theory while ignoring or excusing disconfirmatory evidence and is disinclined to change his or her belief once he or she arrives at a conclusion. The purpose of this quantitative study was to examine whether emotionally charged evidence and evidence presentation order could influence an investigator's belief in a suspect's guilt. The study included 166 sworn police officers (basic training recruits, patrol officers, and criminal investigators) who completed online surveys in response to criminal vignettes across different scenarios to record their measure of guilt belief. Analysis of variance was used to assess the relationship between the 3 independent variables: duty assignment (recruit, patrol, investigator), scenario condition (child and adult sexual assault), and evidence presentation order (sequential, simultaneous, reverse sequential). The dependent variable was confirmation bias (Likert-scaled 0–10 guilt judgment). According to the study results, confirmation bias was least evident in criminal investigators with more experience and training, and both emotion and evidence presentation order can influence guilt judgment. The findings generalize to criminal investigators and attest to the importance of working to include and exclude suspects and to withhold judgment until all available evidence is analyzed. Investigators benefit from this study and through their improved decision making, society benefits as well. This study will contribute to the need for professional dialogue concerning objective fact finding by criminal investigators and avoiding incidents of wrongful conviction.

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## Dedication

For the greatest man I've known, who passed away late in this process. I hope you would be proud, Dad. For my bride, you understood my need to face a computer rather than a vacation, and your sacrifice, consideration, and unselfishness is truly one-of-a-kind. Without your unconditional love, support and encouragement, I would never have come close to completing this. I love you Laurie. For my precious Marley, may you one day understand that the price for success is high, but so is the reward. I love you to the moon...

To the dedicated men and women of law enforcement who endeavor to persevere daily through difficult circumstances in an ever-changing social and criminal landscape, amongst a cadre of second guessers and critics; may you always search for truth and sustain the courage to speak it.

“He who does not expect the unexpected will not detect it”

Karl Popper

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## Table of Contents

List of Tables .....	vi
List of Figures .....	vii
Chapter 1: Introduction to the Study.....	1
Introduction.....	1
Background .....	2
Problem Statement .....	4
Literature Review.....	7
Nature of the Study .....	10
Purpose of the Study .....	12
Research Questions .....	13
Theoretical and Conceptual Support.....	14
Expected Utility .....	15
Rational Choice.....	16
Prospect Theory .....	16
Bounded Rationality .....	17
Definitions.....	19
Assumptions.....	25
Limitations .....	26
Significance.....	27
Summary .....	28
Chapter 2: Literature Review .....	30



Introduction.....	30
Literature Search Strategy.....	37
Theoretical Foundation.....	40
Rational Choice.....	40
Expected Utility.....	41
Prospect Theory.....	41
Social Functionalist Theory.....	42
Bounded Rationality.....	43
Naïve Realism.....	44
Bias Blind Spot.....	44
Information Processing Theory.....	46
Intuition.....	47
Heuristics and Biases.....	47
Anger Attributional Affect.....	48
Police Organizational Culture.....	49
Literature Review.....	52
Summary.....	63
Chapter 3: Research Method.....	68
Introduction.....	68
Research Questions and Hypotheses.....	68
Research Design.....	69
Setting, Population, and Sample.....	70

Design .....	71
Instrumentation and Materials .....	73
Vignette Experiment 1 .....	73
Description of Evidence – Sequential and Simultaneous .....	74
Recording Responses – Sequential and Simultaneous.....	76
Description of Evidence – Reverse Sequential and Simultaneous .....	77
Recording Responses – Reverse Sequential and Simultaneous.....	79
Vignette Experiment 2 .....	80
Description of Evidence – Sequential and Simultaneous .....	80
Recording Responses – Sequential and Simultaneous.....	83
Description of Evidence - Reverse Sequential and Simultaneous .....	84
Recording Responses – Reverse Sequential and Simultaneous.....	87
Data Collection .....	87
Data Analysis .....	88
Ethical Considerations .....	89
Summary .....	90
Chapter 4: Results .....	91
Introduction.....	91
Data Collection .....	92
Sample Description.....	93
Model Assumptions and Outliers.....	94
Relevant Variable Descriptions .....	95

Evidence of Confirmation Bias.....	97
Emotional Factors.....	99
Research Questions and Results .....	101
Research Question 1 .....	101
Discussion.....	104
Research Question 2 .....	104
Discussion.....	111
Research Question 3 .....	112
Discussion.....	118
Summary of Results.....	119
Chapter 5: Discussion, Conclusions, and Recommendations.....	121
Introduction.....	121
Overview of Current Study.....	122
Interpretation of Findings .....	122
Research Question 1 .....	122
Research Question 2 .....	123
Research Question 3 .....	124
Summary.....	124
Summary of Implications.....	125
Limitations of the Study.....	126
Social Change Implications .....	128
Recommendations for Action .....	129

Future Research Implications .....	132
Summary .....	133
Appendix A: Investigative Scenario Survey .....	157
Appendix B: Investigative Scenario Survey .....	162
Appendix C: Investigative Scenario Survey .....	166
Appendix D: Investigative Scenario Survey .....	171
Appendix E: Investigative Scenario Survey .....	177
Appendix F: Investigative Scenario Survey .....	182
Appendix G: Investigative Scenario Survey .....	188
Appendix H: Demographic Questionnaire.....	193
Appendix I: Implied Consent.....	201
Appendix J: IRB Approval .....	205
Appendix K: Demographic Frequencies and Percentages.....	207
Appendix L: Participant’s Experiential Characteristics.....	208
Appendix M: Frequencies, Means and Standard Deviations.....	210

## List of Tables

Table 1. Demographic Sample Characteristics.....	94
Table 2. Initial Report Frequency, Means, and Standard Deviations .....	102
Table 3. Initial Report ANOVA.....	103
Table 4. Frequency, Means, Standard Deviations of Crime Scene & Victim Interview	107
Table 5. Univariate Tests for Initial Report.....	108
Table 6. Victim Interview 3-way ANOVA.....	110
Table 7. Change in Means and Standard Deviation, Victim to Suspect Interviews .....	111
Table 8. Order of Evidence Presentation .....	113
Table 9. Changes in Mean Scores of Victim Interview Guilt Belief Scores .....	115
Table 10. Simultaneous Evidence Presentation, Guilt, or Innocence .....	118

## List of Figures

Figure 1. Legal thresholds of guilt.....	96
Figure 2. Guilt belief scale.....	98
Figure 3. Initial report mean scores.....	109
Figure 4. Child sequential mean scores.....	113
Figure 5. Child reverse sequential mean scores.....	114
Figure 6. Adult sequential mean scores.....	117

## Chapter 1: Introduction to the Study

### **Introduction**

In the last half-century, researchers have examined bias and heuristic research with confirmation bias being investigated by Wasson (1960), useful heuristics explained by Tversky and Kahneman (1974), and a compendium of confirmation bias research assembled by Nickerson (1998). More recently, in the last decade there has been an increased forensic interest in understanding confirmation bias and emotion in legal settings (Ask & Granhag, 2005; Ask, Rebelius, & Granhag, 2008; Bornstein & Wiener, 2006; Capestany & Harris, 2014; Dror & Fraser-Mackenzie, 2009; O'Brien, 2009; Rassin, 2008, 2010; Schwind & Budner, 2012; Schrackmann & Oswald, 2014; Snook & Cullen, 2009). The phenomenon of confirmation bias in criminal investigative decision making continues to evolve.

Despite the growing interest in heuristics and biases, an area of research that remains neglected involves practical law enforcement decision making (Wiener, Bornstein & Voss, 2006). The applicability of these biases under different circumstances has been the subject of exploration for many different disciplines (Griffin & Tversky, 1992; Kosnik, 2007). Capestany and Harris (2014) reported on the effect of emotion on legal decision making and the need for recognizing the intention behind the decision making behavior. West, Toplak, and Stanovich (2008) investigated cognitive biases and heuristics as aspects of critical thinking. The purpose of this study was to examine the phenomenon of confirmation bias in context to the nature of law enforcement decision making in the criminal justice system.

Among the cognition errors that affect information processing and decision making, confirmation bias has been described as the single most problematic aspect of human reasoning (Nickerson, 1998). Confirmation bias can lead people to selectively attend to information consistent with their prior convictions based upon available information, (Jonas, Schulz-Hardt, Frey, & Thelen, 2001), thereby bolstering a favored hypothesis (Kosnik, 2008). Confirmation bias may also occur through interpreting ambiguous evidence in a biased manner or recalling information selectively, often resulting in biased reframing of information (Dror, 2005). A more detailed discussion on confirmation bias in decision making is discussed in Chapter 2.

In this chapter, I introduce the psychological phenomenon of confirmation bias and its potential to adversely affect judgment and decision making in a criminal investigative setting as the background of the problem. This section will serve as an overview for this study and will include the problem statement, nature of the study, research questions and hypotheses, theoretical basis, key definitions of variables and operational terms, assumptions, limitations, and delimitations. This chapter will also include the significance of the problem and the social change implications of this study.

### **Background**

In arriving at decisions about evidence, criminal investigators do not always employ judgment about evidence that is accurate (Dror & Bucht, 2011). Forensic science pioneer Luke May (1936), noted “the eyes see in things only what they look for, and they look only for what is already in the mind. Often the most significant piece of evidence is overlooked or misinterpreted because someone has jumped to a premature conclusion”



(p. 59). Technology has changed significantly since May made this observation, but the social cognition errors made by criminal investigators remain the same. Difficult and complex circumstances that lead to human error expose the frailty of the decision-making process when certain information is withheld or mistaken (Manning, 1977). Together the errors often comprise social cognition errors that can be fatal to determining legal probable cause (Schrackmann & Oswald, 2014). Therefore, it is not only what the investigator finds out, but also how they find it that is important.

As human beings, law enforcement officers are susceptible to biases, heuristics, schema, and emotion that can interfere with information processing and decision making (Kosnik, 2008; Neuberg & Fiske, 1987). Investigators maintain dual roles as citizens and as criminal investigative fact finders. They have their own (closed) social world (Klinger, 2004; Manning, 1997), and another, less conspicuous one that they delve into when dealing with criminal behavior. Both roles develop certain expectations and social cognition to make enough sense out of their environment and to function adequately (Manning, 1997). Problems can arise when expectations and environments contaminate objectivity in decision making. Wilson and Brekke (1994) defined mental contamination as “unwanted judgment emotion or behavior related to uncontrollable or unconscious mental processing” (p. 172). By including law enforcement officers as participants in this research, a more realistic perspective of attitudes and biases may improve on the validity of confirmation bias research in criminal investigative decision making.

People are generally believers, not disbelievers, and they have problems not believing something unless they are provided with a reasonable alternative (Douglass,

2000). In a forensic setting, there is an inherent danger when criminal investigators develop biases, assumptions, or conclusions about evidence, which present inherent dangers for the wrongly accused and a loss of faith in the law enforcement profession (Kruger & Dunning, 1999; Taslitz, 2010). The rule of law is an issue of fundamental fairness and equity in the criminal justice system, and confirmation bias in criminal investigation can not only lead to wrongful accusations and convictions or denying people of their rights, but can also by weaken legitimate criminal cases against known perpetrators (Dror & Bucht, 2011).

In most wrongful conviction cases, bias is a factor present in the form of subjective judgments that lead to psychological contamination (Dror & Bucht, 2011; Kassin, Dror, & Kukuka, 2013; Vrij, 2006). A lack of appropriate skepticism toward a complainant can result in little to no investigative effort to refute a wrongful allegation, which if confirmation bias took place, could result in a wrongful conviction. Capestany and Harris (2014) observed that, through brain activity, emotion does inhibit logical decision making. Whether in the form of a perceived confession, faulty eyewitness identification, or the problematic use of forensic science, bias is common in wrongful convictions (Dror & Bucht, 2005; Kassin et al., 2013). This study was needed to examine confirmation bias from an applied perspective in a forensic setting.

### **Problem Statement**

The problem addressed in this study involves the effect of confirmation bias on criminal investigative decision making. The main premise of confirmation bias is that there is a preference for theory consistent information (Ditto & Lopez, 1992; Ditto, 1998;

Gilovich & Griffin, 2002; Kassin et al., 2013; Nickerson, 1998; O'Brien, 2008; Rassin, 2010; Spano, 2005; Tversky & Kahneman, 1974). While it is theorized that confirmation bias exists in criminal investigative decision making, the subject has not been studied exclusively in an applied setting. In this study, I attempted to determine whether there is a preference for confirmatory evidence from a practical law enforcement perspective, filling an existing research gap.

Emotion can influence an investigator's belief in the guilt of a suspect in a crime such as sexual abuse. Experiencing anger can cause the criminal investigator to form a guilt judgment (Ask & Pina, 2011) or even respond punitively (Capestany & Harris, 2014; Lerner & Tiedens, 2006). When contextual factors combine with an investigator's expectations, the officer may distort the interpretation of what he or she sees (Pronin, Ross, & Gilovich, 2004), such as when an officer learns that a suspect is a convicted sex offender. Even when an investigator makes an effort to remain objective, he or she may revert to a previously held bias or heuristic to make a judgment (Weiner, Bornstein, & Voss, 2006). When people are aware of their own biases, they are better able to overcome them (West, Meserve, & Stanovich, 2012). Part of the phenomenon of confirmation bias that is particularly relevant to this study is that once a conclusion is formed, it is unlikely to change (Ditto et al., 2002; Nickerson, 1998) even in the face of disconfirmatory information. Thus, the influence of emotion in the formation of confirmation bias can be powerful.

Another research gap is the inconsistency of the findings on confirmation bias in forensic settings. O'Brien (2009) argued that should a preference for incriminating

evidence occur, such confirmation bias can be counteracted if officers think of reasons of why the suspect may be innocent. Rassin (2008) determined that investigators are prone to seek evidence of the suspect's guilt. Further, Rassin concluded that participants did not favor incriminating over exonerating evidence. Schrackmann and Oswald (2014) argued that people who are inclined to reach a decision quickly demonstrate rigidity of thought and reluctance to consider views other than their own. Such rigidity of thought is inconsistent with best practices in criminal investigation where the investigator must follow the evidence, even when it excludes a person who may formerly have been a suspect.

Confirmation bias is generally studied in cognitive and social psychology laboratories; however, the applied nature of this problem brings it into the public domain of law enforcement. Existing studies lack an applied component that is critical to understand confirmation bias in criminal investigative decision making correctly, and lack any realistic assistance to effect change. In this study, I addressed these limitations to by incorporating a population of U.S. law enforcement personnel as research participants. This study built upon the existing research by evaluating various influences on investigative decision making, such as the type of assignment within law enforcement (recruit, patrol, investigations), the order in which evidence is presented, and whether affect can overcome evidence to produce a guilt judgment in an crime with an emotional element.

## Literature Review

There is a small body of research on confirmation bias in criminal investigations and even less that includes police as research participants. The most salient research on confirmation bias in criminal investigation that informed the present study was 6 to 8-years-old, from studies by O'Brien; (2009), Ask and Granhag, (2005), Ask et al., (2008), and Rassin (2008, 2010, 2012). Researchers in Sweden (Ask & Granhag, 2005; Ask et al., 2008) and The Netherlands (Eerland & Rassin, 2012; Rassin, 2008, 2010; Rassin, Eerland, & Kuijpers, 2010) have studied confirmation bias in forensic decision making in their respective countries, the results of which were consistent with previous research on confirmation bias. Rassin, (2010, 2012) attempted to replicate older research (Ask & Granhag, 2005) and provided support for the concept that people prefer incriminating versus exonerating evidence when the severity of crime increases.

Ask and Granhag, (2007) conducted research with Swedish police recruits and examined the elasticity of different kinds of evidence, including photographic, witness statements, and DNA. Ask and Granhag concluded that the recruits rated disconfirmatory evidence as less reliable than confirmatory evidence. Rassin, (2010) attempted to replicate the findings by Ask and Granhag using Dutch police, lawyers, and judges. Rassin confirmed the confirmation proneness that it had predicted. Rassin investigated the concept of confirmation bias in criminal investigation as it related to crime severity and the strength of evidence in a case. Rassin used Dutch law students as participants and the findings were in line with the predicted hypothesis that criminal procedure inherently fuels confirmation bias. Rassin also found that the "fact finders" appeared to create

nonexistent evidence of the suspect's guilt, suggesting that the absence of disconfirmatory evidence can be interpreted as guilt.

Research by O'Brien (2009) demonstrated that participants displayed a preference for hypothesis-consistent evidence. In this research O'Brien explored confirmation bias in the pretext of a law enforcement setting and suggested that the students who considered alternative hypotheses demonstrated less of a preference for confirmatory evidence. O'Brien concluded that participants preferred information favoring their hypothesis in a crime scenario and theorized that remedial measures might counteract this tendency to prefer theory-consistent evidence including considering counter-hypotheses. Rassin et al. (2010) disagreed with this assessment, however, and cast doubt on the assumption that confirmation bias lurks in legal decision making.

Research on the role of mood and emotion in legal decision making is more current than that of confirmation bias. Capestany and Harris (2014) studied the biological basis of logical reasoning with functional Magnetic Resonance Imaging (fMRI) technology. Capestany and Harris examined how more 'disgusting' crimes could influence reason in legal decision making. Busey and Dror (2011) investigated forensic decision making from an information processing perspective, focusing on sensory systems. Schrackmann and Oswald (2014) discussed the preference for confirmatory information when testing attitudes or beliefs, and allowed participants to review further items of evidence and readdress their level of suspicion toward a suspect. Fahsing and Ask (2013) concluded that there are certain *tipping points* in homicide investigations that are less related to evidence and are more situational and circumstantial in nature, causing

the investigator to begin to build a case rather than investigate it, resulting in excessive downplaying of conflicting evidence as closed-mindedness. This study attempted to close the gap between basic scientific findings and the practical nature of legal decision making.

A significant research gap that emerges in the study of confirmation bias is the lack of law enforcement personnel as participants when studying confirmation bias. While some Swedish and Dutch researchers have used law enforcement personnel in their studies, no U.S. research has included this population in a study. Fahsing and Ask (2013) included detectives from the United Kingdom and Norway as participants in a qualitative study on decision making in homicide investigations. Including U.S. law enforcement personnel in this quantitative study will address the gap in the literature by using certified police officers representative of the population under consideration: criminal investigators, patrol officers, and police recruits. I examined the effect of confirmation bias and emotion on criminal investigative decision making. In addition, I addressed the gaps in the research concerning the effect of emotion on confirmation in investigative decision making, as well as the differences between assignments (recruit, patrol, investigations) and how it can influence confirmation bias.

What research does exist on the subject of confirmation bias in criminal investigative decision making has borrowed or extended conceptual frameworks from other social science disciplines and extended them to large convenience samples of young college students. The findings are based upon generalizations and assumptions about what data might support, leaving a significant gap in the research (Dabney, Copes,

Tewksbury, & Hawk-Tourtlot, 2013). A more detailed examination of the literature will be in Chapter 2.

This study will help to identify the issue of confirmation bias in criminal investigative decision making, and may suggest ways to avoid or minimize it. Additionally, this study proposes to examine the impact of emotion on legal decision making to aid in furthering the range of awareness of potential interactions between law and emotion. These issues are important to any community who is served by a police department, which includes most all of society.

### **Nature of the Study**

The goal of this quantitative study was to examine the psychological phenomenon of confirmation bias from the perspective of law enforcement, relative to domain-specific context and content. The nature of this study was a quasi-experimental, between-subjects, factorial design. This research design provides the advantage of conducting a study in a natural setting. A disadvantage, however, is the weakness in internal validity and inability to infer causation due to a lack of random assignment (Frankfort-Nachmias & Nachmias, 2008). This methodology was chosen to best examine the problem in an applied setting from a quantitative perspective, with practical research participants.

A high degree of correspondence between the sample, population, and the sampling frame ensured accuracy in helping to provide a representative sample. Thus, the sample included experienced criminal investigators who met the parameters of the research design (Campbell & Stanley, 1963; Frankfort-Nachmias & Nachmias, 2008). The parameters included certified police officers. It was hypothesized that there may be



different degrees of confirmation bias among the groups; thus, the sample sizes for a proportionate stratified sample came from three strata: police recruits, patrol officers, and criminal investigators. A disproportionate sample refers to different sized samples, generally used to analyze one stratum more intensely (Frankfort-Nachmias & Nachmias, 2008). Criminal investigators were in the larger, disproportionate stratum because of the objective to evaluate confirmation bias in criminal investigations.

I used the type of assignment within law enforcement (i.e., recruit, patrol, investigator) as one independent variable, the type of crime (i.e., adult sexual assault or child sexual assault) as another independent variable, and the order of evidence presentation (i.e., sequential, simultaneous, or reverse sequential) as a third independent variable, with a measure of guilt belief (Likert-scaled measure) as a dependent variable. The ordinal data were evaluated using analysis of variance (ANOVA). Interval data were collected. The research instruments included Likert-scaled answers that were completed upon reading a criminal case vignette and evaluating the differences among the independent variables through the use of ANOVA. This provided the opportunity to understand the effect of one or more independent variables on the dependent variable, while controlling for the effects other variables.

The participants for this study were certified police officers in a Midwestern state attending an accredited, state-sponsored criminal justice training. The participants were gathered for their mandatory, annual in-service training. The participants included patrol officers, criminal investigators, and a police recruit class in the basic training academy. With the permission and consent of the state's department of criminal justice training

academy, I notified specific classes that had potentially relevant participants (criminal investigators, patrol officers) of the opportunity to volunteer for the study. Potential participants heard a brief description of the study followed by an educational brief about how to participate if interested.

Those officers who volunteered to participate first completed a questionnaire with some personal and professional demographic information. The officers who volunteered recorded their responses via a computerized survey. They read vignette information and complete Likert-scaled questionnaires. Responses were in the form of fixed-alternative questions on a numbered range of 0 to 10. The participants remained anonymous and were given a unique code to be used in place of their name to log in and participate in the study.

This representative sample of law enforcement participants strengthened the internal validity of the study by reducing extrinsic factors, which may produce differences between the groups of participants (Frankfort-Nachmias & Nachmias, 2008). Only participants volunteered and completed a consent form proceeded. Any participants who did not meet the required status (certified peace officer, investigator or patrol) were not scored or included in the data.

### **Purpose of the Study**

Wrongful conviction researchers have brought some attention to the problem of confirmation bias (Dror & Bucht, 2005, Gross & O'Brien, 2008; Simon, 2012; Vrij, 2004), but greater awareness of the effects of confirmation bias on criminal investigative decision making from a more empirical standpoint can help to bring the issue into

mainstream discussion on policy and procedures with criminal justice administrators (Maroney, 2006). The purpose of this quantitative study was to effect change through recognition that confirmation bias is a personal deficiency with no effective way of changing it. Further, I sought to contribute to the body of knowledge on how to avoid the mistakes that consistently lead to wrongful convictions and generate more effective decision making (O'Brien, 2009).

The purpose of study was also to describe how the independent variables (bias and emotion) can affect the dependent variable (guilt judgment) in such a way that decision making becomes impaired. By describing what areas impair decision making, policy and procedure makers can also identify what does not impair decision making and work toward maintaining objectivity and skepticism through appropriate organizational means. As Bornstein (2006) noted, an officer's training and experience could be capable of offsetting any unwanted effects from a victim's emotional reactions. Using law enforcement officers as participants in this study will help to close the gap that exists from overlooking criminal investigations in the study of bias and emotion in judgment and decision making.

### **Research Questions**

In this study, I examined the presence of confirmation bias in a criminal investigative setting. Three research questions guided this study. In particular, this research was organized around the following research questions and associated null hypotheses:

**RQ 1:** Does confirmation bias differ among various assignments (recruit, patrol, investigators) within law enforcement?

*H<sub>0</sub> 1:* Confirmation bias does not differ among assignments.

*H<sub>1</sub> 1:* Confirmation bias does differ among assignments.

**RQ 2:** Can emotionally charged crimes increase belief in a suspect's guilt?

*H<sub>0</sub> 2:* Emotionally charged crimes do not increase belief in a suspect's guilt.

*H<sub>1</sub> 2:* Emotionally charged crimes can increase belief in a suspect's guilt.

**RQ 3:** Does the order of evidence presentation influence belief in a suspect's guilt?

*H<sub>0</sub> 3:* Evidence presentation order does not influence guilt belief.

*H<sub>1</sub> 3:* Evidence presentation order does influence guilt belief.

To examine the phenomenon, the dependent variable of confirmation bias was represented as a confidence assessment of guilt, or guilt belief, relative to the independent variables (e.g., duty assignment, scenario condition, evidence presentation order) with which they interact. Variables are explained in greater detail in Chapter 3.

### **Theoretical and Conceptual Support**

There is a lack of theoretical specificity surrounding the phenomenon of confirmation bias in an applied criminal investigative context. Nevertheless, some theoretical support for this study emerged from expected utility, rational choice, and prospect theory. Conceptual framework of the study is further supported through the

application of bounded rationality and heuristic and biases processing. Chapter 2 will provide a more detailed evaluation of the literature.

### **Expected Utility**

Expected utility helps to explain how people make decisions when uncertainty is a factor. Originally an economic model that helped explain decisions in risky situations, expected utility has proved to be relevant in any area of human existence where a choice with risk is considered (Fiske & Taylor, 2013). Expected utility holds that the intensity of the outcome is as serious as the circumstances precipitating the judgment (Fiske & Taylor, 2013). As social perceivers, people are constantly receiving information from their environment and making choices from the most mundane to the most serious. The volume of material could occupy all of a person's time just to get through a day, so people employ strategies to save time as they make judgments. Expected utility accounts for many decisions of choice where risk is involved, however slight or serious. Expected utility theorists maintain that each choice available as an alternative for people includes a designated value and a probability of occurrence (Fiske & Taylor, 2013). People will assess those choices for the likelihood and worth of the outcomes and calculate the utility of each outcome, choosing the one that optimizes their utility.

The theory of expected utility is helpful when examining different outcomes, but it does not translate fully to human decision making and not to the criminal justice field where subjective probabilities are not acceptable. When considering criminal choice, attitudes toward risk are central. Criminal choice does not allow for various transitive preferences to be known to the decision maker (Fiske & Taylor, 2013). Further, the effect

of context on decisions and preferences, along with the interaction of the effect of context on decisions and different levels of probability, cannot be explained by expected utility theory or real world consequences (Fiske & Taylor, 2013). In some instances, the best choice might be no choice at all. Consequently, a limitation associated with this theory is the position of assuming that people are rational, logical, and systematic thinkers. A more accurate understanding about the psychology of problem representation is necessary.

### **Rational Choice**

According to the theory of rational choice, patterns of behavior in society reflect the choices made by individuals as they try to maximize their benefits and minimize their costs (Griffin, Gilovich, & Kahneman, 2002). In the classical model of rational choice, a rational actor chooses what options to pursue by assessing the probability of each possible outcome, discerning the utility to be derived from each and combining the two assessments. A rational actor will choose options by assessing the probability of each outcome compared to the potential utility to be gained, combine the two assessments, and pursue the option with the greatest combination of utility and probability (Tversky & Kahneman, 1986). The outcome or potential utility can be recognized as the level of belief in a suspect's of guilt and subsequent investigative action. These theories extend to criminal investigative decision making by examining outcomes (i.e., belief in guilt) and maximizing the effects (i.e., strength of evidence).

### **Prospect Theory**

Prospect theorists claim that people select alternative choices by assessing risk where the probabilities are known. Effect, which is a tendency to underweigh outcomes

that are merely probable, in comparison to outcomes obtained with certainty (Kahneman & Tversky, 1979). According to prospect theory, people's ability to comprehend extreme probabilities is limited, meaning events that are highly unlikely are either ignored or undervalued (Tversky & Kahneman, 1979). This can limit the consideration of a full range of probabilities. Prospect theorists consider perception and reasoning; the decision maker weighs probable outcomes with those that are certain. This means that decisional weights will measure the impact of an event on the desirability of its prospects, not just on their perceived likelihood. By focusing on the perceived likelihood, the perception may be subject to biases, as well as other considerations including ambiguity or vagueness.

### **Bounded Rationality**

This study drew upon the psychological framework of Simon (1955, 1971, 1979). Simon proposed a more limited criterion for actual performance. Bound, refers to something being limited and rationality, in this context, refers to normative standards. Thus bounded rationality refers to decision making limited to the information that a person possesses, along with limited cognitive ability and amount of time they have to make a decision. Simon (1955) found that people will avoid the consideration that they could be wrong, similar to the concept of confirmation bias (Nickerson, 1998). The concept of bounded rationality revises many of the assumptions of rational choice theory, as perfectly rational decisions are often not feasible due to the limited resources available to make them.

