IMPACTS OF EVIDENCE ON DECISION-MAKING IN POLICE INVESTIGATION

Minhwan Jang

UNIVERSITY OF GOTHENBURG

Department of Psychology

Doctoral Dissertation in Psychology
Department of Psychology
University of Gothenburg
May 5 2021

Printed in Sweden by Stema Specialtryck AB

ISSN: 1101-718X Avhandling/Göteborgs universitet, Psykologiska inst.
ISBN: 978-91-8009-378-1(print)
ISBN: 978-91-8009-378-8 (PDF)

E-Published version available at: http://http://hdl.handle.net/2077/68336

ABSTRACT

Jang, M. (2021). *Impacts of Evidence on Decision-making in Police Investigation*. Department of Psychology, University of Gothenburg.

When conducting an investigation, police officers collect evidence from various sources (e.g., humans, objects, areas). The type of evidence (i.e., physical vs. personal) can affect the investigators' beliefs about the suspect and how the evidence can be used. In turn, how the evidence is used during the interrogation can impact the suspect's perception of how much evidence the police hold. To date, no study has systematically examined the extent to which types of collected evidence affect investigative decision-making and suspects' perceptions of evidence. This thesis examined the effects of evidence on the two parties (i.e., police investigators and suspects). In **Study I**, police officers in South Korea ($N = 202$) read four crime reports where one suspect and one piece of critical evidence were given. The critical evidence was manipulated by four different evidence types (DNA, CCTV, fingerprint, and eyewitness evidence). Then, they rated the suspect's culpability and the reliability of the critical evidence. Significant differences were found between the conditions in the predicted directions, such that eyewitness testimony (vs. DNA, CCTV, and fingerprint evidence) significantly decreased officers' ratings of the suspect's culpability and the reliability of critical evidence. Moreover, experienced (vs. inexperienced) officers tended to perceive most types of criminal evidence as less reliable. **Study II** was designed to examine the effects of available evidence on interrogators' selection of specific tactics to use when interrogating a suspect. Police interrogators ($N = 106$) were randomly allocated to one of five homicide scenarios in each of which only one type of critical evidence (DNA, CCTV, fingerprint, eyewitness, or no evidence) identified a suspect. Officers were then asked to imagine what tactics they would use when interrogating a suspect. A list of 27 tactic names and descriptions was given for their selection, which was classified into five types of tactics. No significant differences were observed between the conditions – that is, the evidence type did not affect the type of interrogation tactics chosen. **Study IIIa** was conducted with prisoners ($N = 59$) to examine how suspects' perceptions of the evidence would vary depending on the type of interrogation tactics applied to them. Participants rated their perceived evidence for five interrogation tactic types: (a) Evidential/Substantiated, (b) Evidential/Unsubstantiated, (c) Nonevidential/Crime-Relevant, (d) Nonevidential/Crime-Irrelevant, (e) Context-Manipulation. Prisoners tended to infer that the interrogator held more evidence when the tactics that related to using substantiated (reliable) evidence were employed. **Study IIIb** surveyed laypersons with no prior criminal experience ($N = 117$). The same design, procedure, and materials were adopted. As with prisoners, laypersons' ratings were significantly higher for the tactics with substantiated evidence than for the other four types. Additional group comparisons in evidence perception show that prisoners' ratings fluctuated much more across the 27 individual interrogation tactics than did laypersons' ratings. In summary, the results suggest that evidence appears to be influential with respect to investigators' judgments about the culpability of a suspect before interrogation. Also, some of the interrogation tactics may be more effective than others in affecting the suspect's perception of the evidence; further research is needed into factors associated with diverse police tactics affecting the perception of evidence. The present findings supplement our understanding of the effects of evidence on investigators' and suspects' decision-making in a police investigation.