This framework was relevant to the present study, as a criminal investigator will have limited time and information on which he or she may deliberate and is often required to make a decision. According to this framework, even when a person is confronted with facts that contradict his or her thoughts, he or she may simply will a way to perceive things otherwise, thereby maintaining their beliefs. The criminal investigator may also be confronted with an ipsative situation, where no decision is not an option, such as when evidence is obvious but lacks context or meaning to the investigator, and it is not immediately clear what to do with the evidence. Even though an optimal decision is preferable, a satisfactory one may be all that an individual can accomplish (Erzinclioglu, 3002; Innes, 2003). For example, short-lived (e.g., blood, fluid) evidence may disappear quickly and a decision must be made whether or not to expend the time and effort necessary to secure it properly. The evidence, however, may not have an obvious connection to the case and could be a waste of limited resources.

Because a decision maker lacks the ability and resources to arrive at an optimal solution, they may instead simplify their choice and then apply their rationality accordingly. This type of decision making is satisficing, or settling for a satisfactory solution, rather than searching for an optimal one (Gigerenzer, 2010). Rationality, in this sense, may come in the form of an emotion such as anger or sympathy and is based largely on heuristics. In the present study, it was theorized that emotion might play a part in decision making when confronted with limited information. Out of anger at the offender, and in sympathy for the victim, the investigator may be willing to satisfice, settling for enough evidence rather than seeking all of it.



People generally reason and choose rationally, but only within the constraints imposed by their limited search and computation abilities. Because people have different levels of ability and effort to perceive, organize, and process information, they may not arrive at the same conclusion, even though they may have few choices (Gigerenzer & Selton, 2001). Bounded rationality helps to describe how a person's belief may be biased through the limited information they possess or by their beliefs. According to this framework, even when a person is confronted with facts that contradict their thoughts, they may simply *will* a way to perceive things in such a way that they maintain their beliefs. Even when forced, they tend to concede less than the facts that contradict their position might otherwise support (Weiner et al, 2006). As investigators use heuristics to make decisions, bounded rationality must be considered in the context of investigative decision making and the demands of the police environment (Snook & Cullen, 2009).

In addition to bounded rationality, the psychological frameworks of heuristics and biases (Kahneman & Tversky, 1982), information processing, and anger attributional affects (Quigley & Tedeschi, 1996) are influential in forensic decision making and were used here to help understand the current study about how law enforcement decisions are impacted by external forces with psychological explanations.

### **Definitions**

The following list of terms provides relevant definitions pertaining to this research. Other definitions may exist but may not represent the intended use in this study.

*Actor/observer affect:* This occurs when a person relates another's behavior to dispositional factors but relates his or her own behavior to situational factors (Choi & Nisbett, 1988).

*Affect:* Affect refers to a subjective feeling or attitude. Affect occurs through the automatic, subconscious processing of an emotional feeling or experience and is viewed with a positive or negative valence (Lazarus, 1982).

*Attribution theory:* This concerns how people infer causal relations and the dispositional characteristics of others (Taylor & Fiske, 2013).

*Assessment of confidence:* For this study a confidence assessment refers to a degree of guilt belief (see guilt judgment).

*Belief perseverance:* This refers to a belief that perseveres even when the original evidence it was based upon is refuted or discredited (Ross, Lepper, & Hubbard, 1975).

*Belief Scale:* A scale of belief in a person's guilt relevant to a specific crime ranging from *not guilty at all* to *definitely guilty*. Within those parameters exist reasonable suspicion, preponderance of evidence, clear and convincing evidence, and beyond a reasonable doubt; evidence of guilt from least to most, respectively.

*Beyond a reasonable doubt:* This is the legal threshold required for a criminal conviction. It is greater than a preponderance of evidence, but less than beyond all doubt. This is the highest form of legal proof required by the law (Black & Nolan, 1993).

*Bias:* Refers to a preference for one thing over another.

*Clear and convincing evidence:* A legal threshold that is greater than a preponderance of evidence, but less than beyond a reasonable doubt (Black & Nolan, 1993).

*Cognitive load:* This refers to the number of demands simultaneously made upon the human mind, potentially impairing accuracy. Limits on cognitive load may also impair accuracy (Sternberg, 2008).

*Confidence assessment:* A belief in guilt toward a specific suspect, concerning a specific allegation. This assessment includes a Likert-scaled judgment of guilt from 0 (*not guilty at all*) to 10 (*definitely guilty*).

*Confirmation bias:* Confirmation bias in a criminal investigative setting may come in the form of focusing exclusively on one theory of a case while failing to consider others for any number of reasons. It may occur by searching for evidence to support the singular theory, thereby ignoring any other evidence that may be relevant, or disconfirmatory. It also applies to specific items of evidence such as the veracity of a witness statement or the importance of a piece of physical evidence (Nickerson, 1998)

*Criminal investigation:* The process of legally inquiring and gathering evidence of a crime that has been committed (Lyman, 2011)

*Decision making:* Refers to the actions made by a police officer during a criminal investigation.

*Dissonance theory:* Is concerned with selective learning and attention of attitude-relevant information. The hypothesis of selective perception to support a person's attitudes include selective exposure, selective attention, and selective interpretation.

Although evidence for selective exposure entails mostly de facto rather than deliberate evidence, evidence for selective attention and interpretation supports the premises of dissonance theory (Taylor & Fiske, 2013).

*Emotionally charged crime:* This refers to a crime that might shock the conscience of a citizen and may still cause the police officer to be emotionally aroused (such as a child sexual assault) whereas a crime of routine occurrence may not.

*Exculpatory:* Evidence or information that tends to show innocence of a crime (Black & Nolan, 1993).

*Emotions:* The compilation of miscellaneous feelings, mood, and affect from which a state of mind emerges (Maroney, 2006).

*Extraordinary emotional provocation:* This refers to the reporting of a crime of such nature that it has the potential to provoke strong emotion. In this context, it must be recognized that in the field of law enforcement; reported crimes like this are a regular occurrence.

*Exculpatory:* Evidence that tends to show innocence (Black & Nolan, 1993).

*Feelings:* Feelings are conscious experience of happiness, sadness, compassion, hate and so on; however, feelings are distinctly different from emotions. Emotions may emerge from feelings (Taylor & Fiske, 2013)

*Fundamental attribution error:* The tendency, especially in U.S. culture, to judge an individual's actions as stemming from fundamental personality traits rather than from the situation in which he or she finds him or herself (Snook & Cullen, 2009). People are willing to make quick and confident judgments of a subject's personality trait based on a

limited data sample. They will also over-generalize, treating one perceived negative personality trait as indicative of an overall negative personality across many criteria (Fiske & Taylor, 2013).

*Guilt judgment:* Also referred to as a guilt belief or confidence assessment, in this study a guilt judgment refers to the degree to which an officer believes a suspect to be guilty, either in the form of a scale (1-10) or a yes/no judgment. A degree of belief is also referred to as an assessment of confidence (Griffin & Tversky, 1992).

*Heuristics:* These are mental shortcuts that help people reduce everyday complex problem solving into simpler judgmental operations in order to meet various environmental demands (Kunda, 1999). They are often effective strategies that provide efficient for handling complex data and then drawing conclusions from that information (Snook & Cullen, 2009). Not all heuristics are the same. Some are useful, simple, and commonly employed, while others are more sophisticated and idiosyncratic. Tversky and Kahneman (1974) and Nickerson (1998) focused on some of the most commonly used heuristics: availability, representative, and anchoring and adjustment.

*Illusory correlation:* Imposes a relationship where none actually exists (Kunda, 1999).

*Inculpatory:* Evidence or information that tends to show guilt of a crime (Black & Nolan, 1993).

*Optimizer:* A person who holds out for the best possible inference or decision (Gigerenzer, 2010).

*Preponderance of evidence:* Also known as the *balance of probabilities*, the preponderance of evidence means legal proof by information that, when compared to the information opposing it, leads to the conclusion that the fact at issue is more probably true than not (Black & Nolan, 1993). The preponderance of evidence is used in all civil cases because if the standard is met, the proposition is more likely to be true than not. This standard is also described as greater than 50% of the proof, more probable than not, and more likely than not (Federal Rules of Evidence).

*Probable cause:* Probable cause is a standard used in justifying various police actions such as searching and arresting. It consists of more than mere suspicion, but less than the amount of evidence required for conviction (Black & Nolan, 1993).

*Reasonable suspicion:* Has been defined by the U.S. Supreme Court as “the sort of common-sense conclusion about human behavior upon which practical people...are entitled to rely.” It is more than a “hunch” or “gut feeling”. It requires articulable facts or circumstances that give rise to more than a bare, imaginary, or purely conjectural suspicion (Black & Nolan, 1993).

*Saliency.* Refers to when a person notices something and devotes attention to it, and it becomes more prominent and available in the mind and can exert greater influence on subsequent judgments (Fiske & Taylor 2013).

*Satisficing:* Making (or settling for) adequate inferences or judgment rather than an optimal one (Gigerenzer, 2010).

*Social cognition:* How people make sense of themselves and others in their environment (Fiske & Taylor, 2013).

*Self-serving bias*: This is the tendency to take credit for success, and deny responsibility for failure attributions of responsibility. This also manifests as the tendency to evaluate ambiguous information in a way that is beneficial to a person's own interests (Fiske & Taylor, 2013).

*Situation awareness*: This refers to an internal construal of the situation on which a decision is to be based. This process consists of interpreting and combining information in a specific environment in order to understand what is happening and why.

### **Assumptions**

A study with law enforcement participants requires several basic assumptions. One assumption was that the duty of criminal investigation falls to law enforcement and that most major crimes are handled by officers with specialized training who work as criminal investigators. It was assumed that investigative decisions are based upon probable cause and reasonable articulable suspicion. It was further assumed that all law enforcement officers endeavor to behave ethically, professionally, and with a duty to serve the public.

The most significant assumption in this study was that confirmation bias is a ubiquitous phenomenon in human existence (Nickerson, 1998) and should be expected to manifest itself in nearly every area of human judgment (Fiske & Taylor, 2013, Tversky & Kahneman, 1973, 1974). Another main assumption of this study was that certain features of this research such as confirmation bias, judgment, emotion, and decision making can be defined using specific criteria. Another main assumption was that the tasks in this study approximate real world criminal investigative tasks, crime scenarios, and evidence.

### **Limitations**

The unique nature of prosecution, and by extension criminal investigation, requires a certain prejudging of guilt. The duty to do justice requires scrutinizing the evidence against the defendant, not merely for sufficient proof to a guilty verdict, but for proof that persuades the prosecutor of the defendant's guilt beyond a reasonable doubt in their own mind. Investigative theories are generated based upon this scrutiny, thus, a necessary measure of bias automatically exists in early stages of criminal investigation by design.

Another limitation of this study was that it is impossible to know for certain what variables may or may not have influenced the decision maker and their private perspectives. Further, if initial steps are determined to be confirmatory, an entire investigation is not necessarily biased or flawed. Conclusions must be understood in context to the reality of the dynamic nature of criminal investigations and evidence. There is a certain amount of subjectivity involved in criminal investigation that will never be eradicated and would be impossible to quantify

One problem associated with the correlational coefficient in this study was that the findings about attitudes toward sex offender suspects are measured largely against morals, societal norms, and a basic sense of fairness. A more empirical measure of validity in a legal context is the whether or not a person is afforded due process, a clause within the 14th amendment of the U.S. Constitution enumerating that no person shall be denied life, liberty, or property without due process of law. Another measure is proof of



beyond a reasonable doubt, which is the standard for a conviction required in criminal cases (Meyer & Weaver, 2006).

### **Significance**

Approaching a criminal investigative situation with a presumption of guilt (or any presumption at all) may cause an investigator to be insensitive to potentially exonerating information, at a minimum. All wrongful convictions begin with a breakdown in the investigative or adjudicative processes (Simon, 2012). This is especially true when dealing with human testimony, which may be faulty (Ask & Granhag, 2007; Kasin, Dror, & Kukucka, 2013; Vrij, 2009). Thus, the danger in approaching cases in this manner is the possibility of a wrongful conviction, affecting the whole of society. Accordingly, it is necessary to experiment with the closest possible participants to the relevant influences in order to capture the dynamic nature of law enforcement decision making.

Awareness and education may be effective tools in combating bias in decision making, and it is important for forensic psychology professionals to understand this in legal settings. This study may aid in addressing influences toward confirmatory thinking in an investigator's work environment and may be able to increase objective investigative methods. It is conceivable that policies and procedures in law enforcement can be adjusted to decrease bias and make more effective decisions. The potential for this area of study is vast.

The psychological understanding of criminal investigative bias can illuminate the motivational process of social cognition in investigative decision making. The findings of this study can be used to examine legal judgments, policies, and procedures. It is

conceivable that psychologists can impact policy making to incorporate mechanisms to mediate social cognition errors in criminal investigative decision making. Armed with knowledge of how confirmation bias influences investigative decision making in a forensic setting, psychologists can also have an impact on related forensic issues such as interviews and interrogations, eyewitness testimony, and line-up/show-up suspect identification, all of which are all subject to human judgment and can benefit from an understanding in this area. These are benefits not only law enforcement and the criminal justice system, but also the whole of society.

### **Summary**

In this research, I studied bias and emotion that can interfere with criminal investigative decision making. Emotion may be a moderating variable in investigative decision making. It is theorized that emotional, evaluative judgments are hard not to make and angry attitudes toward offenders may remain. Further, there may be certain moderating effects on social cognition such as prior felony arrests, felony convictions, sex offenses, or violent offenses that are known to an investigator and can cause him or her to be more suspicious or willing to make a determination of guilt prematurely. Anger/emotion may transcend situations and increase different attributions that produce and stimulate varying levels of information processing, which are at times irrelevant to the anger-provoking event.

In Chapter 2, I will discuss the relevant literature surrounding the phenomenon of confirmation bias and emotion in decision making within the forensic realm and will also

explain gaps that exist in the research and how the theories of rational choice and expected utility support the phenomenon.

## Chapter 2: Literature Review

### **Introduction**

The deleterious effects of confirmation bias on criminal investigative decision making exists on a continuum of behavior ranging from major miscarriages of justice from wrongful convictions or accusations to the acquittal a guilty defendant. Neither outcome forestalls the guilty offender from reoffending undeterred and eradicating such bias is clearly beyond any human effort; however, recognizing common features that identify and attenuate confirmation bias in a criminal investigative setting is a step in the right direction. This study, shall examine the elements of confirmation bias and emotion within the framework of social cognition in criminal investigation.

Human rationality is limited; unfortunately irrationality has no constraints. The acquisition of intelligence does not automatically bestow competence on a person and people frequently fail to employ intellectual competence in their decision-making (Kruger & Dunning, 1999). Because criminal investigators generally work backwards from the scene to a crime's origin with limited information, it is incumbent upon them to withhold judgment until they have gathered the last piece of evidence in a case, lest they arrive at a premature conclusion. Nevertheless, as human beings, investigators are susceptible to errors in social cognition, therefore, a unique problem for psychology and law is to identify the impetus that produces an error in social cognition at critical moments, and results in a deleterious effect in criminal investigative decision-making.

Decision making and information processing abilities are often not optimal due to the complexity of information confronting the criminal investigator (Dror & Bucht,

2011), creating the likelihood of overwhelming their cognitive abilities and forcing the investigator to rely upon available heuristics and perception (Bornstein & Nemeth, 1999). Since criminal investigations typically operate in reverse linear fashion, they require the investigation to work backwards from the crime scene to the identification of a perpetrator, collecting evidence along the way (Lyman, 2011). Unique situational and contextual pressures further exacerbate the complexities of an investigation such as the seriousness of a crime, the dynamism and ambiguity of evidence, time constraints (Rassin, 2008), institutional pressures, the need for closure (Ask & Granhag, 2005), and others such as overconfidence or even incompetence (Kebbell, Muller & Martin, 2010).

For this study, confirmation bias is best understood as manifesting in three main ways, each emerging differently: the tendency to seek only that evidence that supports a favored theory or hypothesis, the rejection of disconfirmatory evidence, and the tendency to reconstitute vague or ambiguous evidence in such a way that it supports an initial belief. Once an investigator arrives at a conclusion prematurely, confirmation bias leads them to maintain their belief, often in light of disconfirmatory evidence (Hernandez & Preston, 2013; Jonas, Schulz-Hardt, Frey & Thelen, 2001; Tversky & Kahneman, 1974). Investigators are often guided by their initial theories or hypotheses in their search for evidence (Ask & Granhag, 2005) and ambiguous evidence is often interpreted as supporting their expectations (Nickerson, 1997; O'Brien, 2009; Spano, 2005). As a result, confirmation bias can induce the investigator to ask only those questions that are likely to confirm their hypothesis and commit to one single causal explanation (Ask & Granhag, 2005). Once a conclusion is reached it is cognitively adopted as factual (Dror & Fraser-

Mackenzie, 2005), and once adopted as factual it is not likely to be amended. People are as motivated to find correct beliefs and decisions as they are to defend those they have already formed (Johnson & Fuita, 2012). With this approach, the tendentious investigator transforms from fact gathering to case building.

The foundation of the phenomenon of confirmation bias in modern research relies heavily upon the seminal research on heuristics and biases of Tversky and Kahneman (1971, 1973, 1974, 1981, 1983, 1986, 2002; see also Kahneman & Tversky, 1972, 1973, 1979, 1986, 1996, 2000; Kahneman, Slovic, & Tversky, 1982), and meta-analysis of confirmation bias by Nickerson (1998). These studies spawned dozens of subsequent studies, however, none have addressed the practical aspect of confirmation bias or emotion in criminal investigative decision making.

Several different aspects of confirmation bias in the research pertain to legal decision making. Ask, Rebelius, and Granhag (2008) referred to the concept that scrutiny toward personal interpretation tends to be with positive implications for an established personal belief or value rather than negative implications as “asymmetrical symmetry”. Nickerson (1998) isolated the intentionality of confirmation bias as “building a case to justify a conclusion that is already drawn” (p. 175). Schrackmann and Oswald (2014) described biased searching or evaluation of information as a process that “either systematically enhances the probability of the corroboration of a formed belief, or impedes its possible refutation” (p. 5). Fahsing and Ask (2013) noted that confirmation bias includes ignoring or downplaying material that conflicts with the available evidence. Faulty interpretations of evidence can lead to overconfidence in a belief of guilt and often

contribute to wrongful convictions (Dror & Bucht, 2005; Griffin & Tversky, 1992; Gross & O'Brien, 2008; Huff, 2004; Simon, 2012). A key distinction of this phenomenon is that some belief exists with no clear evidence to support the interpretation (Klayman & Ha, 1987; Kosnik, 2007; Oswald & Grosjean 2004).

Another issue associated with confirmation bias is emotional decision making. When confronted by social stimuli, a law enforcement officer's reaction may be automatic, habitual, unthinking (Kahneman & Tversky, 1986; Kahneman, 2011), intuitive, or deliberative (Kruglanski & Gigerenzer, 2011). Emotions are known to influence fact finders' attributions of responsibility (Bornstein & Wiener, 2006). Emotion that precedes decision making in criminal investigative contexts has the potential to begin a process that is flawed from the beginning, since bias, by its very nature, can self-perpetuate (Capestany & Harris, 2014; Johnson & Fujita, 2012). Additionally, people largely fail to detect evidence of their own bias (Pronin, Kruger, Savitsky, & Ross, 2001) and when they look for it, they are apt to conclude that none exists (Kahneman, 2011). Emotion has the potential to be a significant problem in criminal investigative decision making.

Emotional contexts that precede legal decision making can override rational thinking and decision making (Bornstein & Wiener, 2006; Shiv & Fedorikhin, 2002). Emotional decision making can be problematic if personal perception overcomes objective evidentiary evaluation and a subjective threshold of guilt is considered (Feigenson & Park, 2006). The belief in one's own accuracy can lead to the belief that their perceptions reflect the true nature of things (Pronin, Kruger, Savitsky, & Ross,

2001). If emotion can cause evidence to be perceived through a new framework, it can lead to different perceptions, distortions, and conclusions (Feigenson & Park, 2006). Evidence must be explained as it is, rather than as it could be, for if our belief correlates with our biased perception, as West, Meserve, and Stanovich (2012) observed, the latter will dictate the former.

A core problem with confirmation bias is that it is pervasive and perpetual in the human experience (Johnson & Fujita, 2012). In the process of making decisions criminal investigators are subject to the same kinds of errors as lay persons (Innes, 2003). This study proposes to investigate the phenomenon in a criminal justice setting with law enforcement participants from different levels of experience, from basic police recruits to experienced criminal investigators. This research will explore whether or not the criminal investigator demonstrates a preference for confirmatory evidence and what variables, if any, correlate with objectivity in criminal investigative decision making. This study will also examine the effect of emotion on investigative decision making. In addition, this study will explore the relationship between confirmation bias and criminal investigative decision making, and its effect on guilt judgment.

The last decade has witnessed a burgeoning interest on confirmation bias literature with a forensic application of legal decision making. Swedish studies (Ask & Granhag, 2005; Ask, Rebelius, & Granhag, 2008), Dutch studies (Eerland & Rassin, 2012; Rassin, 2008, 2010; Rassin, Eerland, & Kuijpers, 2010), and an Australian study (Wastell, Weeks, Wearing, & Duncan, 2012) have explored the issue in a forensic setting, while O'Brien (2009) conducted the lone identifiable study on confirmation bias in



criminal investigation in the US. Other cognitive and psychological phenomenon that confirm the current study include research on perception, judgment and decision making (Dror & Fraser-Mackenzie, 2009; Gilovich, Griffin, & Kahneman, 1998; Kahneman, Slovic & Tversky, 1982; Masnick & Zimmerman, 2009; Nickerson, 1998; Nisbett & Ross, 1980; Rossmo, 2009; Snook & Cullen, 2009).

It is well documented that criminal investigators have a tendency to perceive suspects as very likely to be guilty (Baldwin, 1993; Leo, 1996; Meissner & Kassin, 2002). Anger is known to increase attributions of blame and intent to people who cause negative events (Goldberg, et al., 1999; Quigley & Tedeschi, 1996; Young, Tiedens, Jung, & Tsai, 2011). In the present study it is hypothesized that vivid details that inflame emotions can spark anger in the investigator, who may then focus on the factors incidental to the evidence (e.g., learning a suspect is a registered sex offender may confirm an investigator's belief in guilt). Research by Gollwitzer (1990) showed that when an investigative mindset focuses on specific course of action, a more deliberative mindset is assumed, suggesting that an investigator with a deliberative mindset may search only for confirmatory evidence.

Capestany and Harris (2014), Fahsing and Ask (2011), and Maroney (2006) confirm the problem of affective responses in investigative decision making. Quigley (1996) observed that anger led to stronger attributions of blame, while Ask and Granhag (2007) studied how anger toward sex offenders can produce strong affective reactions, supporting the hypothesis that there is a relationship between the type of offense and the strength of a guilt judgment by an officer. Cognitively, Sternberg (2006) describes the

heuristic of confirmation bias as an objective to authenticate a criminal investigator's beliefs, influencing both reasoning and decision making. Ruscio (2006) describes confirmation bias as detrimental to evidence-based reasoning and efficient decision making. As Bornstein and Nemeth (1999) noted, it is rare that a person can ignore their emotions in a criminal case.

This review begins with the relevant theories associated with the phenomenon, and will continue by discussing the effect of this bias on guilt judgment by the criminal investigator, and how it can impact a crime scenario. This literature review will include comparisons of former studies and the gaps associated with each study that have led to the need of this research study. Further, this literature review will investigate the relationship between confirmation bias and criminal investigation, examining such variables as the type of duty assignment and the type of crime, as well as the relationship between demographic information and the tendency to engage in biased decision making. What follows is how the search was conducted and how the literature was identified, organized, and synthesized.

The literature review starts with discussion of decision making, social cognition, heuristics and biases, information processing, in decision making. The review then turns to several influential theories in social psychology - prospect theory, rational choice and expected utility, and frameworks that explain the phenomenon such as bounded rationality and heuristic and biases study. The review concludes with a section on affect and decision making.

### Literature Search Strategy

This literature review began with a search of the library databases within the Walden Library in both psychological and criminal justice databases. A computerized search was conducted to identify articles regarding the concepts of confirmation bias, decision making, reasoning, judgment, intuition, legal and criminal investigative decision making, and for material that intersected the domains of forensic psychology and social cognition. Searches were initially set to recognize studies from the years 2010 to 2014 for current research and a comprehensive search examined the years from 1970 to 2013.

The review was conducted via tertiary Libraries with electronic EBSCO databases, mostly utilizing psychological databases including psycINFO, psycARTICLES, ProQuest, Google Scholar, Psychology: SAGE Full-Text, SocINDEX, ERIC and Google Scholar. Criminal justice databases included Lexis-Nexis Academic, Legal Trac, Criminal Justice Periodicals, Oxford Bibliographies Online: Criminology, SocINDEX, ProQuest Central, and Google Scholar.

Using the search terms *bias* AND *investigations* in ProQuest Criminal Justice returns 66 results. The virtual Boolean search parameters that were utilized included multiple combinations of keywords including *confirmation*, *bias*, *decision making*, *perception*, *criminal*, *investigation*, *investigations* and *investigative*, and included variations of keywords.

The phrase confirmation bias produced 133 results, however, separating the terms as Boolean parameters produced 398 results, 45 of them books, 39 dissertations, 11 book reviews, and the remaining 308 journal articles. Of the journal articles, 306 were peer-

reviewed. Using the terms *criminal AND bias* returned 219 results. Among these results are articles on confession evidence, hate crime, gender bias, hypnosis, and racial bias, economic bias, interview, lineup, jury selection, and a few on confirmation bias in a criminal investigative setting.

Multiple combinations of search terms were conducted in different library databases. In ProQuest Criminal Justice database, search terms *investigator AND bias* returns 19 results, *investigative AND bias* returned three results, *confirmation AND bias* return eight results, and *confirmation AND bias AND criminal* returns two results, none of which are related to criminal investigative bias. Using search terms *decision AND making* returns 22,870 results. In PsycINFO, using Boolean search parameters *confirmation AND bias* returned 133 results. Among the results were several articles of relevance. Adding the third search parameter *investigation* yielded 10 results, three of which were specifically relevant to this study. The search terms *confirmation AND investigative AND bias* returned eight results, which included articles already gathered for this study. Using *criminal AND bias* returned 386 results, many of which were on racial bias as well as lineup, gender, examiner, interview and organizational biases.

Among the results are articles on confession evidence, hate crime, gender bias, hypnosis, and racial bias, but little related to confirmation bias in a criminal investigative setting. Using search terms *bias AND investigations* in ProQuest Criminal Justice search turns up 66 results Using the same search terms in different psychology and criminal justice databases provided no further results. The phrase *investigator bias* produces results that focus on the detection of deception in interview settings and false confessions.

This body of research discusses the concept of interrogation strategies that potentially lead to statements by the accused. While this information has relevance to false confession, it does not consider the role of the criminal investigator's judgmental process, perception, cognition and practical aspects of the role of the criminal investigator.

Sources were also located from literature reviews and meta-analyses that addressed confirmation bias and bias in criminal investigation. The type of literature searched included the domains of cognitive neuroscience, cognitive and social psychology, information processing, heuristics and biases, decision making and judgment, criminal investigative decision making, critical thinking, and criminal justice. Contained within the body of research related to bias is literature related to interview and interrogation, racial profiling, criminal profiling, lineups and show-ups, and eyewitness reliability. As they are related to legal problems, they are often framed in the context of forensic bias, however, while forensic in nature, these issues are only tangentially related to confirmation bias in the context of criminal investigative decision making.

There is approximately 40 years of heuristics and biases research in cognitive and social psychology literature (Evans, 1989; Kahneman, 1973, 2003, 2011; Kahneman & Frederick, 2002; Kahneman & Tversky, 1972, 1973, 1996, 2000; Tversky & Kahneman, 1971, 1973, 1974, 1981, 1983, 1986, 2002; Wason, 1966). A keyword search in Google Scholar produces 419,000 results with Nickerson (1998) listed as the first response. Nickerson (1998) also leads other articles, having been cited 1139 times. Among the most commonly cited articles in the literature on the domain of biases and heuristics

included Wason (1960), Simon (1959; 1971), and Tversky and Kahneman (1973; 1974; 1979; 1986; 2000).

### **Theoretical Foundation**

For a theory to be relevant to criminal investigation there must be qualities to account for objectivity. Since this disqualifies many theoretical frameworks, this study shall focus on those theories and frameworks that lend themselves to objectivity in decision making. There are several theoretical concepts combine to explain the concept of bias and emotion in criminal investigative decision making, including information processing, heuristics and biases and affect.

### **Rational Choice**

The study of modern day heuristic and bias research emerged from the model of rational choice. It is generally accepted as rational that we want more of something good, rather than less of it. This simple explanation of behavior found its way into nearly all modern economic textbooks and other realms of human decision making. The framework of rational choice allows for an understanding of both economic and social behavior. In the classical model of rational choice, a *rational actor* chooses what options to pursue by assessing the probability of each possible outcome, discerning the utility to be derived from each, and combining the two assessments. One assumption of this theory is that the human being is a rational actor and will pursue the option that offers the optimal combination of probability and utility.

According to rational choice theory, decisions determine behavior and follow a set of general laws (Satz & Ferejohn, 1994). This theory generally explains a person's

actions in terms of her or his own mental state. In the present study this can be understood as looking at certain preferences of criminals. A child sex offender, for example, has very specific preferences that investigators recognize and they may come to expect consistency from the child sex offender.

### **Expected Utility**

The theory of expected utility assumes that the decision maker has complete control over all of the potential outcomes that might occur based upon their decision (Baron, 2007). Although we may have defined a continuum of good to bad, we all have deviations from that continuum from which our individual biases are conceived in the form of tastes, desires, and expectations that we develop through our life experiences. (Caplin & Lehey, 2001) explained expected utility theory to anticipated emotions. This theory applies to the present study in this limited sense, for the purpose of recognizing the need for consistency in behaviors. Expected utility applies to the present study in that people adopt decision making strategies to accomplish broad objectives to reduce risk. In another sense, this is consistent with law enforcement decision making goals to resolve unknown circumstances and attribute causality to specific behaviors.

### **Prospect Theory**

Tversky and Kahneman (1974) developed prospect theory, which holds that people make choices mostly by how they are framed and that they select alternative choices by assessing risk where the probabilities are known. The focus of prospect theory is an estimation of how choices are made under risk. It holds that intuitive judgments occupy a position between the automatic operations of perception and the deliberate

operations of reasoning. Contained within the prospect theory is the certainty effect (Kahneman & Tversky, 1979), which is a tendency to under-weigh outcomes that are merely probable, in comparison to outcomes obtained with certainty. In research on heuristics, Tversky and Kahneman (1974) described three general-purpose heuristics: availability, representativeness, and anchoring and adjustment. These heuristics are said to be simple and efficient as they piggyback on basic computations that the human mind has evolved to make. Each individual heuristic associates with a set of biases that are departures from normative rational theory. Kahneman and Tversky (1979) note that people are limited in their ability to comprehend and evaluate extreme probabilities. As a result, events that are highly unlikely are either ignored or under-weighed.

In the present study, prospect theory helps to explain perception and reasoning as decisional factors as a belief in guilt is weighed against other explanations.

### **Social Functionalist Theory**

Tetlock (1992) proposed that psychological explanations are ultimately rely upon functionalist assumptions regarding how people attempt to achieve goals through thinking, feeling and acting. Further, Tetlock (1992) noted people engage in an *internalized dialogue* whereby they anchor certain values and confer legitimacy upon social practices (p. 452). In a professionalized setting such as law enforcement, certain commonalities are enforcing the law. Thus, police serve to protect against encroachments upon shared social values, which are legislated into laws. In the process of controlling law breakers, Tetlock (1992) suggested that police must protect from exploitation those who would violate cultural norms, harming others. There are many assumptions



associated with human behavior so the key is to stick to those assumptions that are reasonable and based upon sound judgment, an issue that is relevant to police conduct in sound decision making.

### **Bounded Rationality**

The conceptual framework of bounded rationality is most relevant here because nowhere is it more descriptive where a person makes a *rational* judgment *bound* by limited information (Snook & Cullen, 2007). Bounded rationality helps to describe how a person's belief may be biased through the limited information they possess, or by what strong beliefs they hold. This psychological framework acknowledges inherent processing limitations of the human mind. People reason and choose rationally, but only within the constraints imposed by their limited search and computational abilities (Findlay & Scott, 2006). It is the idea that in decision-making, rationality of individuals is limited by the information they have, the cognitive limitations of their minds, and the finite amount of time they have to make a decision. This is particularly relevant to the present study, as the investigators will have limited time on which they may deliberate on the stimulus. In this context, bounded rationality is a dynamic concept that can change with exposure to information.

In former research the concept of bounded rationality has been applied to criminal investigative decision making in the form of responses to vignettes of carefully crafted criminal cases (Ask & Granhag, 2005; Dror & Fraser-Mackenzie, 2009; Rassin, 2010). This method provides an effective framework from which to produce the desired bias for experimental purposes, and to present case facts in such a manner as to stimulate a

response from the participants about how they feel about their previous answer in light of newly acquired information.

### **Naïve Realism**

People typically believe that facts as they see them, are there for all to see and therefore, others should agree with them. Naïve realism posits that if people do not agree with another person, they believe those others have either not been exposed to the relevant facts, or they are blinded by their own interests and ideologies (Pronin, Ross, & Gilovich, 2004). In the present study this can help to describe how an investigator may believe their perception is accurate because, in their eyes they possess a unique insight. While this may be true, the investigator's belief is not as important as what they may be able to prove from an evidentiary standpoint.

### **Bias Blind Spot**

The bias blind spot is a phenomenon where people are motivated to view themselves, their assessments, and their outcomes, in a positive light. A person's self-perception (like social perception) causes them to rely on, and attend to, information such as their own private mental events, where they believe they have more precise information than the observer about their own emotional states and intentions (Pronin, Gilovich, & Ross, 2004). We know that people perceive the world in their own way and they accept that others' senses are different than theirs, however, they tend to believe that *their* senses and perceptions are objective and that it is others whose perceptions and objectivity are altered. When people's knowledge of their own intentions is direct, other's knowledge of those intentions usually quite inferior and highly subject to error (Nisbett &

Ross, 1980). Many people decide that what is normal is what they would do, when they would do it, and they cannot or will not accept anything else. In Pronin, et al., (2001) research participants overwhelmingly reported that they were personally less susceptible to each of these biases than the average American.

People are often confronted with instances in which others respond to issues and events differently than we do. We tend to resolve people seeing the world differently than we see it by declaring that those others, as a consequence of some basic intellectual and moral defect, are unable to see the things “as they really are” and to react to them “in a normal way” (Pronin, et al., 2004, p. 783). The implication is that things are in fact as we see them, and that our ways are in fact normal.

Notably, people expect other reasonable and attentive people to perceive the same reality they do and cannot fully escape the conviction that the perception of such events is shared by other reasonable people who have the same information about those events and issues who will, or at least should, perceive them similarly (Pronin, et al., 2004). Most people can recall instances in which they have accepted evidence that was at variance with their preconceptions and that they would have preferred to reject. In fact, introspection often produces the honest conviction that one acted as one did in spite of, not because of, one’s private sentiments. Wilson (2002) suggested, more generally, that it is the very amount of inside information that we possess that gives rise to misplaced confidence in its authority and authenticity as a guide in assessing the causes of one’s own behavior. The extent to which the actor behaves differently in the same situation should cause each to attribute the other’s actions to internal dispositional factors.

Naïve realism and the bias blind spot are two particularly relevant theories in this study that explain how faulty decision making occurs, and how an individual's judgment regarding evidence affected through a person's personal beliefs, and may be in contradiction to the actual meaning of evidence. In particular, Wilson (2002) discussed how inside information (i.e., evidence) can give a false sense of authenticity (i.e., guilt belief) to the decision maker (i.e., criminal investigator).

### **Information Processing Theory**

Cognition is the focal point of social psychology and has many concepts in experimental psychology. One early psychologist whose work led ultimately to social cognition research was Kurt Lewin (1951), who imported gestalt ideas from Germany that emphasized the influence of one's social environment as perceived by the individual. Referred to as the psychological field, this individual perception describes how a person perceives and understands their own environment based on the total situation, and not isolated elements, and also being independent of others since what matters is the person's own interpretation (Fiske & Taylor 2013). The present study builds upon the emphasis of information processing theory on the real-world social issue of criminal investigative decision making. Nickerson (1998) discusses information processing for the confirmation bias saying that it is sometimes attributed to the tendency of people to gather information about only one hypothesis at a time, and that the hypothesis is only true (or only false), but neither probability could be considered simultaneously. So the information processing theory limits the decision maker to one hypothesis, and assigns only one truth

or falsehood to it. Lord, Ross, and Lepper (1979) found that people rated confirming information as more convincing than disconfirming.

### **Intuition**

Kahneman (2003; 2011) described human intuition as automatic and effortless and fast and powerful. Reasoning, on the other hand, is more slow and deliberate and is thus more controllable and subject to interference. Intuition is an implicit function that humans learn and is thus difficult to modify or control (Kahneman, 2003; Rossmo, 2009; Sternberg, 2009). Although intuition operates at a below-consciousness level, it is still based upon normal sensory input (Douglass, 2008; Rossmo, 2009). Intuition is often emotionally charged, implicit, and accessed easily through the use of heuristics. Intuition can help perform a number of tasks quickly and correctly, however, intuition is also often wrong (Kahneman, 2003). Using intuition is easier than reasoning, and in complex situations humans search for the most easily accessible solution. Because it is more thoughtful and deliberate, reasoning can overrule intuition.

### **Heuristics and Biases**

Kahneman and Tversky (1982), inspired by examples of biased, real-world judgments, further developed on the theory of bounded rationality. Heuristics are “mental shortcuts” that are informal, intuitive, speculative strategies that most often lead to effective solutions (Sternberg, 2009). The heuristics and biases approach developed by Kahneman and Tversky (1984) recognized that intuitive judgments were categorically different than simple rational choice models (Gilovich & Griffin, 2002). In the process they described three general-purpose heuristics: availability, representativeness, and

anchoring and adjustment. These heuristics, each associated with a set of biases, are simple and efficient and have a tendency to integrate with judgments and decisions that need to be made.

One feature of heuristics is that they can yield quick solutions while drawing on sophisticated, underlying processes (Gilovich & Griffin, 2002). It is important to note that biases and heuristics do not always yield optimal or even accurate decisions, due to excessive complexities. One way to understand this approach is to think of the human mind as a computer with limited processing. The response is efficient and but not always accurate. In this context heuristics and biases should be acknowledged as potential influences on important decisions, and include expectations and preconceptions that can affect criminal investigative decision making, and ultimately the strength of belief in a suspect's guilt.

The information processing and heuristic and bias approach describes heuristic processing information with very little effort in judging it's validity (Chaiken, 1980), relying upon more accessible information or non-content cues, and preferring confirmatory information (Lord, Ross, & Lepper, (1979) when determining the conclusion of the message.

### **Anger Attributional Affect**

The attributional effects of anger are expected to support the theory that anger may lead to stronger attributions of blame. Quigley and Tedeshi (1996) concluded that once experiencing an anger-type emotion, an investigator might be more inclined to search for evidence of guilt and believe in a suspect's culpability. This type of guilt

judgment is likely to inspire heuristic processing that may lead to even more blame attribution. Further research supports the concept of anger attribution (Maroney, 2006; Young, Tiedens, Jung, & Tsai, 2011).

Anger also leads to the propensity to seek confirmatory information (Young, et. al, 2011). In the present study it is theorized that anger may lead to attribution of blame toward a suspect in an emotional crime such as child sexual abuse. In the present study it is hypothesized that a criminal investigator may suspend skepticism and arrive at a belief in guilt before it is justified by thorough investigation of other evidence or disconfirmatory information. This behavior has the potential to exacerbate confirmation bias through anger attribution.

### **Police Organizational Culture**

Examining police decision making from the perspective of organizational culture contributes to the understanding the effect of law enforcement environments (Morreale, Bond & Dahlin, 2003; Paoline, Myers & Worden, 2000). Organizational culture can be characterized by suppositions, shared beliefs, opinions, and prototypes that are taken for granted without questioning and shared by members within an individual agency (Jermier, Slocum, Fry, & Gaines, 1991). A “culture” can possess both negative and positive attributes. The U.S. Department of Justice (1997) described police culture as a “set of norms or beliefs that guide a particular group's behavior, the truths that officers feel in their bones, the touchstones that govern their attitudes and behavior...” (p. 30). Thus, culture is deeply ingrained in law enforcement ethos.

In the present study, an understanding of police culture will help to properly recognize the contribution law enforcement officers can add to the validity of this study. The responses in this study will include the important aspect of “tacit experience” that police acquire by virtue of their experience. Pozzali (2006) explains that not all scientific knowledge can be expressed in explicit form. Much of it is stored in the practices, abilities, personal insights and expertise of the individual practitioner, none of which can be easily codified. Tacit knowledge has been considered a type of bias, however, like riding a bike, it expresses a reality that is part of the application of implicit knowledge (Polanyi, 1958). Police culture can help to give some context to the unique form of decision making that occurs in the criminal justice system.

***The Blue Wall of Silence:*** In police culture “The Blue Wall of Silence” is a colloquial phrase that reflects what is police perceive is a relentless war on crime, with individual loyalty, solidarity and uniformity among police officers, coupled with the belief that secrecy against outsiders is necessary to maintain it (Cancino & Enriquez, 2004; Crank, 1998; Goldsmith, 1990; Manning. 1995; Paoline et al, 2000; Kingshott et al., 2004). There is a belief by many officers that police work cannot be fully understood by outsiders (Crank, 1998) and people who are not there to observe the tacit and intangible aspects of interaction with the criminal element cannot fully appreciate the nature of the work. While the public demands more and more from police, the perception is that the public does not support them enough (DOJ, 1997). When a rogue officer commits a crime or when a wrongful conviction occurs it becomes nation news and media will represent that such instances occur more frequent than they really do,



insinuating that police are less trustworthy. This contributes to an *us versus them* mentality among officers (Kingshott, Bailey, & Wolfe, 2004; Cochran & Bromley, 2003; Crank, 1998; Herbert, 1998; Kingshott, Paoline, Myers, & Worden, 2000) creating the assumption that only other police officers, and not citizens, are trustworthy and can understand and support fellow officers. Drummond (1973) explained this contributes to the police axiom "we have to look out for each other" (p. 25).

Solidarity certainly has negative implications regarding the *code of silence*, however, the literature focuses heavily upon negative aspects that include illegal activity, misconduct, excessive use of force, corruption, and unethical behavior (Goldsmith, 1990; Harrison, 1998; Kingshott, Bailey, & Wolfe, 2004; Paoline, Myers, & Worden, 2000; Terril, Paoline, & Manning, 2003). Trautman (2001) concluded that the *code of silence* is a source of police deviance that serves as a protective shield for illegal behavior. Harrison (1998) stated that it is more influential in police than other professions. Crank (2008) argued that officers will "purify" their abuse of suspects and illegal behavior through a "police morality" they construct, that justifies what they do on their own turf (p. 155).

Not all of the research agrees. Solidarity among officers can also have a positive influence on the police environment (Paoline, Myers, & Worden, 2000). As Harrison (1998) noted, solidarity can provide a source of pride and partnership that can cultivate camaraderie and esprit de corps in an agency Likewise, Sever (2008) concluded that solidarity and can serve to unite against hostility in unpredictable environments. With such disparate meanings it is uncertain what the rationale is for police silence. What is

certain is that getting input from police in the understanding of psychological phenomenon is crucial to making progress on issues of that contribute to positive social change.

It is important to endeavor to work with law enforcement in the attempt to reach realistic research findings that can benefit agencies in their professional development, and to better serve their communities. The present research proposes to include police officers in studying law enforcement decision making rather than relying on convenience sampling. It is not difficult to understand the cynical nature of police when research is critical of them, and no attempt is made to examine the nature of their actions. This misconception prevents collaborative scientific research rather than drawing interested fields of inquiry together. For this reason it is beneficial to obtain the cooperation of police as research participants in a matter of such important public interest.

### **Literature Review**

The seminal work by Tversky and Kahneman (1974) and Nickerson (1998) enlightened the study of social cognition and contemporary research and has been cited in thousands subsequent research studies. Work in the domain of heuristic and bias research includes that of Daniel Kahneman and Amos Tversky who published a series of papers about decision making under uncertainty and risk (Kahneman, 1973; Kahneman & Tversky, 1972, 1973, 1979, 1986, 1996, 2000; Kahneman, Slovic, & Tversky, 1971, 1972, 1982; Tversky & Kahneman, 1971, 1973, 1974, 1981, 1983, 1986, 2002). This field-changing work outlined three commonly employed heuristics as good examples of how people reduce complex tasks into more simple, less effortful operations: availability,

representative, and anchoring and adjustment (Tversky & Kahneman, 1974). This program of research has become known as the heuristics and biases program (Snook & Cullen, 2009), explaining how heuristic processes can often sometimes lead to errors and biases and that people assess and reason about a situation in a way that is very sensitive to prior information.

Heuristics-oriented decision making refers to the use of simple mental strategies to deal with dubiety and an uncertain world (Fiske & Taylor, 2013; Kerstholt & Eikelboom, 2007). One criticism of this research however, is that they imply step-by-step search strategies (Dhmi, 2010). The idea that they are bad stem from research that strives for optimality (Kahneman, Slovic, & Tversky, 1982; Nisbett & Ross, 1980). Specifically, this research holds that heuristics ignore certain information that might be relevant, and do examine information that other idealistic models do (Snook & Cullen, 2009).

Another seminal study included a meta-analysis by Nickerson (1998). In this study on confirmation bias the question of spontaneous versus deliberated case-building is addressed. Nickerson (1998) describes deliberate case-building as an attorney's job, whereas spontaneous case-building is of the less conscious, more biased sort. This study goes on to describe motivated vs. unmotivated forms of confirmation bias.

O'Brien (2009) conducted a study of some relevance to this research issue by using a common methodology; participants were exposed to an element of bias and then questioned about their feelings of belief in a particular subject's guilt. Ask, et al., (2008) have studied the concept of confirmation bias in the context of evidence, and the

elasticity (the latitude for interpretation) of evidence in changing circumstances. Rassin (2010; 2012) conducted research of a similar vein, evaluating the susceptibility of confirmation bias, and also biased evaluations of criminal evidence. O'Brien (2009) and Ask, et al., (2008) and Rassin (2010, 2012) all generalized their findings to the field of criminal investigation, theorizing that the data from their research participants yielded valid responses.

The methodologies of these studies included quasi-experimental designs. O'Brien (2009) divided participants into two conditions (hypothesis, no hypothesis) x 2 groups (half-case file, full-case file) and utilized a split-half reliability method. Ask, et al., (2008) conducted a 3 x 2 factorial design with three evidence types (DNA, photos, witness) and two evidence outcomes (consistent, inconsistent). Rassin (2010) also conducted a factorial design with two evidence types (severe, aggravated) and two strengths of evidence (strong, weak). In each study, participants received evidentiary propositions with certain facts they were to assume were true. The participants also completed short questionnaires about their impression of guilt and strength of evidence. In addition to the use of Likert scale questionnaires, this study proposes to conduct hierarchical multiple regression analysis to examine whether the characteristics and variables such as education, age, time in grade, gender, or training serve to moderate the effects of confirmation bias.

Among the most current research that informs this study includes. Busey and Dror (2011) investigated forensic decision making from an information processing perspective, and West, Meserve, and Stanovich (2012) explained how the bias blind spot interferes

with optimal decision making in an investigative context. Girgenzer (2010) explained how moral satisficing could lead to decision making. Kebbell, Muller, and Martin (2010) investigated decisional bias in dealing with uncertainties in serious crime, and Keel (2008) identified some “best practices” for investigations.

Research into law enforcement decision making includes an emphasis on organizational culture (Goldsmith, 1990; Harrison, 1998; Kingshott, Bailey, & Wolfe, 2004; Paoline, Myers, & Worden, 2000; Terril, Paoline, & Manning, 2000; Trautman, 2001). Criminal investigative decision making is influenced by shared beliefs and opinions between members of an agency (Jermier, Slocum, Fry, & Gaines, 1991). Within law enforcement agencies, the more experienced officers often shape the beliefs and opinions of newer officers, creating a more uniform subculture, and perpetuating the cycle (Sever, 2008). Part of this subculture includes uniformity and solidarity in a war on crime (Bailey & Wolfe, 2004; Paoline, Meyers, & Worden, 2000), creating a morality where questionable decisions are “purified” (Sever, 2008), thereby justifying “bending” the rules in order to be successful against criminals (Cochran & Bromley, 2003). This is a more conscious, intentional form of bias than what is being considered in the proposed study, however, it helps to explain how strong the influence of organizational culture.

Research by Fahsing and Ask (2013) studied affective reactions in an investigative context, and described how sexual offenses violate shared human values and influence investigative decision making. This study is consistent with the theory that the types of evidence may lead to different levels of confirmation bias. Quigley and Tedeschi (1996) showed that anger can transcend a situation and increase blame attribution to

subsequent events. Dror (2008) describes how mental states play active roles in decision making in whether and how we acquire, process, and interpret information. Thus, even before information is collected, people will usually have a preference (Busey & Dror, 2011). Capesteny and Harris (2014) examined how more disgusting crimes could influence reason in legal decision making, including affective responses. Offering more physiological substance, Greene, Sommerville, Nystrom, Darley, & Cohen (2001) showed that in participants who considered personal moral dilemmas involving direct contact with a victim, the brain demonstrated increased emotional activation.

Feigenson & Park (2006) explain that in a forensic context, emotion includes feelings, cognitions, and actions (or inclinations to act). Kruglanski and Gigerenzer (2011) demonstrated how it emotionally significant crimes lead to satisficing in legal decisional judgment. That is, finding a way to conclude guilt with the existing evidence. Additional research offers support for the research hypothesis that emotion can result in forming a guilt judgment (Bornstein & Wiener, 2006; Maroney, 2006; Weiner, Bornstein, & Voss, 2006). Finally, once a guilt judgment is made it can be cognitively adopted as factual (Dror & Fraser-Mackenzie, 2005), and once adopted as factual the judgment is not likely to be amended.

According to Maroney (2006), the literature on emotion in legal decision making reached a “high-water mark” with a series of essays from scholars across many disciplines (Bandes, 1999), however, psychology was excluded. Though advancing the dialogue, Bandes (1999) did little to explain the cognitive content of emotion in legal decision making. Nevertheless, this prompted further study on the subject of emotion in

law and there is substantial support for the concept of anger attribution. More recently, Stevenson, Malik, Totton, and Reeves, (2014) demonstrated how extreme emotion can cause jurors to dehumanize a *super-predator* defendant who perpetrates what they perceive as disgusting crimes.

Research by Ask and Granhag (2007) investigated similar outcomes of interest using a methodology similar to the present study. Schrackmann and Oswald (2014) discussed the preference for confirmatory information in an investigative setting when testing attitudes or beliefs. This research allowed participants to revise their level of suspicion toward a suspect after reviewing evidence. Additional research supporting the hypothesis of emotion influencing investigative decision making is found in Bodenhausen (1992), Ditto, et al., 1998; 2006), Kosnik (2007; 2008), Klayman and Ha (1987) and Wilson (1998).

The presence of confirmation bias in criminal investigation is supported in multiple studies (Ask & Granhag, 2005; Ask, et al., 2008; Busey & Dror, 2011, Dror & MacKenzie, 2009; Eerland & Rassin, 2010; O'Brien, 2009; Rassin, 2008; Rossmo, 2009; Snook & Cullen, 2009; Spano, 2005). These studies are relevant to the research hypotheses that confirmation bias can be present in criminal investigations, but there may be individual characteristics that moderate the phenomenon.

Among the studies of confirmation bias and criminal investigations, those that are most central to the current study are O'Brien (2009) and Weiner, Bornstein, and Voss (2006). Ask and Granhag (2005) and Rassin (2008; 2010) are often cited in the literature as key studies, however, they are not included in the same category here based upon the

non-representative choice of research participants as well as the broad differences in Swedish and Dutch criminal justice systems compared to the U.S. O'Brien (2009) also used convenience sampling, and with 18-year old college freshman might be argued that they are even less representative, however, O'Brien (2009) is the only research identified in the U.S. on the subject close to what the present study proposes.

Of the studies that bear directly upon the issue of confirmation bias in criminal investigations, O'Brien (2009) considered that if experienced criminal investigators demonstrated confirmation bias, the natural follow-up questions are what exacerbate it, and what might mitigate it? Based upon suggestions that deploying countermeasures might force an investigator to consider alternative hypotheses, O'Brien (2009) suggests that thinking of reasons why their hypotheses might be wrong, or that another suspect might be viable, might diminish an investigator's bias. The research is well conceptualized except it branches off here and focuses on showing how to "reduce" the tendency toward theory favoritism.

The greatest weakness of this research is in the use of lay personnel as participants. Even O'Brien cautions that the findings of the study are "limited by the lay participants". This weakness is understated, however, as the average age of the participants was 18-years old and they all received course credit in exchange for their participation. Additionally, the study went to great lengths to replicate a complicated homicide case with complex evidence; a type of case that would require years of relevant experience to acquire the nuances and subtleties in understanding case complexities, along with the importance of disconfirmatory evidence and the legal requirement of



reporting exculpatory evidence. An inexperienced layperson runs the risk of categorizing something immediately if it makes reasonable sense to them, whereas criminal evidence can quite often only make sense in retrospect, if at all.

Rassin, et al. (2010) and Ask, et al. (2008) are studies of direct relevance that arrived at different conclusions than O'Brien (2009). Rassin, et al. (2010) found that it is difficult for an investigator to remain open to alternative scenarios, even if they clearly exist. Ask, et al., (2008) investigated the phenomenon by examining different kinds of evidence (witness, photo, DNA) and whether inconsistent evidence might be considered less reliable than consistent evidence. This study found that the reliability was more pronounced when the evidence consisted of less interpretation such as DNA, and the evidence did not challenge their suspicions. When the interpretation of the evidence was greater, such as witness statements of photographic evidence, the probability of contextual influences was also found to be greater. This research provides insight into the evaluation of certain forms of evidence, but does not delve into investigative decision making or any of the different forms of bias.

Ask and Granhag (2007) examined the differential impact of anger and sadness on criminal investigative judgments. Researchers there considered the concept of strong affective reactions to child sexual abuse, a crime that provokes strong emotions. The researchers focused on judgments made at the early stage of a criminal justice process (criminal investigation), and considered the resultant consequences of anger and sadness, hypothesizing that anger may transcend the situation and increase blame attributions related to the crime. Ask and Granhag (2007) noted that previous research on anger and

judgment show that participants make more stereotypical judgments (Bodenhausen, et al., 1994) and may rely on fewer diagnostic cues (Lerner, Goldberg, & Tetlock, 1998). Tiedens (2001) noted that in such cases participants pay closer attention to superficial clues and make greater use of chronically accessible information (Tiedens & Linton, 2001). Ask and Granhag (2007) concluded that anger is likely to make criminal investigators rely on superficial processing, and that they may base their judgments more on preexisting expectations and beliefs, than on deeper processing.

Fahsing and Ask (2013) conducted research on investigator's decision making, hypothesizing that time pressures, emotional involvement, and expediency-promoting occupational norms (time) are the primary obstacles of optimal decision making. Kruglanski and Webster (1996) defined the ambiguity of an unsolved crime as a strong need for cognitive closure, motivating the investigator to come to a conclusion rapidly. In another study that informs a hypothesis of the proposed study that emotion can affect decision making, Wiener, Bornstein, and Voss (2006) found that emotions experienced at the time of a legal judgment can help to determine the decisions and behavior. This study concludes that a decision need not arise from the stimuli that occur *before* the decision, but that a decision may be influenced by internal or external factors that are incidental to the task.

One limitation of many of the aforementioned studies was a lack of internal validity. Virtually all of the research on criminal investigative confirmation bias has been conducted with participants with very little life experience, and no law enforcement experience, upon which the relevant perspectives rely. Ask, et al. (2008) explained that

criminal investigations include complex contextual influences and that background knowledge contributes significantly to decision making and judgment. The use of student participants obscures the actual dilemma confronting the perceiver who encounters confirmation bias stimuli. In this regard, 18-year old college students are not representative of experienced law enforcement officers making complicated decisions in dynamic situations. This use of lay participants has been addressed as a limitation (Ask, et al., 2008; O'Brien, 2009; Sears, 1986) with recommendations that experienced investigators be utilized in the future for more accurate interpretation of the phenomenon (Rassin, et al., 2010).

Another weakness of these studies is that quasi-experimental designs preclude firm causal inferences (Frankfort-Nachmias & Nachmias, 2008). The research by Ask, et al. (2008) and Rassin (2010) were conducted in countries with different socio-political cultures whose legal systems have varying levels of proof that are incompatible with the US criminal justice system. In the U.S. judgments of guilt vary according to the required level of proof and are required for a different rationale as well. For example, in the U.S. probable cause is required to conduct a search or effect an arrest. Another notable difference in legal systems is that Sweden allows hearsay evidence whereas it is strictly limited in US courts. Also, Swedish Judges may consider alternative evidence not presented in evidence. Further, Swedish courts are not bound by prior decisions, limiting consistency in the application of the law. Law enforcement in Sweden, like government, is centralized, and run by the Ministry of Justice. In the U.S. law enforcement is more

local with 58% of all agencies smaller than 50 officers or less (Reeves, 2010). Civilian oversight for local agencies exists within the communities that they serve.