Keywords: perceptions of evidence, police interrogation tactics, interviewer's perceived knowledge, investigative decision-making, evidence types

Minhwan Jang, Department of Psychology, University of Gothenburg, P.O. Box 500, 405 30 Gothenburg, Sweden| minhwan.jang@psy.gu.se

SWEDISH SUMMARY

Vid brottsutredningar samlar poliser in bevis från flertalet källor (tex. människor, objekt, platser). Bevistyp (fysisk vs. personlig) kan påverka polisutredarens uppfattning om den misstänkte, och sättet på vilken bevisningen används under ett förhör kan påverka den misstänktes uppfattning om hur mycket bevis polisen sitter inne med. Än så länge saknas studier som systematiskt undersöker i vilken utsträckning bevistyp påverkar beslutsfattande under utredningen samt den misstänktes uppfattning av bevisläget. Denna avhandling ämnar undersöka vilken effekt bevistyp har på de två respektive parterna – polisutredare och misstänkt.

Studie I fick Sydkoreanska poliser ($N = 202$) läsa fyra brottsbeskrivningar där en misstänkt, samt ett kritiskt bevis presenterades. Studien var upplagd så att beviset presenterades i fyra olika former – DNA, övervakningsfilm, fingeravtryck och ögonvittne. Efter att ha läst brottsbeskrivningarna fick poliserna skatta den misstänktes skuld samt bevisets styrka. Som förutspått visade studien signifikanta skillnader mellan de olika betingelserna, nämligen att ögonvittnesmål (jämfört med DNA, övervakningsfilm odh fingeravtryck) signifikant minskade polisernas skattning av den misstänktes skuld samt bevisningens styrka. pålitlighet. Vidare visade studien att mer erfarna poliser tenderade att skatta de flesta bevistyper som mindre starka.

Studie II var designad för att testa den tillgängliga bevisningens påverkan på polisutredarens val av förhörstaktik mot den misstänkte. Polisutredare (N =106) blev slumpmässigt tilldelad ett av fem mordfallsscenarier där enbart ett kritiskt bevis (DNA, övervakningsfilm, fingeravtryck, ögonvittne eller inget bevid) identifierade den misstänkte. Poliserna blev uppmanade att föreställa sig vilka förhörstaktiker de skulla använda mot den misstänkte i aktuellt scenarie. En lista med 27 namngivna taktiker samt beskrivningar (klassificerade i fem olika typer av taktiker) presenterades. Inga signifikanta skillnader mellan betingelserna observerades. Det vill säga, typ av bevis påverkade inte vilken förhörstaktik som valdes.

Studie IIIa genomfördes på intagna på ett Sydkoreanskt fängelse ($N = 59$), med syfte att undersöka om misstänktas uppfattning om polisens bevisläge påverkas av den förhörsmetod som används. Deltagarna skattade det uppskattade bevisläget för de fem olika förhörsmetoderna. Studien visade att de intagna tenderade att tolka det som att polisutredaren hade mer bevis enbart när de använde taktiker relaterade till ordentligt underbyggda bevis.

Studie IIIb använde samma design, procedur och material som Studie IIIa, men genomfördes på lekmän utan tidigare kriminell erfarenhet (N = 117). Precis som för de intagna skattade lekmännen att polisen hade mer information när de använde de ordentligt underbyggda bevisen. Däremot visar jämförelserna av de individuella taktikerna mellan de två grupperna, gällande uppfattningen av bevisläget i de fem olika typerna av taktiker och de 27 individuella taktikerna att vissa taktiker skulle kunna påverka den misstänktes uppfattning av bevisläget.

Sammantaget bidrar resultaten i denna avhandling till en ökad förståelse för de effekter som bevistyp kan ha på polisutredares och misstänktas beslutsfattande i en polisutredning. Resultaten föreslår att bevis är en viktig faktor i utredningsbedömningar, och att bedömningen av bevis kan påverkaras av polisutredarens erfarenhet. Vidare visar avhandlingen att vissa förhörstaktiker, specifikt de som baseras på att presentera trovärdig bevisning, kan påverka den misstänktas uppfattning av bevisläget.

ACKNOWLEDGMENTS

> "At times, our own light goes out and is rekindled by a spark from another person. Each of us has cause to think with deep gratitude of those who have lighted the flame within us."
>
> – Albert Schweitzer –

I give my humble gratitude and sincere love to **my parents** who gave me a candle to light… to **myself** who keeps it burning in all the sufferings of life… to **my wife** who holds the candle together by my side… to **my son and daughter** who enlightened me about my parents' love… to **my brothers, sister, friends, and colleagues** who have fueled my light with huge support… to **the Korean National Police Agency** and **the European Commission** who let it glitter… and to **all my supervisors** who have rekindled my empty and dim flame with their knowledge…

PREFACE

This thesis is based on the following three studies, which are referred to by their Roman numerals:

I. Jang, M., Luke, T. J., Granhag, P. A., & Vrij, A. (2020). The impact of evidence type on police investigators' perceptions of suspect culpability and evidence reliability. *Zeitschrift für Psychologie*, *228*, 188–198. https://doi.org/10.1027/2151-2604/a000411

II. Jang, M., Luke, T. J., Granhag, P. A., Vrij, A., & Lee, W. (2020). Impacts of the type of available evidence on police interrogators' selection of tactics. Manuscript.

III. Jang, M., Luke, T. J., Granhag, P. A., Vrij, A., & Kim, M. (2020). How police tactics affect prisoners' and laypersons' perception of evidence. Manuscript.

The studies were funded by a fellowship awarded from the Erasmus Mundus Joint Doctorate Programme: The House of Legal Psychology (EMJD-LP) with Framework Partnership Agreement (FPA) 2013-0036 and Specific Grant Agreement (SGA) 532473-EM-5-2017-1-NL-ERA MUNDUS-EPJD to Minhwan Jang.

Table of Contents

INTRODUCTION **1**
The Thesis 3
Key Terms and Definitions 4
Evidence in Police Investigations 5
Concerns About Convictability and Case Rejection 8
Interrogation Tactics 10
Evidence Use During Interrogation 10
Potential Mechanism: Pragmatic Inference 14
SUMMARY OF EMPIRICAL STUDIES **17**
Overview 17
Study I 20
Study II 24
Study IIIa 28
Study IIIb 30
GENERAL DISCUSSION **33**
Evidence Before Interrogation 33
Evidence During Interrogation 35
Methodological Considerations 40
Limitations and Future Directions 42
Ethical Considerations 43
Conclusions 44
REFERENCES **47**
APPENDIX **63**
APPENDIX I 65
APPENDIX II 77
APPENDIX III 127

INTRODUCTION

In the quest for a successful prosecution and conviction, criminal investigators aim to collect evidence that can prove the facts of a crime and substantiate the suspect's guilt. In the collection process, investigators can encounter evidence of many different types at early stages of an investigation. The type of available evidence varies from personal (e.g., eyewitness testimony) to physical types of evidence (e.g., DNA, CCTV, and fingerprint evidence). Both types of criminal evidence are known to play an essential role in every phase of the criminal justice process (Skolnick & Shaw, 2001) and, of course, during interrogation (Granhag & Hartwig, 2015; Moston & Engelberg, 2011; St-Yves & Meissner, 2014). How investigators perceive each type of evidence can critically influence their subsequent judgments. Given the influential role of investigators in the legal system, understanding how they perceive each type of evidence can be of vital importance for both investigative and societal purposes. The type of evidence that the investigators hold can cause bias to cascade from the initial on-scene judgments to the final court decisions by the trier of fact (Dror, 2018).