Rassin's (2010) research with Swedish police officers, lawyers and judges, compared emotion (anger and sadness) with statement consistency (consistent and inconsistent). This research concluded that sad investigators engaged more thoroughly in processing case material than the investigators who were angry, and that sad participants were more likely to believe the suspect was guilty. In research by Rassin, Eerland, and Kuijpers (2010) law students were used as participants and were found to be more likely to prefer evidence of an incriminating or exonerating nature, depending upon their preliminary beliefs in innocence or guilt. The conclusion of this research stressed the importance of delaying conclusions of guilt or innocence until all of the information is obtained. The findings of this research are in line with the research of others (Ask & Granhag, 2007, Nickerson, 1998, O'Brien, 2009) that people have a tendency to look for evidence that confirms their beliefs.

The effect of anger and emotion on criminal investigative judgments is highly relevant as such judgments may influence the investigator's attributional judgments towards personal and situational causes (Ask, et al., 2008; Dror, 2005). This may come in the form of affecting the perception of the causes a perpetrator's behavior, or the consequences for a victim. In the present study, the effect of anger is anticipated to come in the form of a swifter guilt judgment. It is also anticipated that empathy for a minor victim may also contribute to a swifter guilt judgment.

In studying confirmation bias Ask, et al., (2008) considered the concept of *asymmetrical skepticism* and utilized as an IV the type of evidence (physical evidence, testimonial evidence, DNA) and compared it to a level of belief in guilt as a DV. Rassin (2010) did the same. In the present study, similar variables were chosen, as they are both relevant representative to the issue under investigation. No study into confirmation bias in criminal investigation would be complete without bias or suspicion toward the suspect. This study utilized a level of bias as an IV, and a measure of guilt judgment toward a suspect using Likert scale responses as a DV.

A key component missing in the existing research regarding confirmation bias in criminal investigative decision making is the applied nature of the decision maker. The applied nature of the criminal investigator incorporates tacit variables that are uniquely and intrinsically present the law enforcement officer, based upon their training and experience. Without an applied component, research distills the information such that the layperson must consider the findings in a vacuum and consider how they might be, rather than with an applied perspective that more accurately demonstrates how they really are (Pozzali, 2006). This study sought to provide that applied component.

### **Summary**

In this chapter I reviewed the literature on confirmation bias and forensic decision making. This review included relevant research discussing confirmation bias in criminal investigation as well as the effect of emotion on judgment and decision making. I have also summarized relevant theories and concepts used by researchers including rational choice, expected utility, prospect theory, and relevant framework from bounded

rationality, heuristics and biases, intuition, information processing, anger attribution, social functionalist theory, and police organizational culture.

Together, the studies outlined offer preliminary evidence that confirmation bias does exist in criminal investigative decision making, but there are some institutional safeguards and individual characteristics that can moderate such bias. Further, these studies have shown that when bias takes place in criminal investigative decision making, it can persist despite the presence of disconfirmatory evidence. These are problematic areas of concern in a forensic setting such as law enforcement.

Confirmation bias is a ubiquitous phenomenon in human nature (Nickerson, 2008) that causes people to selectively seek information that is consistent with prior beliefs, expectations, or desired outcomes, to disregard, deny, devalue or dismiss information that is inconsistent or disconfirmatory, or to interpret ambiguous information in a manner that confirms (or disconfirms) a person's perceived beliefs or expectations (Dror & Mackenzie, 2005; Lilienfeld, 2010; Wiener, Bornstein, & Voss, 2006). The literature on confirmation bias in criminal investigative decision making has demonstrated the presence of confirmation bias (Ask, et al., 2008; O'Brien, 2009; Rassin, 2008; 2010). Rassin (2010) notes that an investigator may create search strategies in such a way that confirmation is given more of an opportunity than is falsification.

It is a basic assumption of public conscience that the police operate fairly, impartially and objectively, making decisions only after they have collected the entire body of evidence. Preexisting attitudes, expectations, biases, preconceived notions, stereotypes and schema are variables that may affect criminal investigative decision

making. Thus, in the process of investigating a case, an investigator may seek only that evidence which inculpates the defendant, *building a case* rather than following the clues and facts. In doing so, one tends to believe theory before they have the facts, thus the theory drives the fact-finding, and case building ensues.

One notable gap in the literature related to this study is that there has been no practical analysis of the phenomenon of confirmation bias in criminal investigations with law enforcement personnel within the United States criminal justice system. This study will expand on this gap within the literature, studying the effect of confirmation bias on criminal investigative decision making in an applied manner that affects the whole of society. The use of law enforcement personnel as research participants will allow for a more direct comparison of data with the research problem.

O'Brien (2009) conducted research on this topic using college freshmen with an average age of 18-years old. One limitation of this population is that the obsequious entertainment industry touches young, impressionable people now more than ever with the proliferation of media and electronics over the last decade. One of the most popular entertainment subjects is crime drama, which displays inaccurate and unrealistic depictions of criminal investigations. In 2010, a quarter of the most watched shows in any given week involve crime, investigation, and forensic science: CSI, NCIS, NCIS: Los Angeles, and Criminal Minds (Gabel, 2011). This information tends to taint the belief system and expectations of most people, particularly inexperienced and easily influenced teens. The present study proposes to utilize law enforcement officers who are assigned to patrol and investigative assignments Tapping into the tacit knowledge associated with

this experience is expected to provide somewhat more subdued, but more realistic expectations and beliefs.

The literature reviewed for this research provides insight into the phenomenon of confirmation bias in a general forensic sense. The existing literature emphasizes the pervasive nature of confirmation bias (Nickerson, 1998; Ditto & Lopez, 2002; Ditto, et al., 1998). The relevant theories and psychological frameworks contribute to understanding the nature of the unique influences and pressures on decisions that must be made by police officers in times of stress and uncertainty (Dror & Fraser-Mackenzie, 2009; Dror & Bucht, 2011; Epstein, 2004). The research questions built upon this framework to examine the nature of the influence of emotion and bias on decision making in an applied, criminal context, by comparing the influence of emotion on a confidence assessment of guilt judgment. A comparison of duty assignments expounded on whether criminal investigators were less influenced than others, as the nature of their position entails. The gaps in the articles identified in the research have laid the foundation for the framework of this proposed study into confirmation bias, which examined the forensic aspect of the phenomenon further into the judgment of individual criminal investigators in decision making.

Despite the problematic areas of human decision making and cognition errors, it can be argued that logical reasoning can be used to override such psychological biases (Snook & Cullen, 2005). In light of that, it is worthwhile to expand the field of knowledge in criminal investigative decision making to become more aware of these issues, and develop strategies to lessen or reduce bias through accountability protocol,



training, and agency policies, to add to what we know about the phenomenon, and discover more about what we don't.

Chapter 3 will focus on the study's methods and design, providing an explanation of the design, justification, and measurements utilized in the study, as well as an extensive analyses of the data. This will include an explanation of the rationale for the study's design, a description of the population and sample to be studied, the sampling procedure, data collection, instrumentation and data analysis procedures. Chapter 3 concludes with a summary of the steps to be taken for the ethical protection of the research participants.

## Chapter 3: Research Method

### **Introduction**

The purpose of this study was to examine the association between confirmation bias and criminal investigative decision making and to explore the influence of bias in a practical application. Independent variables (IV) under consideration in this study include the type of duty assignment (i.e., recruit, patrol and investigations), the type of crime (child sexual abuse, abuse of adult), and the order of evidence presentation (sequential, simultaneous, reverse sequential). The dependent variable (DV) in this study included a degree of confirmation bias, represented by a confidence assessment of a suspect's guilt or innocence, in light of specific items of information or evidence.

This chapter describes the methodology employed in this study of the effect of confirmation bias on criminal investigative decision making, and the researcher's justification for the choice of methodological approach. In particular, this chapter describes the method for studying whether confirmation bias differs by duty assignment, and whether emotion influences the belief in a suspect's guilt in a criminal investigative setting. This chapter also explains the study's rationale and research design, the population and sample, instrumentation and materials, procedures for data collection and analysis, and steps taken for ethical protection of participants.

### **Research Questions and Hypotheses**

A quantitative research design was used for this study, which was organized around three research questions and associated hypotheses:

**RQ 1:** Does confirmation bias differ among various assignments (recruit, patrol, investigators) within law enforcement?

*H<sub>0</sub>1:* Confirmation bias does not differ among assignments.

*H<sub>1</sub>1:* Confirmation bias does differ among assignments.

**RQ 2:** Can emotionally charged crimes increase belief in a suspect's guilt?

*H<sub>0</sub>2:* Emotionally charged crimes do not increase belief in a suspect's guilt.

*H<sub>1</sub> 2:* Emotionally charged crimes can increase belief in a suspect's guilt.

**RQ 3:** Does the order of evidence presentation influence belief in a suspect's guilt?

*H<sub>0</sub>3:* Evidence presentation order does not influence guilt belief.

*H<sub>1</sub>3:* Evidence presentation order does influence guilt belief.

### **Research Design**

The purpose of this study was to evaluate the effect of confirmation bias on investigative decision making. Further, utilizing a law enforcement body of research participants provided greater construct validity and allow for further research to build upon this study. To that end, the research design that was selected was a quantitative, quasi-experimental between-subjects factorial analysis, believing that using police officers as research participants in a law enforcement task would result in greater validity provided by greater statistical power. The power of statistical test refers to the probability that it will lead to the rejection of the null hypothesis. Any failure to conduct analyses of statistical power can increase the risk of a false rejection of the null hypothesis (Type I

error) or false retention the null hypothesis (Type II error). The power of the test was determined based on the test instrument in question, along with information regarding the sample population. Power, therefore, was dependent on the significance criterion, research sample, and the population effect size (Cohen, 1992).

### **Setting, Population, and Sample**

The setting for this research study was a state-government-operated criminal justice training center located in a Midwestern state. Sworn officers from around the state who gather to attend annual in-service training was invited to participate in the study. Officers attend in-service training according to their duty assignment (patrol and criminal investigations). Using a state criminal justice training department will provide access to experienced criminal investigators who are assembled to attend advanced training. Basic training recruits at the academy will also be invited to participate.

The target sample size for this study was derived from a power analysis of GPower 3 (Faul, Erdfelder, Buchner & Lang, 2009). This study anticipates an alpha level of 0.05 and a medium effect size and power level. More participants than are suggested was invited to participate to account for possible attrition during the data collection.

A two-tailed, medium effect of .8 and an alpha level of 0.05 was utilized. An appropriate sample size was utilized with these figures and using GPower 3 software (Faul, et al., 2009). A medium effect size was so that inferences that can be made about the relationship among the variables in this study. Further, this study will utilize a split-half method to construct two scales. The scores from the questionnaires was correlated as estimates of reliability, with a correlational coefficient between 0.00 and 1.00. The

product (coefficient) will express how much each response (variable) is related. The resultant predicted power was evident.

### **Design**

This research was considering forensic, social cognition that include biases, heuristics, prejudices, preconceptions, attitudes, stereotypes, to name a few, and how it influences criminal investigative decision making. *Influence* indicates the context of thought processes or acts of thinking. The theory in this research is that there are errors in thought processes that are unique to criminal investigation, such as preconceptions or stereotypes against sex offenders. These thought processes could be harmful when they give the impression of being right but are actually not.

Griffin and Tversky (1982) demonstrated that the balance of arguments for and against competing hypotheses determines people's confidence, with insufficient regard for the weight of the evidence. Griffin and Tversky (1982) further noted that the formation of belief and the weighing of evidence are basic elements of human thought and observed how expert prediction is "often wrong, but rarely in doubt" (p. 230). The impression of being right when one is wrong can be harmful to criminal investigative decision making. For the proposed research the data analysis instrument will include a self-reporting Likert scale questionnaire that will yield responses to fixed-alternative expressions ranging from 0 to 10, with answers ranging from *not guilty at all* to *absolutely guilty*. The statements in the questionnaire are in Appendix H.

Once the responses are calculated, it is expected they will produce ordered responses of discriminative power (DP). The items with the highest amount of DP are

considered the items that the best discriminate among the individuals expressing different attitudes toward the attitude being measured (Frankfort-Nachmias & Nachmias, 2009). In this way, we obtain the most reliable data possible, to reflect the attitude in question.

After each item of evidence, participants will record a confidence assessment of their belief of guilt/innocence on a Likert scale. The guilt belief scores was measured as the difference between the number of items (mean evaluation) and tested against zero for significance. This study was a quasi-experimental, 2 (type of crime: adult sex assault, child sex assault) x 3 (assignment: recruit, patrol, investigator) x 3 (evidence presentation: sequential, simultaneous, reverse sequential), between-subjects, factorial design. The IV's included the duty assignment and evidence presentation order, while the DV included a confidence assessment in the form of level of guilt belief.

Another aspect of this study examined whether emotionally charged evidence could influence belief in a suspect's guilt. Participants were advised they were investigating circumstances surrounding a crime and were receiving several items of evidence. A list of the evidence is found in Appendix A. Both groups received the same vignette of a crime involving a child sexual assault. One group received each item of evidence sequentially, recording a confidence assessment of guilt after each item. The other group received all of the evidence simultaneously, recording one confidence assessment of guilt. The predictor variables included the items of evidence and the criterion variables included the assessments of belief in guilt.

To evaluate the practical nature of confirmation bias in law enforcement in criminal investigations it is necessary to consider the tacit knowledge of criminal

investigators and law enforcement officers. Pozzali (2006) reported that the application of tacit knowledge such as the subtleties and nuances of a criminal investigation are often biases themselves. Consequently, the order of evidence included a reverse sequence presentation order, to explore the nature of confirmation bias when exculpatory evidence precedes the inculpatory evidence. No reverse simultaneous order was utilized because there is effectively no order of presentation when all of the evidence is visible at one time. The effect was expected to be the same as the existing simultaneous presentation order.

The demographic information listed in Appendix I, was collected at the beginning of the study and provides basic information related to individual, organizational, and professional characteristics.

### **Instrumentation and Materials**

Participants were asked to complete questionnaires electronically and record their answers to the vignettes they read. The vignettes include similar sexual assault scenarios and come from actual criminal cases investigated by the researcher, supporting the validity of the material, since the scenarios have actually been encountered in a criminal investigation setting. The following case vignettes conveyed the stimulus material.

#### **Vignette Experiment 1**

Participants were advised they were investigating circumstances surrounding a reported sexual assault of a minor, along with 10 items of evidence. One group received all 10 items of evidence simultaneously for their review, and asked to render a single

opinion after examining the evidence. Another group was provided the evidence sequentially, and asked to render an opinion after each item. A third group received the evidence in reverse-sequential order and asked to render an opinion after each item. All of the groups were asked to provide a guilt estimate at the end of the survey in the form of a *guilty* or *not guilty* selection. The vignettes read:

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe, and their 14-year old daughter Jane. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Jane reports that John raped her, and has been doing so for a while. You have been assigned to investigate the case. There are 10 items of evidence. Choose the number that corresponds to your level of suspicion about the report from 0 (*not guilty at all*) to 10 (*definitely guilty*).

### **Description of Evidence – Sequential and Simultaneous**

**1. Initial report** – You are dispatched to the hospital to meet Ron and Jo Doe. You learn that their 14-year old daughter, Jane Doe, reported that her paternal uncle, John Doe, had raped her. John Doe has been living in the home for 6 months now. Jane's mother states that Jane is not sexually active and would not willingly have sex with anyone, least of all her uncle.

**2. SANE nurse report of examination** - The SANE nurse notes in her report that the victim claims to be sexually active with her boyfriend. The report indicates the victim stated her uncle vaginally raped her and had been doing so for several months now. The report also notes that the victim reported to the SANE nurse that she is concerned about



possibly being pregnant. The victim was given the option of an abortifacient (Day after) pill, which she took. No signs of force or injury were noted, but signs of recent sexual activity were present.

**3. Crime scene** - Utilizing an alternate light source, body fluid was identified on the sheets in Jane's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for analysis.

**4. Victim interview** - Jane Doe states that her Uncle, John Doe, had been flirting with her and that their rooms are so close in the house that she is uncomfortable with him being around, particularly since he is a sex offender. A criminal history review confirms that John Doe is a convicted sex offender, however a check of local records reveals he has not registered on the local Sex Offender Registry.

**5. Suspect interview** – John Doe denies the allegation. John Doe states that Jane is vindictive and resents him being in the home. He states the proximity of his room to Jane's restricts what she can get away with and she dislikes him being there. John Doe states he has caught Jane and her boyfriend having sex in the house on several occasions. On one occasion when he caught the boyfriend sneaking into her room he confronted them. At that time Jane threatened that she would tell her parents that he forced himself on her. John Doe states that his felony conviction is related to having sex with his 16-year old girlfriend when he was 18-years old. John Doe relates that he is aware he is obligated to register on the local sex offender registry but has not yet done so because was only staying temporarily with his brother and had not yet established a residence of his own.

**6. Boyfriend interview** – The boyfriend states that he and Jane have sex almost daily and they had sex on the morning of the reported incident. He further states that he did not use a condom. The boyfriend states that he is not aware if Jane is on birth control or not, but that she was worried that she might be pregnant.

**7. School counselor** - Jane had come to her about a week before the reported incident and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? The school counselor told Jane that in cases of rape, an abortifacient is free.

**8. Follow-up investigation** – In a follow-up interview with John Doe. He reports that he had a vasectomy years ago, thus he no longer produces semen in his ejaculate. Medical records provided confirmation.

An interview with a neighbor reveals that they have observed someone coming in and out of an upstairs window at the Doe's house, using the roof for access. No identification of the individual was possible.

**9. Follow-up investigation** - In a follow-up interview with Jane, she stated she just wanted the whole thing to “go away” and that she no longer wanted to pursue charges against her Uncle.

**10. Lab report** - DNA from the sheet was matched to Jane and included semen from an unidentified male subject.

### **Recording Responses – Sequential and Simultaneous**

Participants in the sequential group will record their confidence assessment on a Likert scale after each item of evidence is presented. Participants in the simultaneous

group will record a single confidence assessment on a Likert scale after all 10 items of evidence are presented. The confidence assessment were measured with the following 11-point Likert scale:

0      1      2      3      4      5      6      7      8      9      10

Some of the evidence is framed in such a way that it is directed at obtaining further evidence incriminating the suspect, implying or confirming the suspect's guilt. Other items of evidence are framed in such a way that exonerates the suspect by reducing the strength of the existing incriminating evidence or by suggesting evidence for an alternative scenario. At the conclusion of the vignette, the participants will also be asked to provide an overall estimate of guilt in the form of *yes* or *no* selection.

### **Description of Evidence – Reverse Sequential and Simultaneous**

The reverse-sequential and simultaneous groups will receive the same items of evidence in a different sequence. Some of the verbiage is reworded for logic and coherence.

**1. Initial report** – You are dispatched to the hospital to meet Ron and Jo Doe. You learn that their 14-year old daughter Jane Doe, said that her Uncle John had raped her. John Doe has been living in the home for 6 months now. Jane's mother states Jane is not sexually active and would not willingly have sex with anyone, least of all her Uncle.

**2. SANE nurse report of examination** - The SANE nurse notes in her report that the victim claims to be sexually active with her boyfriend. The report indicates the victim stated her uncle vaginally raped her and had been doing so for several months now. The report also notes that the victim reported to the SANE nurse that she is concerned about

possibly being pregnant. The victim was given the option of an abortifacient (day after) pill, which she took. No signs of force or injury were noted, but signs of recent sexual activity were present.

**3. Crime scene.** Utilizing an alternate light source, body fluid was identified on the sheets in Jane's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for results.

**4. Lab report** - DNA from the sheet was matched to Jane and included semen from an unidentified male subject.

**5. Follow-up investigation** – In a follow-up interview with John Doe. He reports that he had a vasectomy years ago, thus he no longer produces semen in his ejaculate. Medical records provided confirmation.

An interview with a neighbor reveals that they have observed someone coming in and out of an upstairs window at the Doe's house, using the roof for access. No identification of the individual was possible.

**6. School counselor** - Jane had come to her and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? The school counselor told Jane that in cases of rape, an abortifacient is free.

**7. Boyfriend interview** – The boyfriend states that he and Jane have sex almost daily. Had sex with Jane on the morning of the reported incident. He further states that he did not use a condom. The boyfriend states that he is not aware if Jane is on birth control or not, but that she was worried that she might be pregnant.

**8. Suspect interview** – John Doe denies the allegation. John Doe states that Jane is vindictive and resents him being in the home. He states the proximity of his room to Jane’s restricts what she can get away with and she dislikes him being there. John Doe states he has caught Jane and her boyfriend having sex in the house on several occasions. On one occasion when he caught the boyfriend sneaking into her room he confronted them. At that time Jane threatened that she would tell her parents that he forced himself on her. John Doe states that he was convicted of having sex with his girlfriend, who was 17-years old at the time.

**9. Victim interview** - Jane Doe states that her Uncle, John Doe, had been flirting with her and that their rooms are so close in the house that she is uncomfortable with him being around, particularly since he is a sex offender. A check of local records confirm that John Doe is on the Sex Offender Registry.

**10. Follow-up investigation** - In a follow-up interview with Jane, she stated she just wanted the whole thing to “go away” and that she no longer wanted to pursue charges against her Uncle.

### **Recording Responses – Reverse Sequential and Simultaneous**

Participants in the reverse-sequential group will record their confidence assessment on a Likert scale after each item of evidence is presented. Participants in the simultaneous group will record a single confidence assessment on a Likert scale after all 10 items of evidence are presented. The confidence assessments were measured with the following 11-point Likert scale:

0      1      2      3      4      5      6      7      8      9      10

At the conclusion of the vignettes, the participants will also be asked to provide an overall estimate of guilt in the form of *yes* or *no* selection.

### **Vignette Experiment 2**

In this experiment the crime scenario remained mostly the same with the exception that the victim was not a juvenile and the suspect was not a registered sex offender. One group received all of the evidence simultaneously. A second group was provided the evidence sequentially and asked to render an opinion after each item. A third group received a vignette with a reverse-sequential order of evidence. All of the groups then rendered a guilt estimate in the form of a *yes* or *no* selection. The vignette read:

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Several neighbors come to the Doe home regularly to play cards and drink alcohol, including Scott and Joanne Smith. Joanne Smith has reported that John Doe sexually assaulted her, and you have been assigned to investigate the case. Choose the number that corresponds to your level of suspicion about the report from 0 (not guilty at all) to 10 (definitely guilty).

#### **Description of Evidence – Sequential and Simultaneous**

**1. Initial report** – You are dispatched to the hospital where you meet Scott and Joanne Smith. Joanne Smith reports that John Doe raped her the night before at the home of Ron and Jo Doe, where John resides. Both Scott and Joanne Smith report that they

were intoxicated and do not recall much of the evening. Joanne Smith claims that the incident occurred in John Doe's bed and that it was not consensual.

**2. SANE nurse report of examination** - The SANE nurse's report indicates that Joanne Smith stated she had become voluntarily intoxicated the night before and recalls talking to John Doe in his room, and possibly kissing him. She further stated that she would not consent to having sex, and therefore must have been raped. Joanne Smith was given the option of an abortifacient (Day after) pill, which she took. There were no signs of force or injury noted, however, signs of recent sexual activity were present. A sexual assault evidence collection kit was performed by the SANE nurse on the victim and provided to you.

**3. Crime scene.** Utilizing an alternate light source, body fluid was identified on the sheets in John Doe's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for results.

**4. Victim interview** – Joanne Smith states that she and her husband Scott regularly go to the Doe's home to play cards and socialize, usually drinking alcohol. On this occasion, Joanne Smith became intoxicated and does not recall much. Joanne Smith recalls being in John Doe's room for some reason and has a vague recollection of kissing him, but nothing after that. Joanne stated that in the early morning hours she awoke naked with John Doe, in his bed. She stated that she woke her husband and they went home and went back to bed. Several hours she awoke and came to realize that she had engaged in sexual intercourse and told Scott Smith, who then took her to the hospital.

Joanne Smith stated she would not have consented to having sex with John Doe under any circumstance.

**5. Suspect interview** – John Doe denies the allegation. John Doe states that on the evening in question Joanne Smith had been flirting with him, although at the time he thought nothing of it. John Doe stated that everyone at the home was drinking heavily and getting intoxicated. John Doe stated that at one point during the evening he went to use the restroom and when he exited, he was confronted by Joanne Smith, who kissed him. John Doe states that most of the people had fallen asleep or passed out and that Joanne Smith came into his room. Before long they were engaged in sexual intercourse. John Doe stated that although Joanne Smith was intoxicated, she clearly gave her consent, as she was the instigator of the sexual activity. After awhile they both fell asleep in his bed. When he awoke, Joanne was not there. John Doe stated that Joanne Smith told him more than once that Scott Smith must not find out that they sex.

**6. Interview of Scott Smith** – Scott Smith states that he and Joanne frequent the Doe's home to play cards and socialize, and usually drink alcohol. On the night in question everyone drank more than usual and at some point Scott Smith passed out on the couch. Scott Smith stated that Joanne woke him up at about 5:00 AM and they went home and went to bed. At about 10:00 AM they woke up and Joanne became very upset. She stated that during the previous night John Doe raped her. They got dressed and went to the hospital where they met a SANE nurse and they contacted the police. Scott Smith stated that there could be no way Joanne was pregnant because he had a vasectomy.



**7. Interview of Jo Doe** – Jo Doe states that she and Joanne Smith are friends and have gone to each other's home the past to socialize and play cards. Jo stated that recently Joanne had come to her and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? Jo stated that she told Joanne that in cases of rape, an abortifacient is free.

**8. Follow-up investigation** – In a follow-up interview with friends of Joanne Smith you learn that she had recently become concerned about being pregnant and did not want to have another child.

A witness from the night of the party tells you learn that Joanne was being flirtatious with John Doe and was in and out of his room several times during the evening. This witness states most everyone at the party was aware of Joanne's behavior except for Scott, who seemed too drunk to recognize it.

**9. Follow-up investigation** - In a follow-up interview with Joanne, she stated she just wanted the whole thing to "go away" and that she no longer wanted to pursue charges John Doe.

**10. Lab report** – The DNA from the sheet was matched to Joanne and John Doe.

### **Recording Responses – Sequential and Simultaneous**

Participants in the sequential group recorded their confidence assessment on a Likert scale after each item of evidence was presented. Participants in the simultaneous group recorded a single confidence assessment on a Likert scale after all 10 items of evidence were presented. The confidence assessment was measured with the following 11-point Likert scale:

0      1      2      3      4      5      6      7      8      9      10

At the conclusion of the vignette, the participants were also asked to provide an overall estimate of guilt in the form of *yes* or *no* selection.

### **Description of Evidence - Reverse Sequential and Simultaneous**

The reverse sequential and simultaneous groups received the same items of evidence in a different sequence. Some of the verbiage was re-worded for logic and coherence.

**1. Initial report** – You are dispatched to the hospital where you meet Scott and Joanne Smith. Joanne Smith reports that John Doe raped her the night before at the home of Ron and Jo Doe, where John resides. Both Scott and Joanne Smith report that they were intoxicated and do not recall much of the evening. Joanne Smith claims that the incident occurred in John Doe’s bed and that it was not consensual.

**2. SANE nurse report of examination** - The SANE nurse’s report indicates that Joanne Smith stated she had become voluntarily intoxicated the night before and recalls talking to John Doe in his room, and possibly kissing him. She further stated that she would not consent to having sex, and therefore must have been raped. Joanne Smith was given the option of an abortifacient (Day after) pill, which she took. There were no signs of force or injury noted, however, signs of recent sexual activity were present. A sexual assault evidence collection kit was performed by the SANE nurse on the victim and provided to you.

**3. Crime scene.** Utilizing an alternate light source, body fluid was identified on the sheets in John Doe's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for results.

**4. Lab report** – The DNA from the sheet was matched to both Joanne Smith and John Doe.

**5. Witness interviews** – In a follow-up interview with friends of Joanne Smith you learn that she had recently become concerned about being pregnant and did not want to have another child.

In an interview with a witness from the night of the party, you learn that Joanne was being flirtatious with John Doe and was in and out of his room several times during the evening. This witness states most everyone at the party was aware of Joanne's behavior except for Scott, who seemed too drunk to recognize it.

**6. Interview of Jo Doe** – Jo Doe states that she and Joanne Smith are friends and have gone to each other's home the past to socialize and play cards. Jo stated that recently Joanne had come to her and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? Jo stated that at one point during the course of their conversation, she made the remark that in cases of rape, an abortifacient is free.

**7. Interview of Scott Smith** – Scott Smith states that he and Joanne come regularly to the Doe's home to play cards and socialize, and usually drink alcohol. On the night in question everyone drank more than usual and at some point Scott Smith passed out on the couch. Scott Smith stated that Joanne woke him up at about 5:00 AM and they

went home and went to bed. At about 10:00 AM they woke up and Joanne became very upset. She stated that during the previous night John Doe raped her. They got dressed and went to the hospital where they met a SANE nurse and they contacted the police. Scott Smith stated that there could be no way Joanne was pregnant because he had a vasectomy

**8. Suspect interview** – John Doe denies the allegation of rape, stating that he and Joanne had consensual sexual intercourse. John Doe stated that although Joanne Smith was intoxicated she clearly gave her consent and she was the instigator of the sexual activity. John Doe states that on the evening in question Joanne Smith had been flirting with him, although at the time he thought nothing of it. John Doe stated that everyone at the home was drinking heavily and getting intoxicated. John Doe stated that at one point during the evening he went to use the restroom in his room and when he exited, he was confronted by Joanne Smith, who kissed him. John Doe states that most of the people had fallen asleep or passed out and that Joanne Smith came into his room. Before long they were engaged in sexual intercourse. After awhile they both fell asleep in his bed. When he awoke, Joanne was not there. John Doe stated that Joanne Smith told him more than once that Scott Smith must not find out that they sex.

**9. Victim interview** – Joanne Smith states that she and her husband Scott regularly go to the Doe's home to play cards and socialize, usually drinking alcohol. On this occasion, Joanne Smith became intoxicated and does not recall much. Joanne Smith recalls being in John Doe's room for some reason and has a vague recollection of kissing him, but nothing after that. Joanne stated that in the early morning hours she awoke naked, with John Doe in his bed. She stated that she woke her husband and they went

home and went back to bed. Several hours she awoke and came to realize that she had engaged in sexual intercourse and told Scott Smith, who then took her to the hospital. Joanne Smith stated she would not have consented to having sex with John Doe under any circumstance.

**10. Follow-up investigation** - In a follow-up interview with Joanne, she stated she just wanted the whole thing to “go away” and that she no longer wanted to pursue charges John Doe.

### **Recording Responses – Reverse Sequential and Simultaneous**

Participants in the reverse-sequential group also recorded their confidence assessment on a Likert scale after each item of evidence was presented, while participants in the simultaneous group recorded a single confidence assessment on a Likert scale after all 10 items of evidence are presented. The confidence assessments were measured with the following 11-point Likert scale:

0      1      2      3      4      5      6      7      8      9      10

At the conclusion of the vignettes, the participants were also asked to provide an overall estimate of guilt in the form of *yes* or *no* selection.

### **Data Collection**

Data was collected through SurveyGizmo.com, to administer the questionnaire and eight surveys. Participants completed an initial demographic questionnaire of design, collecting general information pertaining to what could reasonably be predicted to be meaningful and pertinent to be used later to compare to results of the experiments for analysis. The materials for this study consisted of electronic questions and statements,

and consent form. Participants were provided a unique code that was used in place of identities, to facilitate anonymity.

### **Data Analysis**

After each item of evidence, participants recorded a confidence assessment of their belief of the suspect's guilt/innocence on an 11-point Likert scale from 0 to 10. The results were measured as the difference between the numbers of items (mean evaluation) and tested against zero for significance. This study used a quasi-experimental, 2 (type of crime: sex assault, child sex assault) x 3 (assignment: recruit, patrol, investigator) x 3 (evidence presentation: simultaneous, sequential, reverse sequential), between-subjects, factorial design. The IVs will include duty assignment and evidence presentation order, while the DV will include a confidence assessment in the level of guilt belief.

Another aspect of this study examined whether emotionally charged evidence could influence belief in a suspect's guilt. Participants were advised they were investigating circumstances surrounding a crime and were receiving several items of evidence. Both groups received the same vignette of a crime involving a child sexual assault. One group received evidence sequentially (Appendix A), recording a confidence assessment of guilt after each item. The other group received the evidence simultaneously (Appendix B) recording a single confidence assessment of guilt. The predictor variables were the items of evidence and the criterion variables were the assessments of belief in guilt.

To evaluate the practical nature of confirmation bias in law enforcement in criminal investigations it is necessary to consider the tacit knowledge of criminal

investigators and law enforcement officers. Pozzali (2006) reported that the application of tacit knowledge such as the subtleties and nuances of a criminal investigation are often biases themselves. Consequently, the order of evidence included a reverse sequence presentation order, to explore the nature of confirmation bias when exculpatory evidence precedes the inculpatory evidence. No reverse simultaneous order was utilized because there is effectively no order of presentation when all of the evidence is visible at one time. The effect was essentially the same as the existing simultaneous presentation order. Demographic information collected at the beginning of the study provided basic information related to individual, organizational, and professional characteristics.

Participants in 3 groups (recruit, patrol, investigations) were assigned to one of the two conditions (child sexual assault, sexual assault) and one of three orders of presentation (simultaneous, sequential, reverse sequential). Participants' global impression of the case was assessed via one of two (yes/no) guilt measures. Once the data was collected it was analyzed using SPSS Graduate Pack software.

### **Ethical Considerations**

All of the research participants read and signed an informed consent agreement stating that their participation in the study was voluntary, that they could withdraw at any time without any adverse action, and that the researcher was not in a position to influence their careers. There were no material rewards or incentives provided for participating in this study. Anonymity was assured by having the participants use a code that was computer-generated, rather than with their name on the materials. All of the data will be kept in my possession in a locked file cabinet for 5 years after the study is completed,

after which, the data will be destroyed. The electronic data will be stored on a freestanding back-up hard drive, and will only be on the researcher's password-protected computer. All of the electronic data will be maintained for 5 years, at which time it will be destroyed.

### **Summary**

This chapter described methods for a quantitative study of the effect of confirmation bias on criminal investigative decision making. It has been explained that the use of sworn police officers as participants increased the validity of the research and that they completed several research instruments. Data analysis included computing descriptive statistics and analysis of variance to evaluate the relationship between the predictor variables (bias and emotion) and the criterion variable (level of guilt judgment). In Chapter 4, the results of the study are presented.



## Chapter 4: Results

### **Introduction**

The purpose of this study was to examine the phenomenon of confirmation bias in criminal investigative decision making among law enforcement officers by utilizing sworn police officers attending compulsory, annual criminal justice training. This chapter presents the results of the statistical analysis of the research hypotheses of this quantitative study. The objective of this study was to examine criminal investigative decision making by police officers among duty assignments and with extreme emotional evidence, and to evaluate the responses for evidence of confirmation bias. The independent variables in this study included the duty assignments (recruit, patrol, investigations), scenario condition (child & adult), and order of evidence presentation (sequential, simultaneous, reverse sequential). The dependent variable was a measure of confirmation bias, in the form guilt belief (0 to 10 scale) among 10 items of evidence. The research questions were as follows: Does confirmation bias differ among various assignments (recruit, patrol, investigators) within law enforcement? Can emotionally charged crimes increase belief in a suspect's guilt? Does the order of evidence presentation influence belief in a suspect's guilt?

In this chapter, I provide a review of the data collected, statistical analysis, demographic characteristics of the participants, and summarized findings related to the research questions. Descriptive statistics for participants are followed by descriptive statistics for the variables used in the study: measures of central tendency for continuous/interval variables (i.e., means and standard deviations) and frequency

distributions for nominal/categorical variables. ANOVA was used to examine Hypotheses 1 and 2. A summary of the results is presented at the end of this chapter.

### **Data Collection**

The research was conducted at local police and sheriff's offices that also serve as regional training facilities operated by a state department of criminal justice training. Participants included officers attending mandatory annual training as well as the recruits at basic training. Additionally, I traveled to the state criminal justice training center to recruit police trainees who were in basic training. Participants were recruited from six classes: two for criminal investigators, two for patrol officers, and two for basic trainees. The basic training recruits were all sworn officers from their respective law enforcement agencies.

Quantitative data were collected for this study through computer-administrated surveys using SurveyGizmo.com. Participants were provided with a unique ID number and password where they could choose to respond in private and complete the survey at their convenience, in order to assure their anonymity. Officers were told their participation was voluntary and if they did choose to participate, the access code and random password granted anonymity. Despite successful pilot testing that validated the electronic survey process, early in the data collection process there was a problem with accessibility, and several participants advised they could not access the survey. Access codes and passwords were reissued and there were no further problems.

### **Sample Description**

The desired sample size was substantially surpassed and the number of participants exceeded what was proposed in the GPower3 power analysis, therefore the sample size was large enough to identify statistically significant relationships in ANOVA and regression analysis. Approximately 200 officers were solicited and 166 officers responded and completed the survey. Six surveys had been started with no responses registered. These are most likely attributed to the flawed process that was reported by participants at the beginning. Of all of the surveys that were completed there were no discrepancies noted in the data collection process and no volunteers were excluded from the study.

In the sample, presented in Table 1, 87% of participants were male, 84% had rank of patrolman (all recruits hold the rank of patrolman), and 78% had a college degree. Duty assignments were distributed relatively evenly (Recruit  $n = 55$ , Patrol  $n = 54$ , Investigations  $n = 57$ ). A cumulative list of demographic characteristics of the sample is presented in Appendix L. From an experiential component, the amount of trial and suppression hearing experience as well as length of service, duty assignment, training hours and other specialized training hours are presented in Appendix M.

Table 1

*Sample Demographic Characteristics*

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
<b>Duty assignment</b>				
Recruit	55	33.1	33.1	33.1
Patrol	54	32.5	32.5	65.7
Investigations	57	34.3	34.3	100
<b>Gender</b>				
Male	145	87.3	87.3	87.3
Female	21	12.7	12.7	100
<b>Education</b>				
High school	23	13.9	13.9	13.9
Some college	11	6.6	6.6	20.5
Associated degree	31	18.7	18.7	39.2
Bachelor's degree	100	60.2	60.2	99.4
Master's degree	1	.6	.6	100

**Model Assumptions and Outliers**

ANOVA was chosen in order to study the effect of two or more independent variables at a time and to assess how the variables interact (Frankfort-Nachmias & Nachmias, 2008). Several assumptions underlie the univariate ANOVA testing. Foremost among the assumptions is that the DV in each scenario be normally distributed in the population for each combination of levels of the between-subjects factors (Field, 2009). In the analysis of variance models, the samples (duty assignment, scenario condition, order of evidence presentation) did not vary and no volatility was experienced, thus the samples were homogeneous. Further, the observations in the study were independent from one another and the participants did not interact with one another during the survey.

Measures of central tendency demonstrated equal variances among the samples and the data set did not violate the required assumptions of the statistical tests.

Outliers are scores that are so different from other scores that they can skew the distribution and alter the statistics (Field, 2009). Outliers were determined by standardizing the study variables and searching for scores that were in excess of three standard deviations from the mean. In the present case scores were evenly distributed and no violating scores were identified.

### **Relevant Variable Descriptions**

**Guilt belief.** It is important to understand the levels of proof that law enforcement officers work with because they must be able to articulate their perspective in such a way that others can comprehend and be persuaded in the same fashion, by the same evidence (Lyman, 2011). Since no clearly defined standard exists in a specific situation, law enforcement officers proceed from the lowest measure of guilt judgment known as reasonable suspicion. Other guilt belief thresholds relevant to this study include probable cause, preponderance of evidence, and beyond a reasonable doubt.

**Reasonable suspicion.** This may be understood as more than a hunch or gut feeling, but less than probable cause. Reasonable suspicion requires articulable facts or circumstances that give rise to more than a bare, imaginary, or purely conjectural suspicion (Reynolds, 2013). Reasonable suspicion was described by the U.S. Supreme Court in *Terry v. Ohio* (1968) as “the sort of common-sense conclusion about human behavior upon which practical people...are entitled to rely”. Reasonable suspicion is depicted as letter B in Figure 1.

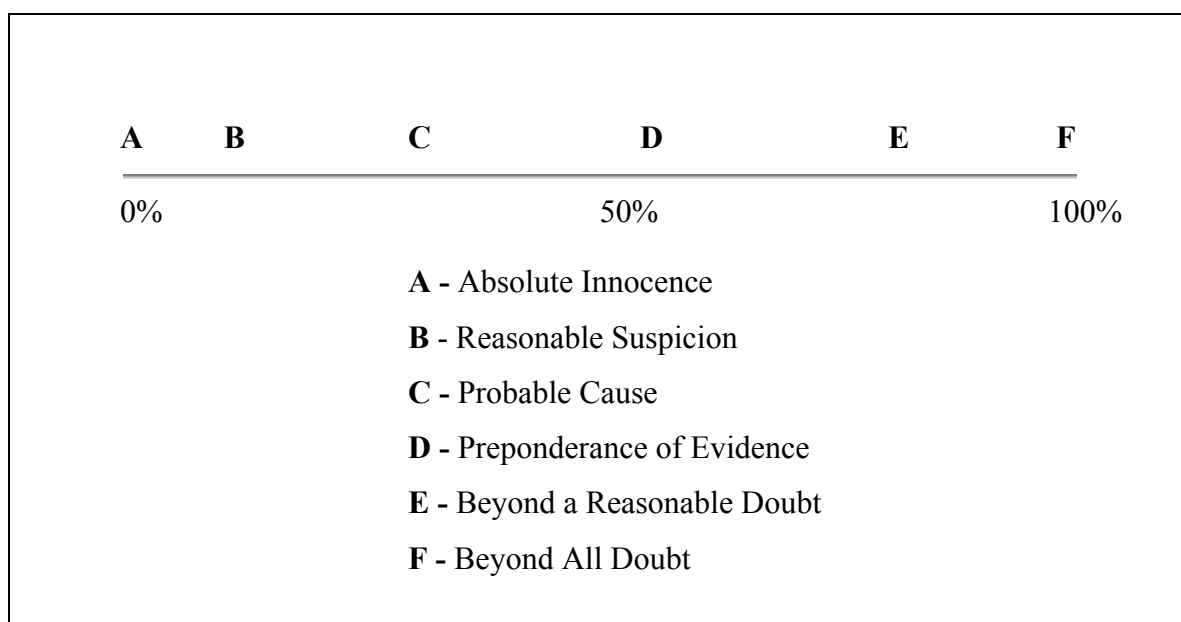
**Probable cause:** Probable cause is the standard required for an officer to justify an arrest or a search (Black & Nolan, 1993). It consists of more than mere reasonable suspicion, but less than beyond a reasonable doubt, which is the amount of evidence required for conviction. Probable cause (C on Figure 1) is the most common level of proof that law enforcement officers work with because it represents the threshold necessary for an arrest or search. Probable cause also requires articulable facts in every arrest or search

Although no constitutional definition of probable cause exists, a series of Supreme Court rulings ultimately created the language under which probable cause is understood today (Oliver, 2010). Probable cause may be understood as reasonable grounds for believing that a specific crime was committed, by a specific person, supported by more than mere suspicion, but less than *prima facie* proof. Also known as a slight, well-grounded suspicion, probable cause must be objectively reasonable and based upon evidence that reasonable and prudent people would rely (Black & Nolan, 1993). As a practical matter, an officer who arrives at probable cause may be considered sufficiently convinced of a suspect's guilt and is thus convinced for the purpose of this study.

**Preponderance of evidence:** This is often associated with civil proof where a conclusion is that a fact at issue is *more probably true than not*. Another definition is 51% of the proof (Federal Rules of Evidence). While mostly civil, a preponderance of evidence provides a solid frame of reference, as it is one of the few guilt thresholds delineated by law. A preponderance of evidence is depicted as letter D in Figure 1.

***Beyond a reasonable doubt:*** This burden of proof (E on Figure 1) is the threshold required for a criminal conviction (Lyman, 2011). While it is not beyond *all* doubt, it represents the highest threshold on the guilt belief scale. Since no legal definition is available, the percentage associated with a particular threshold is approximated.

The relevant legal thresholds of guilt belief (and legal proof) on a scale from 0 – 100% are depicted in Figure 1.

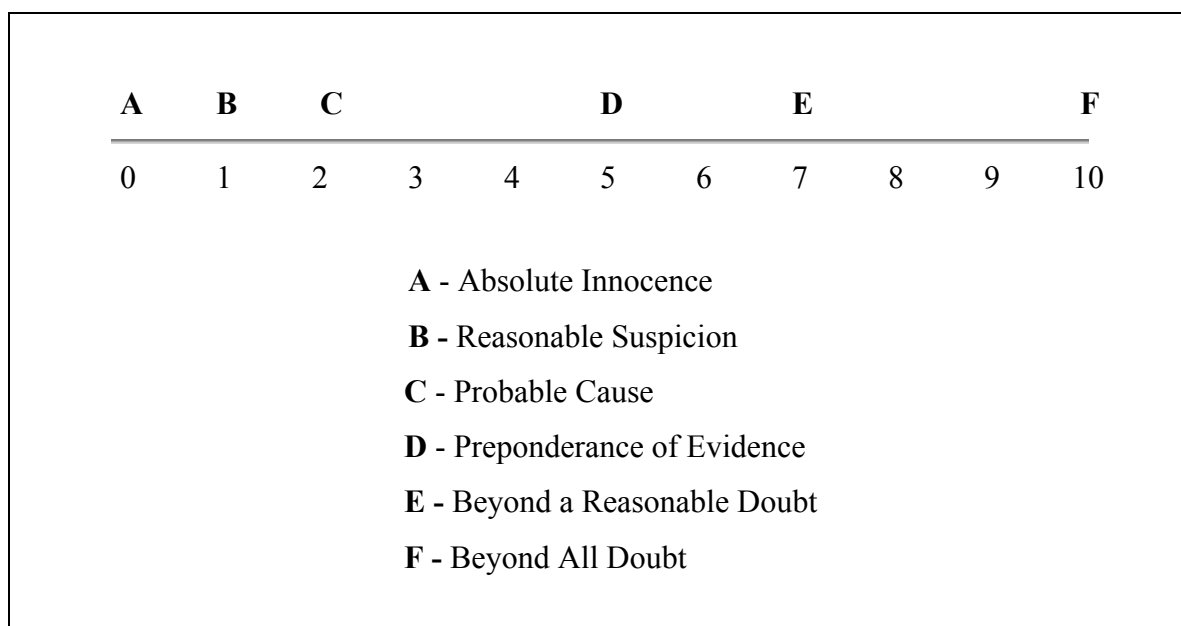


*Figure 1. Legal thresholds of guilt*

### **Evidence of Confirmation Bias**

This study utilizes responses to survey questions ranging from 0 to 10 to establish an assessment of guilt belief and a measure of confirmation bias. Figure 2 provides a frame of reference, demonstrating that 0 corresponds to a belief of *absolute innocence* and 10 corresponds to belief of *absolute guilt*. While this is an approximation, Figure 2

combines the 0 to 10 guilt belief scale with the A-F guilt thresholds. Fifty-one percent correspond to a preponderance of evidence (C on Figure 2), so scores greater than five exceed that threshold. Probable cause corresponds to scores between one to five, thus scores at the higher end of the guilt belief scale (between six to ten) are considered to be representative of confirmation bias for the purposes of this study. Civil verdicts are made at the 51% threshold while criminal verdicts are made at beyond a reasonable doubt.



*Figure 2. Guilt belief scale*

A foundational principle of confirmation bias is belief that is unwarranted, or unsubstantiated by evidence (Nickerson, 2004). In this study, what should be recognized is that while belief in the suspect's guilt may be increasing during the reading of the initial report, there are no corresponding facts or evidence related to the allegation under consideration, other than the allegation. Thus, if the participant registers an unwarranted



level of guilt belief, confirmation bias is established. Other studies regarding confirmation bias have similarly established confirmation bias (Ask & Granhag, 2005; Ask, et al., 2007; O'Brien, 2005; Rassin, 2010; Rassin, Eerland, & Kuijpers, 2010; Spano, 2005).

Maintaining belief in guilt before considering available evidence or investigating a case violates basic best practices standards of criminal investigation (Erzinclioglu, 2000; Lyman, 2011). Further, increasing one's belief on circumstantial grounds, rather than following the case facts and evidence to their logical conclusions, is clear evidence of confirmation bias as the participant is allowing preconceived beliefs and other forms of bias influence their opinion about a suspect's guilt. Lastly, participants are aware that they have ten items of evidence to review, thus, they are well aware further evidence exists

### **Emotional Factors**

The emotionally charged aspect of this study includes the allegation of the sexual abuse of a child and is disclosed in the initial report, which is the first question presented to participants in the child, sequential condition. The emotional characteristic of this crime is hypothesized to result in a higher initial guilt judgment. Absent corroborating evidence regarding the actual allegation, this study asserts that such a judgment would constitute significant confirmation bias as it deviates from investigative protocol and common sense, with ten items of evidence available for review. The victim statement discloses that the suspect is a registered sex offender. At this point the participant recognizes the suspect was once capable of such an act and it is theorized that this will

lead to a greater level of guilt belief. Once established, it is hypothesized that this confirmation bias exists with sufficient strength to increase suspicion of the suspect and will manifest through higher scores on the guilt belief scale.

Emotion may work in different directions in law enforcement decision making (Tiedens & Linton, 2001). In the suspect interview, participants learn that the offense for which the suspect is registered was consensual sex with his 17-year old girlfriend, when the suspect was 18-years old. There is significant jury sympathy and reluctance to convict in this circumstance. The Adam Walsh Act is Federal legislation that creates a misdemeanor of consensual sexual conduct between juveniles less than 4-years apart, to avoid mandatory sex offender registration of juveniles. Called the “Romeo & Juliet Act”, this is a sentencing provision in lieu of offender registry since technically all sexual conduct under 18-years of age is a criminal offense (Petteruti & Walsh, 2008). As a result, this is expected to serve as a mitigating factor and may result in a reduction in suspicion toward the suspect, manifested by lowering of scores on the guilt belief scale in the suspect interview. Where this is problematic is in the selective search for evidence to support suspicion (Nickerson, 1998; Frey & Thelen, 2001) to bolster a preferred hypothesis (Kosnik, 2008) or interpret ambiguous evidence to support a conclusion based upon preconceived beliefs and expectations and biases rather than case evidence and facts (Dror, 2005). A key distinction of the confirmation bias phenomenon is that some degree of guilt belief exists with no clear evidence to support the interpretation (Klayman & Ha, 1987; Kosnik, 2007; Oswald & Grosjean 2004).

As explained in Chapter 3, Pozzali (2006) noted that the application of tacit knowledge that involves subtleties and nuances related to a criminal investigation, are often themselves, biases. The order of evidence presentation is therefore important to consider. Evidence that is reviewed early in a case may be considered with more belief than is warranted, simply because there is nothing to contradict it. In the sequential evidence presentation order, inculpatory evidence in the victim interview preceded exculpatory evidence in the suspect statement. Upon reversing the sequential order of evidence presentation it was possible to explore the nature of guilt belief when *exculpatory* evidence precedes the *inculpatory* evidence. In the simultaneous condition, all 10 items of evidence was reviewed before any guilt judgment was made. It was hypothesized that the simultaneous condition would produce the least amount of confirmation bias.

## **Research Questions and Results**

### **Research Question 1**

***Null Hypothesis 1:*** Confirmation bias does not differ among assignments.

The first hypothesis was posed to explore the relationship between confirmation bias and duty assignment, and whether confirmation bias differed among duty assignments (recruit, patrol, investigations). This was determined by examining the level of guilt belief in the Initial Report among the duty assignments.

***Experimental Design:*** The design for this experiment included evaluating the responses to the Initial Report, where the participants learn of the sexual abuse nature of the complaint. Responses from both the child and adult condition are evaluated and

compared. The initial report variable is first in both the Sequential and Reverse Sequential evidence presentation orders, and is thus, equally representative of confirmation bias for the purposes of the study. Recalling that the sample comes from a law enforcement population, the experimental design is thus, a stratified, between-subjects, 3 x 2 x 2 ANOVA. The sample was large enough to permit random sampling for each condition.

**Analysis:** A 3 x 2 x 2 ANOVA was conducted to evaluate the effects of three duty assignments (recruit, patrol, investigations), two scenario conditions (adult, child) and two evidence presentation orders (sequential, reverse sequential) on guilt belief scores for the initial report variable. The total frequency, means, and standard deviations of guilt belief scores from the initial report variable are presented in Table 2.

Table 2

*Initial Report Frequency, Means, and Standard Deviations*

		<i>N</i>	<i>M</i>	<i>SD</i>
Recruit	Child	19	7.68	1.67
	Adult	18	8.17	1.04
	Total	37	7.92	1.40
Patrol	Child	18	6.72	1.90
	Adult	18	5.0	2.43
	Total	36	5.86	2.34
Investigations	Child	18	4.89	2.63
	Adult	20	5.05	2.01
	Total	38	4.97	2.30

The analysis revealed a significant main effect for duty assignment ( $F(2,99) = 22.78, p = .00$ ). There was no significant effect for evidence presentation order ( $F(1,99) =$

1.79,  $p > .05$ , or scenario condition ( $F(1,99) = 0.99, p > .05$ ). Duty assignment did interact with the evidence presentation order in the expected direction ( $F(2,99) = 3.35, p < .05$ ), as well as scenario condition ( $F(2,99) = 3.48, p < .05$ ). Similarly, there was a significant interaction between evidence presentation order and scenario condition ( $F(1,99) = 5.07, p < .05$ ). The interaction between duty assignment, scenario condition and order of evidence presentation failed to achieve significance ( $F(2,99) = 2.04, p > .05$ ). The results for the three-way ANOVA are presented in Table 3.

Table 3

*Initial Report ANOVA*

	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig</i>	$\eta^2$
Corrected Model	264.04	11	24.00	6.52	.00	.42
Duty Assignment	167.69	2	83.84	22.78	.00	.32
Scenario Condition	3.65	1	3.65	0.99	.32	.01
Evidence Order	6.59	1	6.59	1.79	.18	.02
Duty Assignment * Scenario Condition	25.60	2	12.80	3.48	.04	.07
Duty Assignment * Sequence	24.69	2	12.35	3.35	.04	.06
Scenario Condition * Sequence	18.66	1	18.66	5.07	.03	.05
Duty Assignment * Scenario Condition * Sequence	15.02	2	7.51	2.04	.14	.04
Residual Error	364.40	99	3.68			
Total	4955.00	111				

<sup>a</sup>  $R^2 = .42$  (Adjusted  $R^2 = .36$ )

## Discussion

Recalling that confirmation bias emerges with scores greater than 5, the present findings revealed that in the initial report variable, confirmation bias is present in each duty assignment (within .11 and .03 for investigators in Table 2). Belief in the suspect's guilt appears to be inversely related to experience, with suspicion greater in recruits ( $M = 7.92$ ) and least present in investigators ( $M = 4.97$ ). The interaction between duty assignment and evidence presentation order, duty assignment and scenario condition, and evidence presentation order and scenario condition, are relationships that help to provide some explanation as to what induces change in guilt judgment, although the interaction may be also be related extraneous nuisance variables. While significant, the effects of these interactions were small, with the exception of duty assignment ( $\eta^2 = .37$ ).

### Research Question 2

*Null Hypothesis 2:* Emotionally charged crimes do not increase belief in a suspect's guilt.

Research question 2 evaluated the relationship between emotion and guilt belief. The initial report included information that the crime involves sexual abuse, in the respective child and adult scenario categories. In the victim interview participants learn the suspect is a registered sex offender and in the child condition, that the abuse had been occurring over a period of time. It was hypothesized that upon learning the suspect is a registered sex offender there would be an increased belief in guilt, even though no corresponding factual evidence or case information existed to warrant it, and participants had been cautioned that ten items of evidence were available to be reviewed.

**Experimental Design:** This experiment involved a three-way ANOVA that evaluated the effects of three duty assignments (recruit, patrol, investigations), two scenario conditions (child, adult), and two evidence presentation orders (sequential, reverse sequential) on participant guilt belief scores on both the initial report and victim interview variables.

A baseline of guilt belief was obtained from the initial report (the first item of evidence) and crime scene (immediately preceding the victim interview). Guilt belief assessments were then obtained following exposure to emotional stimuli in the victim interview, and the moderating circumstances in the suspect interview. The child and adult scenario conditions were compared to examine the effect of emotion related to child versus adult sexual abuse. Only the sequential order of evidence presentation was considered because in the reverse sequential condition the victim interview came at the end, after the suspect interview had the potential to confound the evidence.