However, the literature has paid little attention to how the type of evidence can affect police officers' decisions. Scholars have consistently found that jury-eligible persons generally consider physical evidence to be more probative or reliable when making legal judgments, such as guilty verdicts, and assessing evidence reliability (Hans et al., 2011; Martire et al., 2019; Pearson et al., 2018; Pozzulo et al., 2009; Ribeiro et al., 2019). To what extent do police investigators perceive each type of evidence to be reliable, and do those perceptions affect their investigative decisions? The primary aim of this thesis is to provide empirical knowledge that may help answer these questions.

The police play diverse roles in the criminal justice system, from maintaining public safety to providing testimony in court. Above all, securing criminal evidence is regarded by citizens and legal personnel as the most critical and fundamental role the police play, because it can critically influence criminal cases (Carter & Carter, 2016). In this sense, prosecutors' concerns about convictability can be one of the most influential factors to consider. Investigators are obliged to consult a prosecutor and receive comprehensive supervision regarding the evidence when deciding to detain or charge a suspect before prosecution. For example, the prosecution should supervise investigators regarding already collected evidence to confirm whether it is legally valid for prosecuting a suspect. Prosecutors are greatly concerned with convictability (i.e., the likelihood of a guilty verdict at trial; Frohmann, 1997),

and they can favor particular types of evidence to increase their conviction rates. I therefore argue that police investigators' legal decisions can be influenced by how prosecutors view each type of criminal evidence.

Prosecutors generally consider physical evidence to be more probative than personal evidence in proving guilt (Alderden & Ullman, 2012; O'Neal et al., 2015). For this reason, when police investigators hold only eyewitness testimony, the absence of physical evidence may affect investigators' initial judgments even before filing for a prosecution. For example, an eyewitness statement without additional evidence can make investigators believe that they need stronger or more reliable evidence for prosecution. If the police have already found a suspect, the lack of physical evidence can motivate them to extract new information or a confession directly from the suspect during interrogation, because finding new evidence from other sources (i.e., conducting an additional forensic investigation or looking for other eyewitnesses) is often difficult in real-life investigations (Baldwin & May, 2000). If they elicit a confession from the suspect, the prosecutor will be more likely to file charges. Given that prosecutors generally prefer physical to personal evidence for prosecutorial charging decisions, I believe that prosecutors' concerns about convictability—and thus, evidence type—can exert a significant influence on police investigators' legal decision-making from the stage of evidence collection to the interrogation phase.

In addition, evidence types can also be influential on the side of suspects, affecting their decisions regarding counter-interrogation strategies during interrogation (Brimbal & Luke, 2019). For example, the particular evidence type can increase or decrease the suspect's *perception of the evidence* (i.e., how much evidence the interrogator holds about the suspect), and this perception then affects the suspect's counter-interrogation strategies (i.e., confession or denial; Granhag & Hartwig, 2015). Therefore, guilty suspects are eager to draw inferences as to how much evidence the police hold to avoid looking dishonest, attempting to form a hypothesis about the amount of existing evidence that incriminates them (Hartwig et al., 2007). Research shows that how suspects perceive evidence is the most significant factor shaping their forthcoming strategies (Brimbal & Luke, 2019; Hartwig et al., 2014; Luke et al., 2014; Sellers & Kebbell, 2011) and the outcome of interrogation (Deslauriers-Varin, Lussier, & St-Yves, 2011). For instance, if the police have strong evidence (e.g., DNA evidence), suspects are more likely to be forthcoming (i.e., confess) or less likely to deny the crime by adjusting their behavior to their inference as to the interviewer's knowledge (Luke et al., 2014).