**Initial Report:** Information that the complaint involves a sexual abuse allegation is contained in the initial report. While the difference among duty assignments was considered in the first hypothesis, here the focus is on the difference between the adult and child scenario conditions and the extreme emotional evidence of a child sexual assault.

**Crime Scene:** Guilt belief scores from the crime scene variable immediately precede the Victim Interview and served a baseline for subsequent analyses.

**Victim Interview:** In the victim interview participants are told specifically of rape allegations occurring over a long period of time as well as new information that the

suspect is a registered sex offender, a moniker that incites fear in communities (Levenson, Brannon, Fortney, & Baker, 2007), is referred to as a “disgusting” or “gruesome” criminal behavior (Capestany & Harris, 2014), and represents an extreme emotional incident for the purposes of this study.

***Suspect Interview:*** In the suspect interview participants learned of the consensual nature of the sexual conduct and the mandatory “administrative” nature of the sex offender registration.

***Analysis:*** An analysis of means and standard deviations revealed the total mean guilt belief score before the victim interview was  $M = 6.30$  and rose to  $M = 8.04$  after exposure to the emotional evidence, an increase of  $M = 1.74$ . The frequency, means, standard deviations, and changes in the scenario conditions before and after the victim interview are presented in Table 4. Of particular interest, the mean guilt belief score before the victim interview was  $M = 7.44$  for recruits, and  $M = 9.33$  afterwards; an increase of  $M = 1.89$ , registering nearly *absolutely guilty* on the guilt belief scale.



Table 4

*Frequency, Means and Standard Deviations of Crime Scene & Victim Interview<sup>1</sup>*

	Crime Scene		Victim Interview		Change		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Recruit	9	7.44	1.74	9.33	.500	+1.89	- 1.24
Patrol	9	6.78	1.48	8.22	1.20	+1.44	- 0.28
Investigations	9	4.67	2.18	6.56	1.51	+1.89	- 0.67
Total	27	6.30	2.13	8.04	1.60	+1.74	- 0.53

<sup>1</sup> Child scenario

**Initial Report ANOVA:** A 3 x 2 x 2 ANOVA was conducted to evaluate the effects of three conditions on participant's guilt belief scores in the initial report variable in one of three duty assignments (recruit, patrol, investigations), two scenario conditions (adult, child), and two orders of evidence presentation (sequential, reverse sequential). The results for the ANOVA, as detailed in Table 3, indicated a significant main effect for duty assignment ( $F(2,99) = 22.78, p = .00$ ). Main effects were not significant for evidence presentation order ( $F(1,99) = 1.79, p > .05$ ), and scenario condition ( $F(1,99) = 0.99, p > .05$ ). The analysis revealed significant interactions between duty assignment and evidence presentation order ( $F(2,99) = 3.35, p < .05$ ), duty assignment and scenario condition ( $F(2,99) = 3.48, p < .05$ ), and evidence presentation order and scenario condition ( $F(1,99) = 5.07, p < .05$ ). There was no significant interaction between duty assignment, scenario condition and order of evidence presentation ( $F(2,99) = 2.04, p > .05$ ). The results of the analysis are presented in Table 3.

Because of the significant interaction between duty assignment and scenario condition, I chose to focus on the simple main effects in the duty assignment (Field, 2009). That is, the difference among duty assignments in the child and adult conditions separately. To control for Type I error across the two simple main effects I set an Alpha for each at .025. Although the effect sizes were small, there were significant differences for the child condition ( $F(2,105) = 9.08, p. = .000, \eta^2 = .15$ ) and the adult condition ( $F(2, 105) = 14.75, p. = .000, \eta^2 = .22$ ). Univariate Tests data is presented in Table 5.

Table 5

*Univariate Tests for Initial Report*

Category		Sum of Squares	df	Mean Square	F	Sig	$\eta^2$
Child	Contrast	74.14	2	37.07	9.08	.000	.147
	Error	428.94	105	4.09			
Adult	Contrast	120.48	2	60.24	14.75	.000	.219
	Error	428.94	105	4.09			

Figure 3 presents the simple effects of guilt belief scores in the initial report variable by scenario condition for duty assignments.

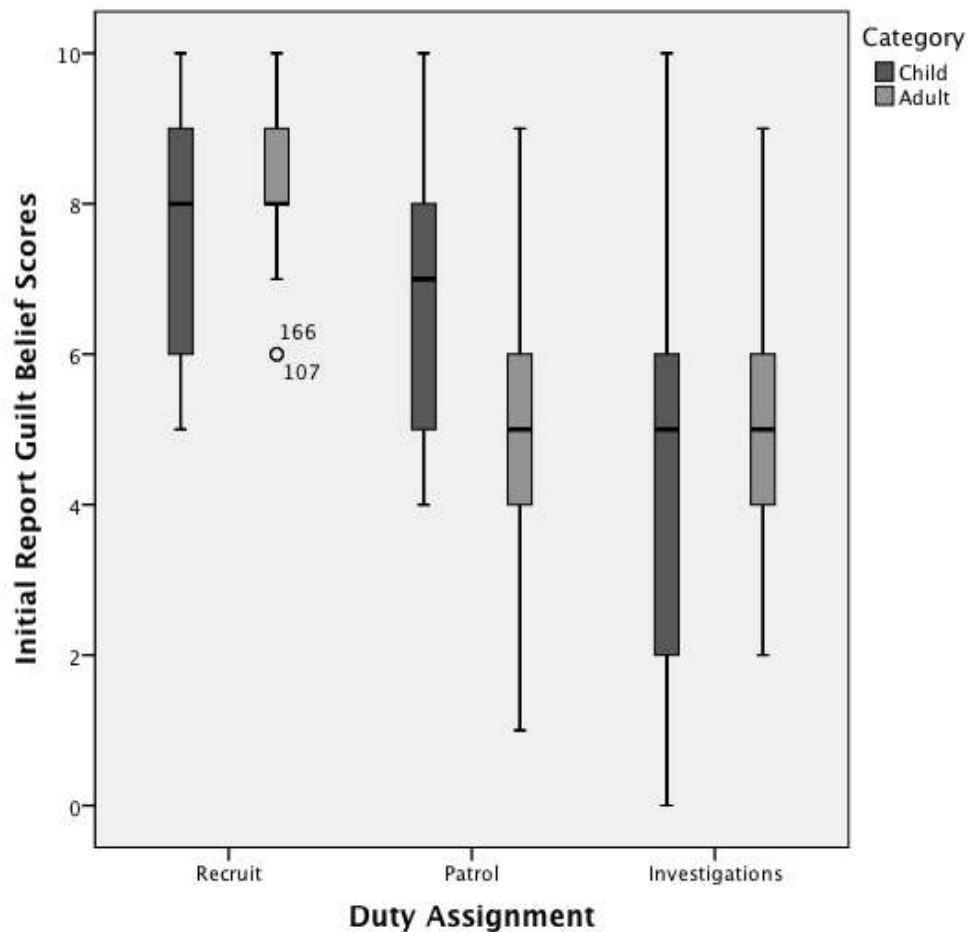


Figure 3. Boxplots of initial report guilt belief mean scores among duty assignment, by scenario condition

**Victim Interview ANOVA:** A 3 x 2 x 2 ANOVA was conducted to evaluate the effects of three conditions on participant's guilt belief scores in the victim interview variable in one of three duty assignments (recruit, patrol, investigations), two scenario conditions (adult, child), and two orders of evidence presentation (sequential, reverse sequential). The results of the ANOVA revealed a significant interaction for duty

assignment and scenario condition ( $F(2,99) = 4.40, p. < .05, \text{partial } \eta^2 = .082$ , duty assignment and order of evidence presentation ( $F(2,99) = 4.83, p. < .05, \text{partial } \eta^2 = .089$ , and duty assignment, scenario condition, and order of evidence presentation ( $F(2,99) = 4.21, p. < .05, \text{partial } \eta^2 = .078$ ). No significant interaction was found for scenario condition and order of evidence presentation ( $F(1,99) = .84, p. > .05$ ). The findings are presented in Table 6.

Table 6

*Victim Interview 3-way ANOVA*

Source	<i>SS</i>	<i>df</i>	<i>M</i>	<i>F</i>	Sig	$\eta^2$
Corrected Model	1134.33 <sup>a</sup>	11	103.12	34.45	.000	.79
Duty Assignment	171.30	2	85.65	28.61	.000	.366
Scenario Condition	7.25	1	7.25	2.42	.123	.024
Evidence Order	901.02	1	901.02	301.01	.000	.753
Duty Assignment * Scenario Condition	26.36	2	13.18	4.40	.015	.082
Duty Assignment * Evidence Order	28.94	2	14.47	4.83	.010	.089
Scenario Condition * Evidence Order	2.50	1	2.50	836	.363	.008
Duty Assignment * Scenario Condition * Evidence Order	25.17	2	12.59	4.21	.018	.078
Error	296.33	99	2.99			

<sup>a</sup>  $R^2 = .793$  (Adjusted  $R^2 = .770$ )

## Discussion

In contrast to the increase in guilt belief in the Victim Interview, the Suspect Interview variable informs participants that the offense for which the suspect was compelled to register as a sex offender was consensual sex with his 17-year old girlfriend, when the suspect was 18-years old. It is clear that upon learning of the nature of the offense for which the suspect was required to register, there is a substantial reduction in guilt belief, as much as 30%. Some scores dropped below where they were before the victim and suspect interviews were conducted. This finding demonstrates that the context of evidence is often critical to understanding the totality of circumstances in a specific case. The change in guilt belief scores is presented in Table 7.

Table 7

*Mean Guilt Belief Scores, Victim and Suspect Interviews*

		Victim	Suspect	Change	Percent
Recruit	Child	9.33	6.22	- 3.11	- 33%
	Adult	9.25	6.25	- 3.00	- 32%
Patrol	Child	8.22	5.44	- 2.78	- 34%
	Adult	8.22	4.89	- 3.33	- 40%
Investigator	Child	6.56	3.78	- 2.78	- 42%
	Adult	4.20	2.40	- 1.80	- 43%

### Research Question 3

*Null Hypothesis 3:* Evidence presentation order does not influence guilt belief.

Research Question 3 examined the order in which evidence was presented (or reviewed) and whether it influenced guilt belief, resulting in confirmation bias. This was determined by examining guilt judgments after each evidence presentation order (sequential, simultaneous, reverse sequential). It was hypothesized that when examining evidence simultaneously, investigators would be less inclined to engage in confirmation bias.

*Experimental Design:* This experiment was conducted utilizing data from Research Question 2. A three-way ANOVA was conducted and evaluated the effects of three duty assignments (recruit, patrol, investigations), two scenario conditions (child, adult), and two evidence presentation orders (sequential, reverse sequential) on participant guilt belief scores in both the initial report and victim interview variables.

*Effect of Evidence Sequence:* Guilt judgments were registered after each evidence item was evaluated. Of particular relevance for this hypothesis is the victim interview. In the sequential order the information about the sex offender registration is learned before any other evidence is known, allowing the emotional impact to influence guilt belief. When evidence was presented in reverse order, the overall context resulted in a different meaning. In the reverse sequential evidence order, the victim interview comes *after* all of the evidence is presented and the participant already knows that the suspect had to register as a juvenile because his girlfriend was not yet 18-years old, not because he was a sexual predator. The sequential and reverse sequential orders of

evidence are presented in Table 8. Follow-up Investigation 2 includes the victim declaring she no longer wants to pursue the case, which, because of the nature of the statement, has too much potential to confound subsequent evidence so it was left at the end of the sequence in both orders.

Table 8

*Order of Evidence Presentation*

Sequential	Reverse Sequential
1. Initial Report	1. Initial Report
2. SANE Report	2. SANE Report
3. Crime Scene	3. Crime Scene
4. Victim Interview	4. Lab Report
5. Suspect Interview	5. Follow-up Investigation 1
6. Boyfriend Interview	6. School Counselor
7. School Counselor	7. Boyfriend Interview
8. Follow-up Investigation 1	8. Suspect Interview
9. Follow-up Investigation 2	9. Victim Interview
10. Lab Report	10. Follow-up Investigation 2

The effect of reversing the sequence order of evidence substantially decreased overall guilt. Further, the extreme emotional information revealed in the victim interview and evidence in the sequential order shown in Figure 4 did not have the same impact on the same victim interview in the reverse sequential order, as depicted in Figure 5.

Frequencies, mean scores and standard deviations of both scenario conditions in both evidence presentation orders in the victim interview, are presented in Appendix N.

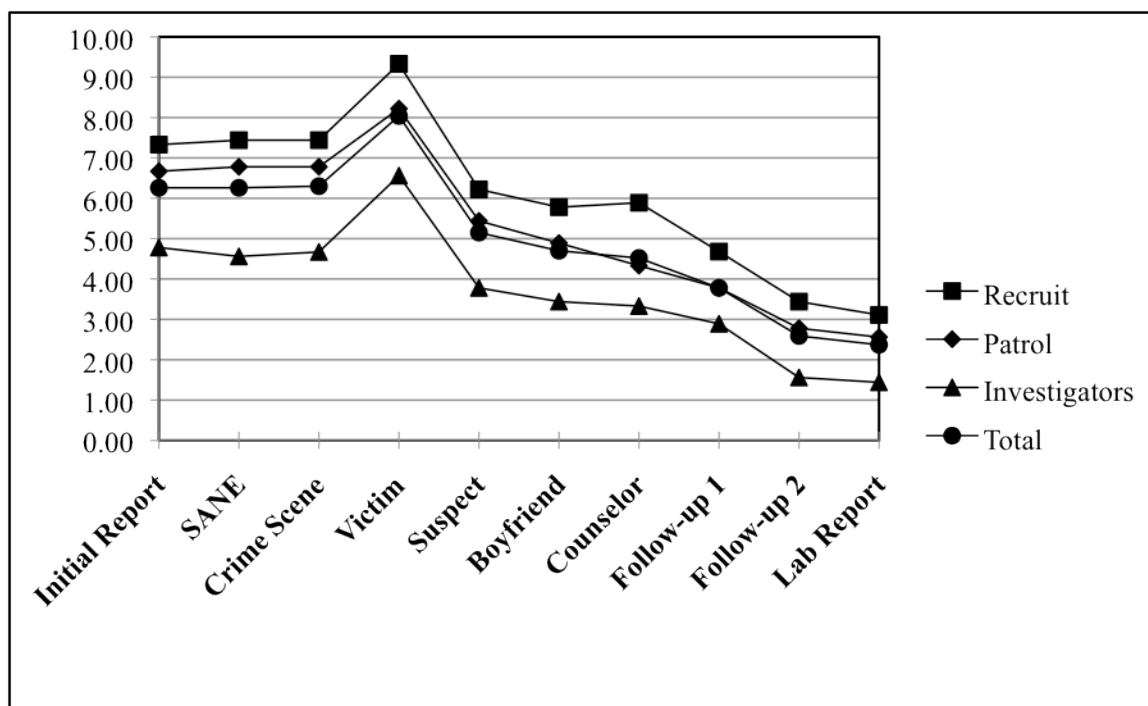


Figure 4. Child sequential mean scores

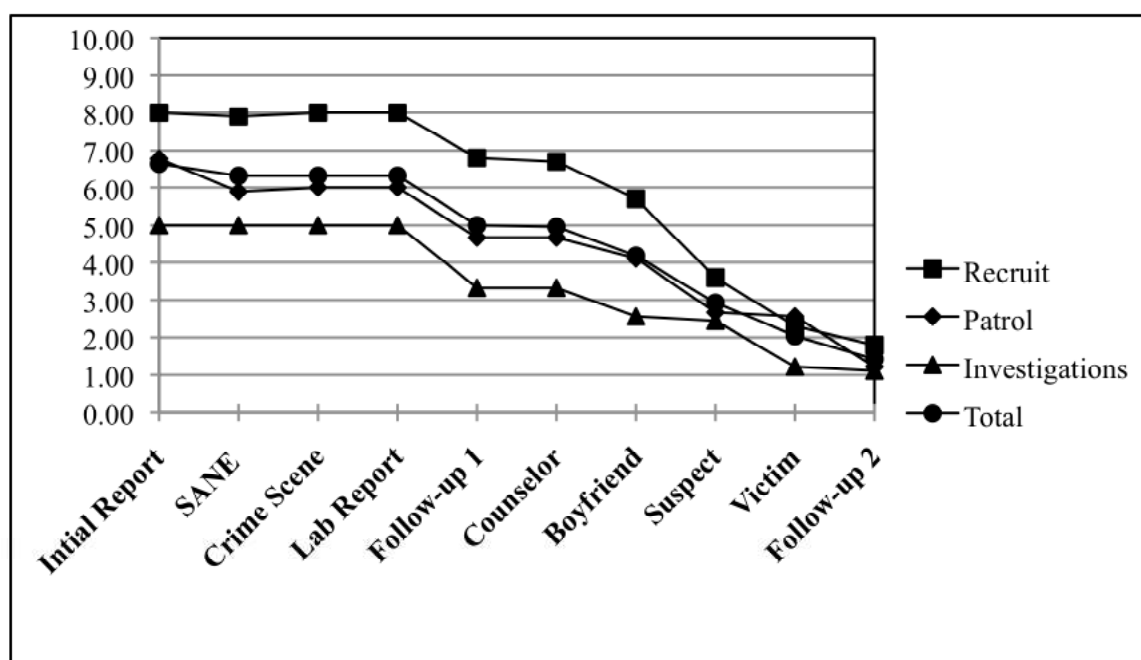


Figure 5. Child reverse sequential mean scores



Guilt belief was markedly reduced when evaluating exculpatory evidence *before* being presented with inculpatory evidence. In the child scenario, reverse sequential evidence order, participants knew the suspect had registered as a sex offender as more of an administrative violation, thus, the anxiety and fear that generally accompanies registered sex offenders was assuaged by the circumstances (Levenson, Brannon, Fortney, & Baker, 2007), and the subsequent revelation in the victim interview had the reverse effect. Thus, the information contained in the suspect interview moderated the effect of the emotional stimuli.

In the adult scenario condition and reverse sequential evidence presentation order, participants were aware of the victim's provocative behavior, corroborating witness statements, and the suspect's claim of consensual sex *before* the victim interview, and guilt belief was reduced to nearly *absolute innocence* in the Patrol ( $M = 0.44$ ) and investigator ( $M = 0.90$ ) scores. Changes in means scores between the two scenario conditions and two evidence presentation orders are presented in Table 9.

Table 9

*Changes in Mean Scores of Victim Interview Guilt Belief Scores*

		Sequential	Reverse Sequential	Change	Percent
Recruit	Child	9.33	2.30	7.03	-75%
	Adult	9.25	4.10	5.15	-56%
	Total	9.29	3.20	6.09	-66%
Patrol	Child	8.22	2.56	5.66	-69%
	Adult	8.22	0.44	7.78	-95%
	Total	8.22	1.50	6.72	-82%
Investigator	Child	6.56	1.22	5.34	-81%
	Adult	4.20	0.90	3.30	-78%
	Total	5.32	1.58	3.75	-70%

In the adult sequential evidence condition there is an experience component evident in the mean scores. Figure 6 depicts the difference in scores from recruits and investigators in the victim interview. Recruits were inclined to believe the victim ( $M = 9.25$ ) whereas investigators were less inclined ( $M = 4.20$ ). Mean scores dropped even lower once the suspect interview was considered for both recruits ( $M = 6.25$ ) and investigators ( $M = 2.40$ ).

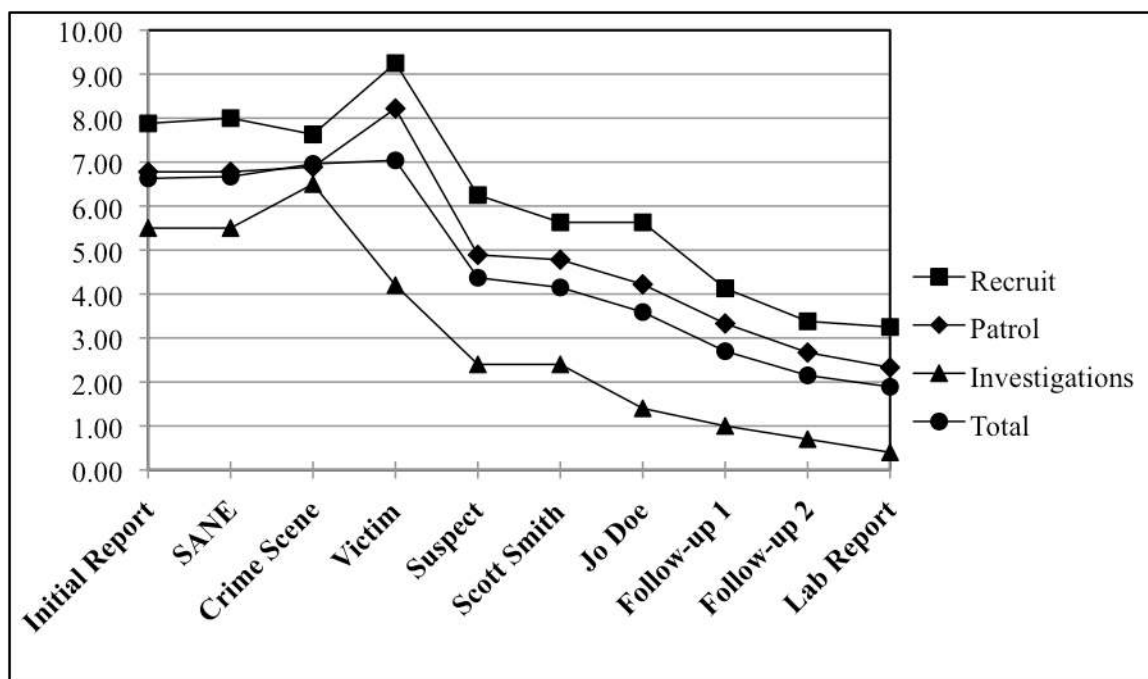


Figure 6. Adult sequential mean scores

***Simultaneous Evidence Presentation:*** When the evidence was presented simultaneously and participants reserved judgment until all of the evidence was reviewed, there was very little guilt judgment in any duty assignment or scenario condition. With the simultaneous evidence presentation order, participants scored their belief in the suspect's guilt once after all of the evidence had been reviewed. As a result, no further analyses were conducted. In the child scenario the mean score was  $M = 0.78$  and in the adult scenario the mean score was  $M = 0.54$ . Clearly, when reviewing all of the evidence before rendering a decision on the ultimate issue of guilt, participants were disinclined to believe in guilt.

***Guilt or Innocence:*** An ultimate determination of guilt or innocence was made after evaluating evidence in each evidence presentation order. In the child sequential condition, there were  $n = 11$  guilty and  $n = 15$  innocent while in the adult sequential

condition there were  $n = 8$  guilty and  $n = 22$  innocent. The reverse sequential and simultaneous evidence presentation orders were mostly innocent. The results are presented in Table 10.

Table 10

*Simultaneous Evidence Presentation Order, Guilt or Innocence*

		Sequential		Reverse Sequential		Simultaneous	
		Guilty	Innocent	Guilty	Innocent	Guilty	Innocent
Recruit	Child	7	2	1	7	0	8
	Adult	2	6	1	8	0	9
Patrol	Child	4	5	0	8	0	8
	Adult	2	7	0	8	0	9
Investigator	Child	0	8	0	8	0	7
	Adult	0	9	1	8	0	9
Total	Child	11	15	1	27	0	26
	Adult	8	22	2	26	0	27

## Discussion

The primary purpose of the research question was to determine whether emotional circumstances can influence criminal investigative decision making. In particular, can circumstances exist such that emotion replaces evidence as a catalyst for decision making. Follow-up analyses to the main effect for scenario condition and duty assignment examined this issue (Salkind & Green, 2011). The follow-up tests consisted of all pairwise comparisons among three duty assignments. The Tukey HSD procedure was used to control for Type I error across the pairwise comparisons. The results of this

analysis indicate that in the child scenario, the emotional evidence affected guilt belief scores. Overall, the 3 x 2 x 2 ANOVA indicates increased guilt belief after exposure to extreme emotional evidence in the victim interview.

These analyses demonstrate that when exculpatory evidence is considered before inculpatory evidence, there is less guilt belief toward the suspect. In this scenario guilt belief was reduced as much as 78% and 95%, in the investigator and patrol categories respectively (see Table 9). Clearly, the order in which an officer learns about evidence can be highly influential and when evidence is evaluated simultaneously there is less confirmation bias.

In sum, these analyses suggest that guilt belief scores were affected by emotion in both inculpatory and exculpatory form. Information in the child scenario inculcated the suspect, whereas the adult scenario included exculpatory evidence. Guilt belief scores in the victim interview demonstrated a much stronger suspicion in the sequential evidence presentation order. This demonstrates that when a confidence assessment of guilt is made *before* all of the available evidence is considered, there is considerable confirmation bias present since there is no evidence on which suspicion can be substantiated, and participants were aware that more evidence was available for consideration.

### **Summary of Results**

The foundational question of this study was whether confirmation bias was different among duty assignments, including police recruits, patrol officers and criminal investigators. Statistical analysis of research data indicated a significant interaction

between duty assignment and confirmation bias. Secondly, this study sought to examine whether extreme emotional evidence could elicit confirmation bias.

When learning of the suspect being a convicted sex offender, we are examining attitudes, expectations, and biases about whether this affects guilt belief in child condition. Thus, we examined the level of guilt belief in the child sequential group following the victim interview, where participants learned the suspect was a registered sex offender. The mean level of guilt judgment for recruits was  $M = 8.63$ , patrol  $M = 7.11$  and investigators  $M = 5.78$ . Guilt judgments for the child sequential condition were similarly disparate. Recruit was  $M = 1.71$ , patrol  $M = 1.85$  and investigations  $M = 1.96$ . These data indicate recruits were more likely to believe in guilt, whereas investigators were less likely, comparatively.

## Chapter 5: Discussion, Conclusions, and Recommendations

### Introduction

Confirming suspicion is a threat to both the security of the innocent and the institution of law enforcement. The purpose of this quantitative study was to investigate confirmation bias in criminal investigative decision making and to address the gap in the research that exists relative to the lack of law enforcement personnel as research participants. This study posited three research questions, that confirmation bias may differ among duty assignments in law enforcement, that emotion can influence criminal investigative decision making, and that the order of evidence presentation can influence guilt belief.

This study contributed to the literature related to criminal investigative decision making and confirmation bias by showing that the effects of confirmation bias differed among duty assignments and that extreme emotional crimes can influence bias in decision making. The research design for this study included stratified random sampling. The key population of participants were sworn police officers attending state sponsored criminal justice training courses. The research questions examined for this study included the following:

**RQ 1:** Does confirmation bias differ among various assignments (recruit, patrol, investigators) within law enforcement?

$H_0$  1: Confirmation bias does not differ among assignments.

$H_1$  1: Confirmation bias does differ among assignments.

**RQ 2:** Can emotionally charged crimes increase belief in a suspect's guilt?

*H<sub>0</sub>2:* Emotionally charged crimes do not increase belief in a suspect's guilt.

*H<sub>1</sub>2:* Emotionally charged crimes can increase belief in a suspect's guilt.

**RQ 3:** Does the order of evidence presentation differ influence belief in suspect's guilt?

*H<sub>0</sub>3:* Evidence presentation order does not influence guilt belief.

*H<sub>1</sub>3:* Evidence presentation order does influence guilt belief.

### **Overview of Current Study**

The goal of the study was to examine decision making by sworn police officers so the relevance of the findings are generally limited to law enforcement. This study utilized a sample of 166 police officers in duty assignments ranging from basic recruit to criminal investigator. Findings were compared using analysis of variance and found that (a) confirmation bias does exist in law enforcement decision making, (b) emotional evidence can affect judgment, and (c) the order in which evidence is examined can affect judgment. This information may lead to greater awareness of the susceptibility of law enforcement officers to react to evidence of an emotional nature, and of the propensity to form belief in guilt before considering all available evidence.

### **Interpretation of Findings**

#### **Research Question 1**

Research question one examined whether confirmation bias differed among duty assignments. Once the nature of confirmation bias and guilt belief was established, it was



determined that confirmation bias was greater among less-experienced police recruits. A three-way ANOVA examined this question and resulted in a finding of significance that provides confidence in the generalizability of the sample to the population. In addition, the stratified nature of the sample coming from a pool of law enforcement officers lent further confidence to the significance.

### **Research Question 2**

Research question 2 examined how extreme emotional evidence can increase belief in a suspect's guilt by evaluating responses to the victim interview, and comparing this condition to one in which the participant learns the suspect is a registered sex offender. The findings substantiated the research hypothesis that such emotion can increase guilt belief, however, examination of evidence of a contrary nature also elicited significant change in guilt belief. In the suspect interview participants learned the suspect was a sex offender because he had a sexual relationship as a juvenile with his juvenile girlfriend. As an adult of 18 he was charged with a statutory sexual abuse of his 17-year old girlfriend, in accordance with the Adam Walsh Act, federal legislation outlining sex offender registration. The nature of this circumstance was enough to mitigate the guilt belief, reducing it to where it was before the victim interview.