Various types of tactics can be employed by an investigator when interrogating a suspect (e.g., Kelly et al., 2013). Some types of tactics can be effective in making suspects believe that interrogators hold more incriminating evidence against them than the interrogators actually do (Granhag & Hartwig, 2015). In that regard, the type of tactic can be a significant factor influencing suspects. I argue that tactics related to using any or all available evidence or information can increase the interviewer's knowledge as perceived by the suspect (e.g., disclosing evidence gradually and presenting investigation materials to a suspect). I refer to such tactics as *evidential tactics*. In contrast, suspects may perceive that the police do not hold much evidence when *nonevidential tactics* are employed, i.e., tactics focusing on things unrelated to the use of evidence (e.g., seeking common ground). Simply put, when an interrogator focuses on employing more evidential (vs. nonevidential) tactics, the suspect will be more likely to perceive that the interrogator holds more incriminating evidence or knowledge of the crime.

In sum, a substantial body of research on evidence and interrogation tactics has revealed that evidence is one of the critical factors during a police investigation (Deslauriers-Varin, Lussier, & St-Yves, 2011; Granhag & Hartwig, 2015; Moston et al., 1992). Nonetheless, relatively little is known about how available evidence can affect interrogators' and suspects' decision-making during interrogation. My research questions were prompted by this gap in the literature.

The Thesis

This thesis aims to examine the potential effects of evidence type on diverse legal decision-making before and during interrogation. Specifically, I investigate the extent to which the type of evidence (i.e., physical vs. personal) affects police officers' investigative judgments of (a) suspects' estimated likelihood of commission and (b) the reliability of specific incriminating evidence in the pre-interrogation phase (Study I). Next, I examine the effects of evidence types on interrogators' decisions to select certain tactic types when questioning a suspect (Study II). Then, I conduct two additional experiments to examine how people respond to the tactic types (evidential vs. nonevidential) employed by the police. I survey prisoners to assess the degree to which their perceptions of the interviewers' knowledge differ according to the two types of tactics (Study IIIa). Lastly, I conduct a similar study using a lay sample. Also, I test the same hypothesis as tested in Study IIIa (Study IIIb) and compare results between the two groups.

The thesis is organized as follows. First, I present and define the key terms used frequently throughout this work. Second, I present an overview of the literature on the possible effects of evidence type on police investigators, especially their investigative judgments and use of police interrogation tactics. Then, I introduce practical factors that can influence the selection of interrogation tactics depending on the type of available evidence. Next, I turn my attention to the perspectives of suspects. I review previous research findings on how perceptions of evidence may differ by the type of police interrogation tactics. Then, I introduce psychological mechanisms that could potentially underlie suspects' perception of the evidence. Finally, in the conclusion, I summarize the empirical studies and discuss the theoretical and empirical implications of the findings of this thesis.

Key Terms and Definitions

In this paper, I divide evidence into two broad types: *physical* (e.g., forensic evidence) and *personal* (e.g., testimony or witness statements). Physical evidence is defined as follows by the National Research Council (2009): "Physical evidence has distinctive physical characteristics that can be measurable and acquired by various scientific disciplines and can be accepted by the court (see pp. 35–39)." With regard to personal evidence, Gehl and Plecas (2016) have provided a useful definition: "Personal evidence such as eyewitness testimony is evidence originated from any person (e.g., victim, on-scene eyewitness, off-scene acquaintance) who can provide the court with information that assists in the adjudication of the charges being tried."

Another term frequently used in this thesis is *interrogation tactic*. This term refers to the tactic employed during interrogation by police interrogators to elicit a confession or reliable information from a suspect by exerting evidential, social, psychological, or environmental influences on the suspect (e.g., Kelly et al., 2013). The literature uses other terms, such as technique, style, approach, or strategy, to refer to what I call interrogation tactics. To avoid confusion, I use "interrogation tactic" as a consistent label when describing police interrogators' attempts to influence a suspect.

Furthermore, the term *perception of evidence* refers to a person's inference as to how much incriminating evidence, information, or knowledge a police interrogator may hold about the suspect and/or the crime (Granhag & Hartwig, 2015). Alternatively, I use *inference of interviewer's knowledge*, *interviewer's perceived knowledge*, or *suspects' perceived evidence* interchangeably.

Lastly, the term *evidential* refers to the use of evidence. Here, evidence encompasses any information, knowledge, or evidence used by the police to gather information or draw a confession from the suspect. In particular, I use this notion in studies II, IIIa, and IIIb to refer specifically to the two types (i.e., evidential vs. nonevidential) that I use to categorize police interrogation tactics by their evidential characteristics. Evidential tactics are related to diverse aspects of using or presenting any available evidence to the suspect. Nonevidential tactics are not associated with any use of the evidence but instead focus on the nonevidential elements of police interrogation (e.g., employing active listening skills and offering incentives).

Evidence in Police Investigations

Criminal evidence plays a decisive role in police investigations and for the administration of criminal justice (Dror, 2018). With little or unreliable criminal evidence, investigators and other decision-makers (e.g., defendants, prosecutors, jurors, and even judges) in the legal system can be even more susceptible to making wrong legal decisions because humans are susceptible to diverse cognitive error factors (e.g., confirmation bias, guilt-presumptive bias, and tunnel vision; Ask & Granhag, 2007; Ask et al., 2008; Kassin et al., 2003). Gehl and Plecas (2016) provided a good illustration of the role of evidence in investigations: "Evidence forms the building blocks of the investigative process and for the final product to be built properly, evidence must be recognized, collected, documented, protected, validated, analyzed, disclosed, and presented in a manner which is acceptable to the court" (p. 33). As described, criminal evidence is indispensable in every phase of police investigations and can significantly influence police investigators' varied decision-making considerations, such as guilt-presumption (Kassin et al., 2003) and interviewing styles (Häkkänen et al., 2009; Leo, 1996; Sellers & Kebbell, 2011). When police investigators make wrong decisions with respect to the evidence that they hold, these can be the source of error, causing bias to snowball to forensic experts or even prosecutors, eventually leading to injustice (a psychological phenomenon that bias can grow in strength and momentum as different elements of an investigation affect one another; Dror et al., 2017; see also Dror, 2018). It is therefore reasonable to suppose that examining how investigators interact with various types of criminal evidence would be important for practitioners, scholars, and the public.

Impacts of Evidence on Decision-making

Much research has suggested that both physical and personal types of evidence influence the outcome of criminal cases and various legal decision-

making (Martire et al., 2019; Wells & Olson, 2003). In particular, physical evidence such as DNA is accepted as the most decisive and critical evidence by courts because recent developments in forensic science have made enormous contributions to newly advanced technologies for identifying perpetrators and proving their guilt (Dror, 2015). Hence, individuals do not equally give the same probative weight to all types of evidence, such that physical evidence has a more powerful influence on people's legal decisions than does personal evidence (Appleby & Kassin, 2016; Pearson et al., 2018; Peterson et al., 2013). More specifically, DNA evidence is significantly more influential as either incriminating or exonerating evidence than are eyewitness statements on legal decision-making (Maeder et al., 2017). Moreover, DNA evidence is perceived as more reliable and important by jury-eligible people in verdict decisions (Golding et al., 2000; Liebermann et al., 2008). This phenomenon is also prevalent when prosecutors make their prosecutorial decisions (Alderden & Ullman, 2012; Alderden et al., 2018; O'Neal et al., 2015).

Prior to the millennium, many researchers showed substantial interest in personal evidence, especially eyewitness testimony. Psychologists have voiced concerns about the accuracy of eyewitness evidence stemming from various psychological factors: for example, perceptual and memory errors, weapon focus effect, confirming feedback, prior information, and unconscious transference (Bradfield et al., 2002; Sarwar et al., 2014; Wells & Olson, 2003). Also, Saks and Koehler (2005) suggested that erroneous eyewitness statements (in 71% of 86 cases) were the most common factor contributing to wrongful convictions, followed by forensic science testing errors (63%). However, it is undeniable that eyewitness testimony has influenced various legal decisions, affecting the rates of conviction by mock jurors (Loftus, 1974; Skolnick & Shaw, 2001) and predicting high conviction rates (Feeney et al., 1983). Also, eyewitness testimony can be the only evidence available for identifying perpetrators and can be more critical in helping police investigators solve crimes than we expect (Wells & Olson, 2003). The Korean National Police Agency (KNPA; 2019) reported that eyewitness statements were one of the most available investigative leads for all crime types in 2018 and that physical evidence was not as available as personal evidence. Although typically regarded as unreliable, personal evidence (i.e., eyewitness testimony) can be as impactful as DNA and CCTV evidence on investigators' decision-making because it is easily accessible by the police in real-life situations.