Guilt judgments in the adult scenario were nearly as strong as those in the child scenario, which was not expected. Recruits even scored stronger guilt in the adult scenario ( $M = 8.17$ ) than in the child scenario ( $M = 7.68$ ). The emotional effect of a sexual assault is clearly strong, regardless of a victim's age or status.

### **Research Question 3**

Research Question 3 examined how the order of evidence presentation can influence guilt belief. The findings substantiated the research hypothesis that confirmation bias can exist when evaluating evidence in isolation. Alternatively, when evidence was evaluated simultaneously (without arriving at a conclusion after reviewing each item) guilt belief did not arise to the same level it did in the sequential presentation order. In reverse order, the emotionally charged evidence did not produce the same level of guilt belief. As described in the previous two paragraphs, when participants had advance knowledge of mitigating information they were less inclined to believe in the suspect's guilt. The order of evidence presentation has significant potential for law enforcement in the area of reducing confirmation bias.

### **Summary**

Research indicates when conclusions are made about guilt there is a tendency to engage in seeking confirmatory evidence (Johnson & Fujita, 2012; Klayman & Ha, 1987; Schrackmann & Oswald, 2014), particularly with evidence is of an emotional nature (Feigenson & Park, 2006; Weiner, et al., 2006). As Festinger (1957) noted, when a decision maker rejects one attractive thing over another, it is not easy to compensate for and there is strong post-decisional dissonance, often resulting in a *seize and freeze* mentality. When this occurs, emphasis is placed predominantly on preexisting cues, rather than later information (Kruglanski & Webster, 1996).

Wiener, et al. (2006) explained that emotions legal decision makers anticipate when contemplating their conclusions could mediate the effect of evidence on their final

judgment. Research also shows that the influence of anticipated emotion can override rational decision making (Shiv & Fedorikhin, 2002). Lastly, it should be understood that while a search for evidence may be complex, often the review and analysis of it is not. This is critically relevant in an investigative context where confirmation bias can result in decisions being made based upon evidence gathered early on, rather than the totality body of evidence; a proposition supported by this study.

### **Summary of Implications**

Recalling confirmation bias in this study was measured by the increase in guilt belief across survey questions. When participants learned the subject in the child scenario was a registered sex offender, their belief in his guilt rose without any evidence to support it. This constitutes seeking or considering confirmatory evidence to confirm a hypothesis of guilt (Rassin, et al., 2010). A more objective means of investigation would be to wait and see what the totality of the evidence shows.

Biased assimilation of evidence occurs when the information is considered more favorably if it supports initial attitudes (Lord, et al., 1979; Masnick & Zimmerman, 2009). This was a likely reason why guilt belief increased after learning of the suspect's registered sex offender status, and was subsequently reduced when learning of the consensual circumstances requiring the suspect to register as a sex offender. Initial attitudes toward both sets of circumstances were strong enough to overwhelm restraint, and register a strong belief. The compelling nature of these beliefs cannot be overstated, as they appeal on an emotional level and are highly influential on decision making, even on the part of criminal investigators.

Attitudes, emotions and prior beliefs are strong factors in confirmation bias as they generally involve deeply rooted beliefs. For instance, belief about a suspect's guilt may be the result of an overzealous desire to protect children or skepticism about the recidivist nature of registered sex offenders. Emotion can bond an opinion to an attitude or belief in such a way that it becomes an unyielding position. These findings lead to the conclusion that confirmation bias is not only present in criminal investigative decision making but it can be systematically problematic if not recognized and contained. The dynamic nature of evidence requires context to be properly understood. While on its face, evidence may appear to lean one way or the other, but context is required to fully understand the totality of circumstances, and avoid erroneous decision making.

#### **Limitations of the Study**

Construct validity of the survey is subject to the honesty and certainty of the participant's responses (Creswell, 2003; Frankfort-Nachmias & Nachmias, 2008). If participants under or over-estimated their beliefs, the reliability of the survey may be compromised. Initially, demand characteristics are of concern given the familiar nature of the evidence by the participants. The background information revealed in the implied consent form together with the incident summary gives an idea of what the case entails and any experienced officer is familiar with the circumstances presented in this study. After all, the scenarios in this study come from this researcher's own experience as a detective. Thus, participants could very well be guessing at what they anticipate is the proverbial *rest of the story* that so often accompanies complaints of this nature. Since any explanation about bias in the study would most likely have caused more confusion than

clarity, participants were simply told that the study involves law enforcement decision making, and they should answer as honestly and accurately as possible.

Further, when participants registered their belief in the suspect's guilt in the respective vignettes, they very well may have estimated, rather than evaluated, their responses compared to the specific circumstance. Various biases such as response bias, social desirability bias may have had a confounding affect on the survey, limiting the validity of the findings, however, surveys are commonly used and are identified as great sources of information (Creswell, 2003).

These limitations are an intrinsic part of survey research, not just the present study. Electronic data collection was designed to maintain anonymity in order to mitigate this as much as possible. Additionally, during participant recruitment officers were advised of the research gap created by the use of non-law enforcement personnel in police related research and were encouraged to answer all questions honestly and accurately.

Stereotyping may have been influential while evaluating the guilt of a registered sex offender accused of another child sex offense. If the notion, *he's done it before so he is capable of it again*, were to invade a participant's deliberation, stereotyping could overwhelm practicable recidivism rates, affecting the reliability of their conclusion. So authentic is this threat that it is impermissible for jurors to be made aware of a defendant's prior criminal history during guilt deliberations. Only if a verdict of guilt is returned, are jurors permitted to learn about a defendant's prior bad acts (FRE 404b) during sentencing deliberations. In spite of these potential limitations, the surveys utilized

in this study are common sources of information and should not exclude the substance of the research findings.

The availability heuristic explains that people tend to answer questions of probability by summoning examples that come readily to mind (Kahneman, 2011; Tversky, & Kahneman, 1973). Clearly, actual examples of criminal conduct are more frequently in the mind of police officers than college age research participants, thus their responses are more realistic. Unfortunately, there is no greater influence on what a person can call to mind than entertainment and television in this day and age of law enforcement programming. While a law enforcement officer may compare a scenario to a case they worked last week, a student is more likely to imagine it according to what they saw on a screen.

As a result, this study was designed with law enforcement population in mind. Given the trend in similar research utilizing convenience sampling for research participants, this study sought to fill the existing research gap by utilizing law enforcement officers so the findings may be more readily, and accurately generalized. While being more relevant to law enforcement officers, the findings are obviously limited to that population.

### **Social Change Implications**

The clearest social change implication is the connection between confirmation bias and wrongful conviction. A consistent presence in wrongful conviction exonerations, confirmation bias is of crucial importance in both forensic and legal contexts. Recognizing the construct and its potential for error is a matter of education and

awareness, however, implementation of measures to lessen and prevent it may be more challenging. The fact that it may be challenging, however, should not be a deterrent, but a call to action for those who operate at the intersection of law and psychology.

The present study offers clear evidence of how confirmation bias tends to emerge in criminal investigation and provides several practical suggestions on how to avert these situations. Any research that can improve on law enforcement decision making has potential for social change. This study can help by disseminating research findings within the law enforcement community first to acknowledge the ubiquity of criminal investigative confirmation bias in wrongful conviction cases from an empirical perspective, and secondly to understand the practical importance of recognizing and limiting confirmation bias in the practice of investigative decision making. By including law enforcement officers as participants and law enforcement constructs in the process, these research findings have the potential to be received auspiciously by the law enforcement community and therefore, to more successful in effecting social change.

### **Recommendations for Action**

The first recommendation for action is the continued, if not increased, inclusion of law enforcement personnel as research participants in order to investigate psychological constructs in a forensic context. Not only can this bring practicality to the subject matter, it can advance forensic related research toward mainstream academic discussion. The use of 18-year old college freshman for experimentation and the subsequent generalization to professional law enforcement may be convenient from a research perspective, but it is wholly impractical from a realistic standpoint. Recommendations are not likely to be

considered when presented in academic jargon and directed *at* law enforcement, rather than enlisting their input and including them in the process from start to finish.

Secondly, greater cooperation between law enforcement and academic researchers can facilitate the exchange of practical findings. Eliminating layers of bureaucracy can help to implement positive suggestions more directly and efficiently, teaching and training the actual participants who work on the street. Establishing positive peer-to-peer relationships may even result in feedback from the user perspective. Imagine relaying findings on interview techniques directly to police interviewers, encouraging them with information and instruction. The implications of such collaboration is encouraging and potentially constructive

The most important recommendation this research can make is for investigators to withhold judgment until collecting as much evidence as possible, and focus more on what is *known* than what is *suspected*. Conscious awareness of the potential for bias can help to avoid premature judgments. More importantly, from a law enforcement perspective focusing on what is known instead of suspected can help to enhance the prosecutive merit of a case by eliminating speculation and potential avenues of defense. Ultimately, convicting the guilty and avoiding wrongful accusations and convictions has potential to avoid negative impacts that cannot be underestimated. Deliberating on conclusive evidence can help to remove doubt and ultimately, enhance community relations by engendering trust and confidence in law enforcement. Including appropriate training in the basic training and in-service training curriculums can be an effective means to achieve this recommendation.



Psychologists and law enforcement need to collaborate to develop better decision making skills and reduce the presence of confirmation bias in wrongful conviction. Practical recommendations can be made in layman terms that show the way forward in recognizing confirmation bias and reserving personal judgment until an entire body of evidence is considered in a case.

Investigators must implement judgment, not simply common sense or some sort of undefined rule; judgment is mental activity that draws upon beliefs, emotions, sensations, and involves integrating new information into existing patterns of thought, readjusting patterns to accommodate new perspectives where appropriate (Garsten, 2006). Judgment is affected by life experience, personal beliefs, and implicit professional familiarity, all of which can influence decision making. Exercising temperance in judgment can increase the criminal investigator's effectiveness and awareness is an important first step, however responsibility for accountability must emanate from the parent agency.

Acknowledging that confirmation bias is real and seeking information that is contrary to a favored hypothesis is an unnatural process so it takes a conscious effort. Investigators in particular should limit overconfidence and seek out consultation regarding their investigative findings, such as an informal verification of investigative conclusions through the use of a peer or supervisor. It is a professional responsibility to challenge findings in order to ensure truthfulness and accuracy to avoid convicting the innocent, and to fortify weak elements in a criminal case in order to convict the guilty.

The phenomenon of confirmation bias in law enforcement is a subject that merits discussion in public forums as community policing initiatives. In the next few years, the U.S. Department of Justice's Community Oriented Policing Services (COPS) will emphasize reforming policing, aligning organizational management, and pursuing proactive problem solving, preventing biased-based policing, and bringing greater resources to openness, transparency, and identification of problem solving strategies. Right or wrong, contemporary policing is in the public spotlight now more than ever, and there is no time like the present for a stronger, sustained relationship between law enforcement and psychology practitioners to partner for the purpose of addressing issues that affect the public.

### **Future Research Implications**

This study showed that confirmation bias is related to restraint in judgment, that it differs among duty assignments, and that extreme emotional evidence and evidence presentation order can influence guilt judgment in law enforcement officers, affirming Nickerson's (2004) observation of the ubiquitous nature of the phenomenon. Linking these variables with confirmation bias attempted to bridge the gap between research in bias and decision making, while using a law enforcement research population.

A recommendation for future research that corresponds with what Eerland and Rassin (2012) suggested deals with the effect of crime severity on the evaluation of evidence. Clearly the emotionally charged crime of child abuse proved sufficient to heighten guilt judgment, but other crimes may also stimulate strong emotional such as elder abuse or domestic violence. In addition, there is a tendency in criminal investigation

to take severe crimes more seriously, particularly when there is more active supervision by administrators or when the media are involved. This goes hand in hand with the study of extreme emotion. As this research has shown, when investigators are confronted with extreme emotional crimes, they are susceptible to the same inducement as others to react or respond, when they should be collecting facts and information and withholding judgment until the facts are in. The results of this study indicate that more research is necessary to understand the influence of emotion experienced by investigators at the time of decision making, also recommended by Wiener, et al. (2006).

### **Summary**

“The ability to objectively evaluate information is a hallmark of rational decision making” (Rassin & Judge, 2007). It is undisputable that bias is ubiquitous in the human experience. To deny the presence of bias is a certain plan for failure in one’s professional endeavors. In my own military training I learned that you either plan to succeed, or plan to fail; a philosophy that would serve me well in a 20-year law enforcement career. Accounting for bias, recognizing it’s presence and being honest about it’s effect, can have positive implications, and prepares the legal practitioner to deal with issues before they arise. This is not a case-by-case situation or a one-time allowance; it is a form of behavior and a plan for success. Objectivity, skepticism, and accountability are not only a means for successful investigative decision making, they are a mechanism to preserve individual liberty.

It is unlikely that bias will ever be eradicated from criminal investigative decision making. Despite federal, state and local laws, Rules of Evidence, Rules of Criminal

Procedure, as well as numerous local ordinances, policies and procedures governing police procedure, confirmation bias continues to exist in decision making. As an inherent part of the human psyche, bias tends to get lost in the process and often becomes the source of legal argument. Further, judgment emerges from personal dispositions, emotions, beliefs, and tacit knowledge, and can be biased by factors that are not connected to specific facts and circumstances. Any exercise involving judgment has the potential for human error as a consequence, however, confirmation bias need not be as compulsory a consequence as it often is. For example, upon interviewing a victim, an investigator believing or disbelieving their story may proceed to seek evidence to confirm their suspicion. This is an unnecessary initiation of confirmation bias.

Nothing in this study is intended to suggest that judgment be eliminated or replaced from decision making by police officers. On the contrary, mixing skilled investigative acumen with the right dispositions or habits of affective responses should be cultivated and tempered with prudence. This skill requires the decision maker to be on guard against allowing personal beliefs from intruding into matters requiring professional judgment. Beliefs are imperfect, whereas facts more accurately represent of what may or may not have occurred and are, in theory, impervious to bias. Ultimately a belief is only as reliable as the facts that support it. Judgment is the very tool with which the decision maker can identify and limit bias in decision making.

Reaching beyond the research and statistical analysis of the data, the core issue continues to be fairly simple; criminal investigators must reject the temptation to profile an offender while in the fact gathering process of an investigation, and endeavor to

reserve judgment until all of the facts are in, considering alternative scenarios as critically as others. Confirmation bias often leads to case building instead of fact gathering, where the investigator filters their perspective of the evidence in a case through the lens provided by a conclusion of guilt. As Findlay and Ross (2006) noted, supporting evidence is elevated in significance and viewed as consistent with the other evidence, where it is then deemed relevant and supportive of the main conclusion of guilt. Vigorous skepticism of a favored theory is a strong guarantee against investigative tunnel vision, premature theory development, attribution error and ultimately, confirmation bias. Tenets of fairness and justice demand no less.

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## Appendix A: Investigative Scenario Survey

## Investigative Scenario Survey

Participant's Number \_\_\_\_\_

Date \_\_\_\_\_

## Instructions

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**Not Guilty at All**

**Definitely Guilty**

**Incident Summary**

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe, and their 14-year old daughter Jane. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Jane reports that John raped her, and has been doing so for a while. You have been assigned to investigate the case. There are 10 items of evidence.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

**Evidence****1. Initial Report**

You are dispatched to the hospital to meet Ron and Jo Doe. You learn that their 14-year old daughter Jane Doe, reported that John Doe, her paternal uncle, had raped her. John Doe has been living in the home for 6 months now. Jane's mother states Jane is not sexually active and would not willingly have sex with anyone, least of all her Uncle. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

### **2. SANE nurse report of examination**

The SANE nurse notes in her report that the victim claims to be sexually active with her boyfriend. The report indicates the victim stated her uncle vaginally raped her and had been doing so for several months now. The report also notes that the victim reported to the SANE nurse that she is concerned about possibly being pregnant. The victim was given the option of an abortifacient (Day after) pill, which she took. No signs of force or injury were noted, but signs of recent sexual activity were present.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

### **3. Crime scene.**

Utilizing an alternate light source, body fluid was identified on the sheets in Jane's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for analysis.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

#### **4. Victim interview**

Jane Doe states that her Uncle, John Doe, had been flirting with her and that their rooms are so close in the house that she is uncomfortable with him being around, particularly since he is a sex offender. A check of local records confirm that John Doe is on the Sex Offender Registry.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

#### **5. Suspect interview**

John Doe denies the allegation. John Doe states that Jane is vindictive and resents him being in the home. He states the proximity of his room to Jane's restricts what she can get away with and this she resents him being there. John Doe states he has caught Jane and her boyfriend having sex in the house on several occasions. On one occasion when he caught the boyfriend sneaking into her room he confronted them. At that time Jane threatened that she would tell her parents that he forced himself on her. John Doe states that he was convicted of having sex with his girlfriend, who was 17-years old at the time.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**6. Boyfriend interview**

The boyfriend states that he and Jane have sex almost daily and they had sex on the morning of the reported incident. He further states that he did not use a condom. The boyfriend states that he is not aware if Jane is on birth control or not, but that she was worried that she might be pregnant.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**7. School counselor**

Jane had come to her about a week before the reported incident and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? The school counselor told Jane that in cases of rape, an abortifacient is free.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**8. Follow-up investigation**

In a follow-up interview with John Doe. He reports that he had a vasectomy years ago, thus he no longer produces semen in his ejaculate. Medical records provided confirmation.

An interview with a neighbor reveals that they have observed someone coming in and out of an upstairs window at the Doe's house, using the roof for access. No identification of the individual was possible.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**9. Follow-up investigation**

In a follow-up interview with Jane, she stated she just wanted the whole thing to “go away” and that she no longer wanted to pursue charges against her Uncle.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**10. Lab Report** - DNA from the sheet was matched to Jane and included semen from an unidentified male subject.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**11. What is your overall belief in the suspect's guilt or innocence?**

- Guilty
- Innocent

Thank you for your cooperation.

## Appendix B: Investigative Scenario Survey

## Investigative Scenario Survey

Participant's Number \_\_\_\_\_

Date \_\_\_\_\_

## Instructions

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

**Not Guilty at All****Definitely Guilty****Incident Summary**

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe, and their 14-year old daughter Jane. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Jane reports that John raped her, and has been doing so for a while. You have been assigned to investigate the case. There are 10 items of evidence. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

**Evidence****1. Initial Report**

You are dispatched to the hospital to meet Ron and Jo Doe. You learn that their 14-year old daughter Jane Doe, said that her Uncle John had raped her. John Doe has been living in the home for 6 months now. Jane's mother states Jane is not sexually active and would not willingly have sex with anyone, least of all her Uncle.



## **2. SANE Nurse Report**

The SANE nurse notes in her report that the victim claims to be sexually active with her boyfriend. The report indicates the victim stated her uncle vaginally raped her and had been doing so for several months now. The report also notes that the victim reported to the SANE nurse that she is concerned about possibly being pregnant. The victim was given the option of an abortifacient (Day after) pill, which she took. No signs of force or injury were noted, but signs of recent sexual activity were present.

## **3. Crime Scene**

Utilizing an alternate light source, body fluid was identified on the sheets in Jane's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for analysis.

## **4. Victim Interview**

Jane Doe states that her Uncle, John Doe, had been flirting with her and that their rooms are so close in the house that she is uncomfortable with him being around, particularly since he is a sex offender. A check of local records confirms that John Doe is on the Sex Offender Registry.

## **5. Suspect Interview**

John Doe denies the allegation. John Doe states that Jane is vindictive and resents him being in the home. He states the proximity of his room to Jane's restricts what she can get away with and she dislikes him being there. John Doe states he has caught Jane and her boyfriend having sex in the house on several occasions. On one occasion when he caught the boyfriend sneaking into her room he confronted them. At that time Jane threatened

that she would tell her parents that he forced himself on her. John Doe states that he was convicted of having sex with his girlfriend, who was 17-years old at the time.

#### **6. Boyfriend Interview**

The boyfriend states that he and Jane have sex almost daily and they had sex on the morning of the reported incident. He further states that he did not use a condom. The boyfriend states that he is not aware if Jane is on birth control or not, but that she was worried that she might be pregnant.

#### **7. School counselor**

Jane had come to her about a week before the reported incident and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? The school counselor told Jane that in cases of rape, an abortifacient is free.

#### **8. Investigative Follow-up**

In an interview with John Doe. He reports that he had a vasectomy years ago, thus he no longer produces semen in his ejaculate. Medical records provided confirmation.

An interview with a neighbor reveals that they have observed someone coming in and out of an upstairs window at the Doe's house, using the roof for access. No identification of the individual was possible.

#### **9. Investigative Follow-up**

In a follow-up interview with Jane, she stated she just wanted the whole thing to "go away" and that she no longer wanted to pursue charges against her Uncle.

**10. Lab Report** - DNA from the sheet was matched to Jane and included semen from an unidentified male subject.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**11. What is your overall belief in the suspect's guilt or innocence?**

- Guilty
- Innocent

Thank you for your cooperation.

### Appendix C: Investigative Scenario Survey

Participant's Number \_\_\_\_\_

Date \_\_\_\_\_

#### Instructions

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

**Not Guilty at All**

**Definitely Guilty**

#### **Incident Summary**

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe, and their 14-year old daughter Jane. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Jane reports that John raped her, and has been doing so for a while. You have been assigned to investigate the case. There are 10 items of evidence. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

#### **Evidence**

##### **1. Initial Report**

You are dispatched to the hospital to meet Ron and Jo Doe. You learn that their 14-year old daughter Jane Doe, reported that John Doe, her paternal uncle, had raped her. John Doe has been living in the home for 6 months now. Jane's mother states Jane is not sexually active and would not willingly have sex with anyone, least of all her Uncle.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

## **2. SANE Report**

The SANE nurse notes in her report that the victim claims to be sexually active with her boyfriend. The report indicates the victim stated her uncle vaginally raped her and had been doing so for several months now. The report also notes that the victim reported to the SANE nurse that she is concerned about possibly being pregnant. The victim was given the option of an abortifacient (Day after) pill, which she took. No signs of force or injury were noted, but signs of recent sexual activity were present.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

## **3. Crime scene.**

Utilizing an alternate light source, body fluid was identified on the sheets in Jane's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for analysis.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**4. Lab Report** - DNA from the sheet was matched to Jane and included semen from an unidentified male subject.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

### **5. Follow-up Investigation**

In a follow-up interview with John Doe. He reports that he had a vasectomy years ago, thus he no longer produces semen in his ejaculate. Medical records provided confirmation.

An interview with a neighbor reveals that they have observed someone coming in and out of an upstairs window at the Doe's house, using the roof for access. No identification of the individual was possible.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

### **6. School counselor**

Jane had come to her about a week before the reported incident and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? The school counselor told Jane that in cases of rape, an abortifacient is free.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

### **7. Boyfriend interview**

The boyfriend states that he and Jane have sex almost daily and they had sex on the morning of the reported incident. He further states that he did not use a condom. The boyfriend states that he is not aware if Jane is on birth control or not, but that she was worried that she might be pregnant.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

### **8. Suspect interview**

John Doe denies the allegation. John Doe states that Jane is vindictive and resents him being in the home. He states the proximity of his room to Jane's restricts what she can get away with and this she resents him being there. John Doe states he has caught Jane and her boyfriend having sex in the house on several occasions. On one occasion when he caught the boyfriend sneaking into her room he confronted them. At that time Jane threatened that she would tell her parents that he forced himself on her. John Doe states that he was convicted of having sex with his girlfriend, who was 17-years old at the time.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

### **9. Victim interview**

Jane Doe states that her Uncle, John Doe, had been flirting with her and that their rooms are so close in the house that she is uncomfortable with him being around, particularly

since he is a sex offender. A check of local records confirm that John Doe is on the Sex Offender Registry.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**10. Follow-up investigation**

In a follow-up interview with Jane, she stated she just wanted the whole thing to “go away” and that she no longer wanted to pursue charges against her Uncle.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**11. What is your overall belief in the suspect’s guilt or innocence?**

- Guilty
- Innocent

Thank you for your cooperation.



## Appendix D: Investigative Scenario Survey

## Investigative Scenario Survey

Participant's Number \_\_\_\_\_

Date \_\_\_\_\_

## Instructions

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

**Not Guilty at All**

**Definitely Guilty**

**Incident Summary**

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Several neighbors come to the Doe home regularly to play cards and drink alcohol, including Scott and Joanne Smith. Joanne Smith has reported that John Doe sexually assaulted her, and you have been assigned to investigate the case. There are 10 items of evidence. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

**Evidence****1. Initial Report**

You are dispatched to the hospital where you meet Scott and Joanne Smith. Joanne Smith reports that John Doe raped her the night before at the home of Ron and Jo Doe, where

John resides. Both Scott and Joanne Smith report that they were intoxicated and do not recall much of the evening. Joanne Smith claims that the incident occurred in John Doe's bed and that it was not consensual. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

## **2. SANE Nurse Report**

The SANE nurse's report indicates that Joanne Smith stated she had become voluntarily intoxicated the night before and recalls talking to John Doe in his room, and possibly kissing him. She further stated that she would not consent to having sex, and therefore must have been raped. Joanne Smith was given the option of an abortifacient (Day after) pill, which she took. There were no signs of force or injury noted, however, signs of recent sexual activity were present. A sexual assault evidence collection kit was performed by the SANE nurse on the victim and provided to you. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

## **3. Crime Scene**

Utilizing an alternate light source, body fluid was identified on the sheets in John Doe's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for analysis.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0 1 2 3 4 5 6 7 8 9 10

#### **4. Victim Interview**

Joanne Smith states that she and her husband Scott regularly go to the Doe's home to play cards and socialize, usually drinking alcohol. On this occasion, Joanne Smith became intoxicated and does not recall much. Joanne Smith recalls being in John Doe's room for some reason and has a vague recollection of kissing him, but nothing after that. Joanne stated that in the early morning hours she awoke naked, with John Doe in his bed. She stated that she woke her husband and they went home and went back to bed. Several hours she awoke and came to realize that she had engaged in sexual intercourse and told Scott Smith, who then took her to the hospital. Joanne Smith stated she would not have consented to having sex with John Doe under any circumstance. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0 1 2 3 4 5 6 7 8 9 10

#### **5. Suspect Interview**

John Doe denies the allegation. John Doe states that on the evening in question Joanne Smith had been flirting with him, although at the time he thought nothing of it. John Doe stated that everyone at the home was drinking heavily and getting intoxicated. John Doe stated that at one point during the evening he went to use the restroom and when he exited, he was confronted by Joanne Smith, who kissed him. John Doe states that most of the people had fallen asleep or passed out and that Joanne Smith came into his room. Before long they were engaged in sexual intercourse. John Doe stated that although

Joanne Smith was intoxicated clearly gave her consent, as she was the instigator of the sexual activity. After awhile they both fell asleep in his bed. When he awoke, Joanne was not there. John Doe stated that Joanne Smith told him more than once that Scott Smith must not find out that they had sex. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

#### **6. Interview of Scott Smith**

Scott Smith states that he and Joanne come regularly to the Doe's home to play cards and socialize, and usually drink alcohol. On the night in question everyone drank more than usual and at some point Scott Smith passed out on the couch. Scott Smith stated that Joanne woke him up at about 5:00 AM and they went home and went to bed. At about 10:00 AM they woke up and Joanne became very upset. She stated that during the previous night John Doe raped her. They got dressed and went to the hospital where they met a SANE nurse and they contacted the police. Scott Smith stated that there could be no way Joanne was pregnant because he had a vasectomy. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

#### **7. Interview of Jo Doe**

Jo Doe states that she and Joanne Smith are friends and have gone to each other's home the past to socialize and play cards. Jo stated that recently Joanne had come to her and asked for information about an abortion. Jane was concerned she might be pregnant and

asked how much an abortion would cost? Jo stated that she told Joanne that in cases of rape, an abortifacient is free. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

### **8. Investigative Follow-up**

In a follow-up interview with friends of Joanne Smith you learn that she had recently become concerned about being pregnant and did not want to have another child.

A witness from the night of the party tells you learn that Joanne was being flirtatious with John Doe and was in and out of his room several times during the evening. This witness states most everyone at the party was aware of Joanne's behavior except for Scott, who seemed too drunk to recognize it. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

### **9. Investigative Follow-up**

In a follow-up interview with Joanne, she stated she just wanted the whole thing to “go away” and that she no longer wanted to pursue charges John Doe. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

### **10. Lab Report**

The DNA from the sheet was matched to Joanne and John Doe.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**11. What is your overall belief in the suspect's guilt or innocence?**

- Guilty
- Innocent

Thank you for your cooperation.

## Appendix E: Investigative Scenario Survey

## Investigative Scenario Survey

Participant's Number \_\_\_\_\_ Date \_\_\_\_\_

## Instructions

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

**Not Guilty at All**

**Definitely Guilty**

**Incident Summary**

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Several neighbors come to the Doe home regularly to play cards and drink alcohol, including Scott and Joanne Smith. Joanne Smith has reported that John Doe sexually assaulted her, and you have been assigned to investigate the case. There are 10 items of evidence. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

**Evidence****1. Initial Report**

You are dispatched to the hospital where you meet Scott and Joanne Smith. Joanne Smith reports that John Doe raped her the night before at the home of Ron and Jo Doe, where

John resides. Both Scott and Joanne Smith report that they were intoxicated and do not recall much of the evening. Joanne Smith claims that the incident occurred in John Doe's bed and that it was not consensual.

## **2. SANE Nurse Report**

The SANE nurse's report indicates that Joanne Smith stated she had become voluntarily intoxicated the night before and recalls talking to John Doe in his room, and possibly kissing him. She further stated that she would not consent to having sex, and therefore must have been raped. Joanne Smith was given the option of an abortifacient (Day after) pill, which she took. There were no signs of force or injury noted, however, signs of recent sexual activity were present. A sexual assault evidence collection kit was performed by the SANE nurse on the victim and provided to you.

## **3. Crime Scene**

Utilizing an alternate light source, body fluid was identified on the sheets in John Doe's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for analysis.

## **4. Victim Interview**

Joanne Smith states that she and her husband Scott regularly go to the Doe's home to play cards and socialize, usually drinking alcohol. On this occasion, Joanne Smith became intoxicated and does not recall much. Joanne Smith recalls being in John Doe's room for some reason and has a vague recollection of kissing him, but nothing after that. Joanne stated that in the early morning hours she awoke naked, with John Doe in his bed. She stated that she woke her husband and they went home and went back to bed. Several



hours she awoke and came to realize that she had engaged in sexual intercourse and told Scott Smith, who then took her to the hospital. Joanne Smith stated she would not have consented to having sex with John Doe under any circumstance.

### **5. Suspect Interview**

John Doe denies the allegation of rape, stating that he and Joanne had consensual sexual intercourse. John Doe stated that although Joanne Smith was intoxicated she clearly gave her consent and she was the instigator of the sexual activity. John Doe states that on the evening in question Joanne Smith had been flirting with him, although at the time he thought nothing of it. John Doe stated that everyone at the home was drinking heavily and getting intoxicated. John Doe stated that at one point during the evening he went to use the restroom in his room and when he exited, he was confronted by Joanne Smith, who kissed him. John Doe states that most of the people had fallen asleep or passed out and that Joanne Smith came into his room. Before long they were engaged in sexual intercourse. After awhile they both fell asleep in his bed. When he awoke, Joanne was not there. John Doe stated that Joanne Smith told him more than once that Scott Smith must not find out that they had sex.

### **6. Interview of Scott Smith**

Scott Smith states that he and Joanne come regularly to the Doe's home to play cards and socialize, and usually drink alcohol. On the night in question everyone drank more than usual and at some point Scott Smith passed out on the couch. Scott Smith stated that Joanne woke him up at about 5:00 AM and they went home and went to bed. At about 10:00 AM they woke up and Joanne became very upset. She stated that during the

previous night John Doe raped her. They got dressed and went to the hospital where they met a SANE nurse and they contacted the police. Scott Smith stated that there could be no way Joanne was pregnant because he had a vasectomy

### **7. Interview of Jo Doe**

Jo Doe states that she and Joanne Smith are friends and have gone to each other's home the past to socialize and play cards. Jo stated that recently Joanne had come to her and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? Jo stated that at one point during the course of their conversation, she made the remark that in cases of rape, an abortifacient is free.

### **8. Follow-up Investigation**

In a follow-up interview with friends of Joanne Smith you learn that she had recently become concerned about being pregnant and did not want to have another child.

In an interview with a witness from the night of the party, you learn that Joanne was being flirtatious with John Doe and was in and out of his room several times during the evening. This witness states most everyone at the party was aware of Joanne's behavior except for Scott, who seemed too drunk to recognize it.

### **9. Follow-up Investigation**

In a follow-up interview with Joanne, she stated she just wanted the whole thing to "go away" and that she no longer wanted to pursue charges John Doe.

### **10. Lab Report**

The DNA from the sheet was matched to both Joanne Smith and John Doe.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

**11. What is your overall belief in the suspect's guilt or innocence?**

- Guilty
- Innocent

Thank you for your cooperation.

## Appendix F: Investigative Scenario Survey

## Investigative Scenario Survey

Participant's Number \_\_\_\_\_ Date \_\_\_\_\_

## Instructions

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

**Not Guilty at All**

**Definitely Guilty**

**Incident Summary**

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Several neighbors come to the Doe home regularly to play cards and drink alcohol, including Scott and Joanne Smith. Joanne Smith has reported that John Doe sexually assaulted her, and you have been assigned to investigate the case. There are 10 items of evidence. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

**Evidence****1. Initial Report**

You are dispatched to the hospital where you meet Scott and Joanne Smith. Joanne Smith reports that John Doe raped her the night before at the home of Ron and Jo Doe, where

John resides. Both Scott and Joanne Smith report that they were intoxicated and do not recall much of the evening. Joanne Smith claims that the incident occurred in John Doe's bed and that it was not consensual. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

## **2. SANE Nurse Report**

The SANE nurse's report indicates that Joanne Smith stated she had become voluntarily intoxicated the night before and recalls talking to John Doe in his room, and possibly kissing him. She further stated that she would not consent to having sex, and therefore must have been raped. Joanne Smith was given the option of an abortifacient (Day after) pill, which she took. There were no signs of force or injury noted, however, signs of recent sexual activity were present. A sexual assault evidence collection kit was performed by the SANE nurse on the victim and provided to you. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

## **3. Crime Scene**

Utilizing an alternate light source, body fluid was identified on the sheets in John Doe's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for analysis.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

#### **4. Lab Report**

The DNA from the sheet was matched to both Joanne Smith and John Doe.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

#### **5. Follow-up Investigation**

In a follow-up interview with friends of Joanne Smith you learn that she had recently become concerned about being pregnant and did not want to have another child.

In an interview with a witness from the night of the party, you learn that Joanne was being flirtatious with John Doe and was in and out of his room several times during the evening. This witness states most everyone at the party was aware of Joanne's behavior except for Scott, who seemed too drunk to recognize it. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

#### **6. Interview of Jo Doe**

Jo Doe states that she and Joanne Smith are friends and have gone to each other's home the past to socialize and play cards. Jo stated that recently Joanne had come to her and

asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? Jo stated that at one point during the course of their conversation, she made the remark that in cases of rape, an abortifacient is free.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

### **7. Interview of Scott Smith**

Scott Smith states that he and Joanne come regularly to the Doe's home to play cards and socialize, and usually drink alcohol. On the night in question everyone drank more than usual and at some point Scott Smith passed out on the couch. Scott Smith stated that Joanne woke him up at about 5:00 AM and they went home and went to bed. At about 10:00 AM they woke up and Joanne became very upset. She stated that during the previous night John Doe raped her. They got dressed and went to the hospital where they met a SANE nurse and they contacted the police. Scott Smith stated that there could be no way Joanne was pregnant because he had a vasectomy. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

### **8. Suspect Interview**

John Doe denies the allegation of rape, stating that he and Joanne had consensual sexual intercourse. John Doe stated that although Joanne Smith was intoxicated she clearly gave

her consent and she was the instigator of the sexual activity. John Doe states that on the evening in question Joanne Smith had been flirting with him, although at the time he thought nothing of it. John Doe stated that everyone at the home was drinking heavily and getting intoxicated. John Doe stated that at one point during the evening he went to use the restroom in his room and when he exited, he was confronted by Joanne Smith, who kissed him. John Doe states that most of the people had fallen asleep or passed out and that Joanne Smith came into his room. Before long they were engaged in sexual intercourse. After awhile they both fell asleep in his bed. When he awoke, Joanne was not there. John Doe stated that Joanne Smith told him more than once that Scott Smith must not find out that they had sex. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

### **9. Victim Interview**

Joanne Smith states that she and her husband Scott regularly go to the Doe's home to play cards and socialize, usually drinking alcohol. On this occasion, Joanne Smith became intoxicated and does not recall much. Joanne Smith recalls being in John Doe's room for some reason and has a vague recollection of kissing him, but nothing after that. Joanne stated that in the early morning hours she awoke naked, with John Doe in his bed. She stated that she woke her husband and they went home and went back to bed. Several hours she awoke and came to realize that she had engaged in sexual intercourse and told Scott Smith, who then took her to the hospital. Joanne Smith stated she would not have consented to having sex with John Doe under any circumstance. Choose the number that



corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

#### **10. Follow-up Investigation**

In a follow-up interview with Joanne, she stated she just wanted the whole thing to “go away” and that she no longer wanted to pursue charges John Doe. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0    1    2    3    4    5    6    7    8    9    10

#### **11. What is your overall belief in the suspect's guilt or innocence?**

- Guilty
- Innocent

Thank you for your cooperation.

## Appendix G: Investigative Scenario Survey

## Investigative Scenario Survey

Participant's Number \_\_\_\_\_ Date \_\_\_\_\_

## Instructions

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

**Not Guilty at All**

**Definitely Guilty**

**Incident Summary**

John Doe has been down on his luck recently and he has been staying with his brother and sister-in-law, Ron and Jo Doe. John has been living with the family for the past several months as has had trouble finding a job, due in part to the fact that he is a convicted felon. Several neighbors come to the Doe home regularly to play cards and drink alcohol, including Scott and Joanne Smith. Joanne Smith has reported that John Doe sexually assaulted her, and you have been assigned to investigate the case. There are 10 items of evidence. Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

**Evidence****1. Initial Report**

You are dispatched to the hospital where you meet Scott and Joanne Smith. Joanne Smith reports that John Doe raped her the night before at the home of Ron and Jo Doe, where

John resides. Both Scott and Joanne Smith report that they were intoxicated and do not recall much of the evening. Joanne Smith claims that the incident occurred in John Doe's bed and that it was not consensual.

## **2. SANE Nurse Report**

The SANE nurse's report indicates that Joanne Smith stated she had become voluntarily intoxicated the night before and recalls talking to John Doe in his room, and possibly kissing him. She further stated that she would not consent to having sex, and therefore must have been raped. Joanne Smith was given the option of an abortifacient (Day after) pill, which she took. There were no signs of force or injury noted, however, signs of recent sexual activity were present. A sexual assault evidence collection kit was performed by the SANE nurse on the victim and provided to you.

## **3. Crime Scene**

Utilizing an alternate light source, body fluid was identified on the sheets in John Doe's bedroom. Preliminary lab results indicate the substance may be semen. The sample was submitted to the lab for analysis.

## **4. Lab Report**

The DNA from the sheet was matched to both Joanne Smith and John Doe.

## **5. Follow-up Investigation**

In a follow-up interview with friends of Joanne Smith you learn that she had recently become concerned about being pregnant and did not want to have another child.

In an interview with a witness from the night of the party, you learn that Joanne was being flirtatious with John Doe and was in and out of his room several times during the

evening. This witness states most everyone at the party was aware of Joanne's behavior except for Scott, who seemed too drunk to recognize it.

#### **6. Interview of Jo Doe**

Jo Doe states that she and Joanne Smith are friends and have gone to each other's home the past to socialize and play cards. Jo stated that recently Joanne had come to her and asked for information about an abortion. Jane was concerned she might be pregnant and asked how much an abortion would cost? Jo stated that at one point during the course of their conversation, she made the remark that in cases of rape, an abortifacient is free.

#### **7. Interview of Scott Smith**

Scott Smith states that he and Joanne come regularly to the Doe's home to play cards and socialize, and usually drink alcohol. On the night in question everyone drank more than usual and at some point Scott Smith passed out on the couch. Scott Smith stated that Joanne woke him up at about 5:00 AM and they went home and went to bed. At about 10:00 AM they woke up and Joanne became very upset. She stated that during the previous night John Doe raped her. They got dressed and went to the hospital where they met a SANE nurse and they contacted the police. Scott Smith stated that there could be no way Joanne was pregnant because he had a vasectomy.

#### **8. Suspect Interview**

John Doe denies the allegation of rape, stating that he and Joanne had consensual sexual intercourse. John Doe stated that although Joanne Smith was intoxicated she clearly gave her consent and she was the instigator of the sexual activity. John Doe states that on the evening in question Joanne Smith had been flirting with him, although at the time he

thought nothing of it. John Doe stated that everyone at the home was drinking heavily and getting intoxicated. John Doe stated that at one point during the evening he went to use the restroom in his room and when he exited, he was confronted by Joanne Smith, who kissed him. John Doe states that most of the people had fallen asleep or passed out and that Joanne Smith came into his room. Before long they were engaged in sexual intercourse. After awhile they both fell asleep in his bed. When he awoke, Joanne was not there. John Doe stated that Joanne Smith told him more than once that Scott Smith must not find out that they had sex.

#### **9. Victim Interview**

Joanne Smith states that she and her husband Scott regularly go to the Doe's home to play cards and socialize, usually drinking alcohol. On this occasion, Joanne Smith became intoxicated and does not recall much. Joanne Smith recalls being in John Doe's room for some reason and has a vague recollection of kissing him, but nothing after that. Joanne stated that in the early morning hours she awoke naked, with John Doe in his bed. She stated that she woke her husband and they went home and went back to bed. Several hours she awoke and came to realize that she had engaged in sexual intercourse and told Scott Smith, who then took her to the hospital. Joanne Smith stated she would not have consented to having sex with John Doe under any circumstance.

#### **10. Follow-up Investigation**

In a follow-up interview with Joanne, she stated she just wanted the whole thing to "go away" and that she no longer wanted to pursue charges John Doe.

Choose the number that corresponds to your level of belief in John Doe's guilt between 0 (not guilty at all) and 10 (definitely guilty).

0      1      2      3      4      5      6      7      8      9      10

**11. What is your overall belief in the suspect's guilt or innocence?**

- Guilty
- Innocent

**Thank you for your cooperation.**

## Appendix H: Demographic Questionnaire

## Demographic Questionnaire

1. What is your age?
  - a. 21 - 25
  - b. 26 - 30
  - c. 31 - 35
  - d. 36 - 40
  - e. 41 - 45
  - f. 46 - 50
  - g. 51 - 55
  - h. 56 - 60
  - i. 61 - 65
2. What is your gender?
  - a. Male
  - b. Female
3. What is your level of education?
  - a. High school
  - b. Some college credit, no degree
  - c. Associates degree
  - d. Bachelors degree
  - e. Masters degree

- f. Professional Degree
  - g. Doctorate Degree
4. What is your household composition?
- a. Single, never married
  - b. Married or domestic partnership
  - c. Widowed
  - d. Divorced
  - e. Separated
5. How long have you been a police officer?
- a. Less than 1 year
  - b. 1 - 5 years
  - c. 6 - 10 years
  - d. 11 -19 years
  - e. 20 - 29 years
  - f. 30 - 39 years
  - g. More than 40 years
6. What is your rank?
- a. Patrol officer
  - b. Specialist
  - c. Sergeant
  - d. Lieutenant or above
7. What is your current duty assignment?



- a. Recruit
- b. Patrol
- c. Criminal Investigations
- d. Other

8. How long have you been in your current duty assignment?

- a. Less than 1 year
- b. 1 - 5
- c. 6 - 10
- d. 11 - 15
- e. 16 - 19
- f. 20 or more

9. How much experience do you have conducting criminal investigations?

- a. None
- b. Less than 1 year
- c. 1 - 5 years
- d. 6 - 10 years
- e. 11 - 15 years
- f. 16 - 19 years
- g. 20 or more

10. How do you rate your ability to conduct a criminal investigation?

- a. Novice
- b. Basic

c. Intermediate

d. Advanced

11. How many times have you testified in trial?

a. 0

b. 1

c. 2

d. 3

e. 4

f. 5

g. 6

h. 7

i. 8

j. 9

k. 10 or more

12. Have you assisted the prosecutor at their table throughout a trial?

a. Yes

b. No

13. How many times have you testified in a suppression hearing?

a. 0

b. 1

c. 2

d. 3

- e. 4
- f. 5
- g. 6
- h. 7
- i. 8
- j. 9
- k. 10 or more

14. Do you work alone or with a partner?

- a. Alone
- b. Partner

15. What types of crime do you investigate?

- a. Personal
- b. Property
- c. Both

16. What types of personal crimes are you responsible to investigate?

- a. Homicide
- b. Homicide
- c. Rape
- d. Kidnapping
- e. Aggravated Assault
- f. Sexual assault
- g. Aggravated Robbery

- h. Domestic violence
- i. Crimes against children (abuse, assault, sexual exploitation, other)
- j. Family crimes (incest, parental elder abuse, etc...)
- k. Other personal crimes (pornography, disorderly conduct, escape, vice, etc...)

17. What types of property crimes are you responsible to investigate?

- a. Burglary
- b. Theft
- c. Arson
- d. Criminal damage to property
- e. Economic crimes (fraud, identity theft, forgery, related crimes)
- f. Other (bribery, escape, official misconduct, perjury, prostitution, gambling, etc...)

18. How many hours of in-service training have you attended?

- a. 50-100
- b. 101-200
- c. 201-300
- d. 301-400
- e. 401-500
- f. 501-750
- g. 751-1000
- h. 1001-2000

- i. 2001-3000
- j. 3001-4000
- k. 4001 or more

19. How many other hours of training have you attended?

- a. 50-100
- b. 101-200
- c. 201-300
- d. 301-400
- e. 401-500
- f. 501-750
- g. 751-1000
- h. 1001-2000
- i. 2001-3000
- j. 3001-4000
- k. 4001 or more

20. What does the majority of your training pertain to?

- a. Criminal investigations
- b. Patrol procedures
- c. Other

21. Of your training hours, about how many pertain to criminal investigations?

- a. Less than 25%
- b. 25% – 50%

c. 50% - 75%

d. 75% - 100%

**This concludes the questionnaire. Please proceed to the Investigative Scenario Survey.**

## Appendix I: Implied Consent

### Implied Consent

You are invited to take part in a research study of Criminal Investigative Decision Making. The researcher is inviting police recruits and officers to be in the study. This form is part of a process called “informed consent” to allow you to understand this study before deciding whether to take part. This study is being conducted by a researcher named Wayne Wallace, who is a doctoral student at Walden University.

#### **Background Information**

The purpose of this study is to examine law enforcement decision making in an investigative environment. Certain circumstances may influence a decision while others may be ignored. What matters however, is the not compromising accuracy while protecting a citizen’s rights. This study will examine factors affecting criminal investigative decision making under different circumstances.

#### **Procedures**

If you agree to be in this study, you will be asked to:

- Complete demographic questionnaire
- Read a crime scenario vignette
- Record your answer by choosing a number from 0 to 10.
- The questionnaire and survey will take approximately 10 - 15 minutes to read and complete.

#### **Voluntary Nature of the Study**

This study is voluntary. Everyone in your group will be provided the same invitation to participate. The survey is administered privately so you may choose whether or not you want to participate in a private setting. Nobody will be aware of your decision, including the Department of Criminal Justice Training. While you cannot stop and re-start the study, you may choose to stop at any time.

### **Risks and Benefits of Being in the Study**

Being in this type of study involves some risk of minor discomfort that can be encountered in daily life, such as fatigue, personal distress, or even boredom. Being in this study would not pose risk to your safety or well-being.

A study about law enforcement can be more effective with law enforcement officers participating, so one benefit of this study is including law enforcement as participants. This can provide realistic, empirical data to aid in understanding decision making in a criminal investigative environment. Understanding the phenomenon empirically may help to effect social change by improving upon investigative decision making, avoiding wrongful accusations, and possibly averting wrongful convictions. Effective decision making benefits all parties involved in a criminal investigation.

### **Payment**

There is no monetary payment associated with this study, however, you have my sincere personal gratitude for your assistance, and a special thank you for participating in a study that is closely associated with law enforcement professionalism. You may be assured knowing that you are contributing to an important element of research with the



potential to positively effect social change in your chosen profession, and safeguard the public whom you've sworn to serve and protect.

**Privacy:**

Privacy is not an issue when you choose to participate because you will not record any private information. You will be provided an access code and password, however, this information is not recorded. In this study the researcher will not ask or record your name anywhere. Your personal information will not be recorded in any fashion. All of the data will be kept in the researcher's possession in a locked file cabinet for 5 years after the study is completed, after which, the data will be destroyed. The electronic data will be stored on a freestanding back-up hard drive, and will only be on the researcher's password-protected computer. All of the electronic data will be maintained for 5 years, at which time it will be destroyed.

**Contacts and Questions:**

You may ask any questions you have now. Or if you have questions later, you may contact the researcher via phone at (859) 991-7198 or [wayne.wallace@waldenu.edu](mailto:wayne.wallace@waldenu.edu) if you would like to talk privately about your rights as a participant, you can call Dr. Leilani Endicott, the Walden University representative who can discuss this with you. Dr. Endicott's phone number is (612) 312-1210. Walden University's approval number for this study is 09-24-14-0273264 and it expires on September 23, 2015.

**Consent**

Your completion of the questionnaire and survey implies your voluntary consent to participate in the research.

- Yes I want to proceed
- No I do not want to proceed

## Appendix J: IRB Approval

## IRB Approval

Dear Mr. Wallace,

This email is to notify you that the Institutional Review Board (IRB) has approved your application for the study entitled, "The Effect of Confirmation Bias on Criminal Investigative Decision Making."

Your approval # is 09-24-14-0273264. You will need to reference this number in your dissertation and in any future funding or publication submissions. Also attached to this e-mail is the IRB approved consent form. Please note, if this is already in an on-line format, you will need to update that consent document to include the IRB approval number and expiration date.

Your IRB approval expires on September 23, 2015. One month before this expiration date, you will be sent a Continuing Review Form, which must be submitted if you wish to collect data beyond the approval expiration date.

Your IRB approval is contingent upon your adherence to the exact procedures described in the final version of the IRB application document that has been submitted as of this date. This includes maintaining your current status with the university. Your IRB approval is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, your IRB approval is suspended. Absolutely NO participant recruitment or data collection may occur while a student is not actively enrolled.

If you need to make any changes to your research staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 1 week of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB application, you made a commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained at the IRB section of the Walden web site or by emailing [irb@waldenu.edu](mailto:irb@waldenu.edu): <http://researchcenter.waldenu.edu/Application-and-General-Materials.htm>

Researchers are expected to keep detailed records of their research activities (i.e., participant log sheets, completed consent forms, etc.) for the same period of time they retain the original data. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Institutional Review Board.

Both students and faculty are invited to provide feedback on this IRB experience at the link below:

**[http://www.surveymonkey.com/s.aspx?sm=qHBJzkJMUx43pZegKlmdiO\\_3d\\_3d](http://www.surveymonkey.com/s.aspx?sm=qHBJzkJMUx43pZegKlmdiO_3d_3d)**

Sincerely,  
Libby Munson  
Research Ethics Support Specialist  
Office of Research Ethics and Compliance  
Email: [irb@waldenu.edu](mailto:irb@waldenu.edu)  
Fax: [626-605-0472](tel:626-605-0472)  
Phone: [612-312-1341](tel:612-312-1341)  
Office address for Walden University:  
100 Washington Avenue South  
Suite 900  
Minneapolis, MN 55401

Information about the Walden University Institutional Review Board, including instructions for application, may be found at this link: <http://researchcenter.waldenu.edu/Office-of-Research-Ethics-and-Compliance-IRB.htm>

## Appendix K: Demographic Frequencies and Percentages

## Participant Demographic Frequencies and Percentages

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
<b>Duty Assignment</b>				
Recruit	55	33.1	33.1	33.1
Patrol	54	32.5	32.5	65.7
Investigations	57	34.3	34.3	100
<b>Gender</b>				
Male	145	87.3	87.3	87.3
Female	21	12.7	12.7	100
<b>Education</b>				
High School	23	13.9	13.9	13.9
Some College	11	6.6	6.6	20.5
Associated Degree	31	18.7	18.7	39.2
Bachelors Degree	100	60.2	60.2	99.4
Masters Degree	1	.6	.6	100
<b>Marital Composition</b>				
Single	50	30.1	30.1	30.1
Married	55	33.1	30.1	63.3
Divorced	61	36.7	36.7	100
<b>Age</b>				
21-25	37	22.3	22.3	23.3
26-30	27	16.3	16.3	38.6
31-35	21	12.7	12.7	51.2
36-40	25	15.1	15.1	66.3
41-45	25	15.1	15.1	81.3
46-50	24	14.5	14.5	95.8
51-55	6	3.4	3.6	99.4
56-60	1	.6	.6	100
Total	166	100	100	
<b>Rank</b>				
Patrolman	139	83.7	83.7	83.7
Specialist	10	6.0	89.8	89.8
Sergeant	17	10.2	100	100

## Appendix L: Participant's Experiential Characteristics

*Frequencies and Percentages of Categories of Participant's Experiential Characteristics*

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
<b>Length of Service</b>				
0-1	55	33.1	33.1	33.1
2-5	2	1.2	1.2	34.3
6-10	19	11.4	11.4	45.8
11-19	58	34.9	34.9	80.7
20-29	32	19.3	19.3	100
<b>Length of Duty</b>				
0-1	56	33.7	33.7	33.7
1-2	2	1.2	1.2	34.9
2-5	5	3.0	3.0	38.0
6-10	43	25.9	25.9	63.9
11-15	35	21.1	21.1	84.9
16-19	21	12.7	12.7	97.6
20+	7	2.4	2.4	100
<b>Trial</b>				
0	29	29	29	29
1	15	9.0	9.0	38.6
2	10	6.0	6.0	44.6
3	7	4.2	4.2	48.8
4	2	1.2	1.2	50
5	13	7.8	7.8	57.8
6	9	5.4	5.4	63.3
7	0	0	0	63.3
8	16	9.6	9.6	72.9
9	1	.6	.6	73.5
10	44	26.5	26.5	100
<b>Suppression</b>				
0	67	40.4	40.4	40.4
1	21	12.7	12.7	53.0
2	8	10.8	10.8	63.9
3	4	2.4	2.4	66.3
4	7	4.2	4.2	70.5
5	22	13.3	13.3	83.7
6	7	4.2	4.2	88
7	0	0	0	88
8	11	6.6	6.6	94.6
9	0	0	0	94.6

	10	9	5.4	5.4	100
Training Hours					
0-49	10		6.0	6.0	6.0
50-100	41		24.7	24.7	30.7
101-200	16		9.6	9.6	40.4
201-300	6		3.6	3.6	44.0
301-400	0		0	0	44.0
401-500	2		1.2	1.2	45.2
501-750	8		4.8	4.8	50
751-1000	9		5.4	5.4	55.4
1001-2000	33		19.9	19.9	75.3
2001-3000	35		21.1	21.1	96.4
3001-4000	6		3.6	3.6	100
Other Hours					
0-49	10		6.0	6.0	6.0
50-100	41		24.7	24.7	30.7
101-200	16		9.6	9.6	40.4
201-300	6		3.6	3.6	44.0
301-400	0		0	0	44
401-500	2		1.2	1.2	45.2
501-750	8		4.8	4.8	50.0
751-1000	9		5.4	5.4	55.4
1001-2000	33		19.9	19.9	75.3
2001-3000	35		21.2	21.2	96.4
3001-4000	6		3.6	3.6	100

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## Appendix M: Frequencies, Means and Standard Deviations

*Child Sequential Victim Interview Frequency, Means, and Standard Deviations*

		<b>N</b>	<b>M</b>	<b>SD</b>
Recruit	Child	9	9.33	0.50
	Adult	8	9.25	0.71
	Total	17	9.29	3.88
Patrol	Child	9	8.22	1.20
	Adult	9	8.22	1.20
	Total	18	8.22	1.20
Investigator	Child	9	6.56	1.50
	Adult	10	4.20	2.35
	Total	19	5.32	2.87

*Child Reverse Sequential, Victim Interview Frequency, Means, and Standard Deviations*

		<b>N</b>	<b>M</b>	<b>SD</b>
Recruit	Child	10	2.30	1.95
	Adult	10	4.10	0.47
	Total	20	3.20	2.35
Patrol	Child	9	2.56	2.45
	Adult	9	0.44	0.89
	Total	18	1.50	4.20
Investigator	Child	9	1.22	1.64
	Adult	10	0.90	1.59
	Total	19	1.05	1.58