Evidence and Human Errors

Many scientists argue that we should be more cautious when making legal judgments based on physical evidence (Dror, 2020). Physical evidence is

known to have diverse flaws stemming not only from its inherent scientific foundation but also from the human operators who handle it (National Research Council, 2009). Saks and Koehler (2005) reported that forensic science testing errors (63%) were among the most important factors contributing to wrongful convictions. Forensic experts are exposed to excessive contextual information provided by the police and prosecution when interpreting physical evidence, leading to human errors (Dror, 2018). Moreover, laboratories have independent interpretation guidelines, and these organizational guidelines affect the interpretation of complex DNA mixtures (Alexander, 2014; Dror & Hampikian, 2011). Procedural and operational misconduct can therefore occur in all phases, during the collection, assessment, and interpretation of physical evidence (e.g., Kaplan et al., 2020; Rebeiro et al., 2019). In addition, human errors can bias people's judgments even regarding CCTV evidence (e.g., overestimation, discrimination, and lack of awareness of actual accuracy; Granot et al., 2018). However, people tend to overestimate the reliabilities of some forensic technologies and underestimate their error rates (Martire et al., 2019).

I am concerned that we know relatively little about how physical or personal evidence can influence police officers' investigative decisions. For example, prejudiced judgments of evidence can lead the police in the wrong direction in an investigation. Suppose a piece of DNA evidence was found by a crime scene investigator (CSI). This evidence could demotivate the CSI team during the follow-up collection process, for example, causing them to pay insufficient attention to the rest of the crime scene. This can happen because the investigators may believe that the DNA evidence is already strong enough for prosecuting the case (Leo, 1996; Sellers & Kebbell, 2011). Also, criminal detectives who hear information about the DNA found by their colleagues can be influenced, such that they perceive the suspect as more culpable, prepare less for reading the case details, and employ more direct and guilt-presumptive tactics (Häkkänen et al., 2009; Leo, 1996; Soukara et al., 2002). In addition, investigators are more asymmetrically skeptical towards evidence that is disconfirming (vs. confirming) toward their investigative judgments, and holding personal evidence (i.e., eyewitness testimony) makes them especially prone to this bias (Ask & Granhag, 2007; Ask et al., 2008, 2011; Marksteiner et al., 2011). For instance, when investigators hold eyewitness evidence consistent with their initial belief about the case or the suspect, they may believe that the eyewitness evidence is more reliable than it, in fact, is. Innocent suspects may therefore encounter a disadvantageous situation when the investigator holds eyewitness statements as incriminating evidence. Consequently, the police's misjudgment of evidence—as consistently witnessed in wrongful convictions—eventually has a ripple effect on

prosecutors, judges, and even jurors (The National Registry of Exonerations, 2020).

Given the above, I argue that examining how police investigators perceive each type of criminal evidence at the stage of collecting evidence is important because we know little about how they assess evidence in different forms. In addition, their perceptions of specific evidence types may affect investigators' decision-making when choosing tactics for suspect interrogation. To my best knowledge, previous research on evidence perception has focused mostly on laypersons, with few studies systematically examining the potential effects of evidence types on police interrogators. In Study I, I accordingly seek new insights into the unknown effects of available evidence on police investigators' investigative judgments toward suspects and evidence types. In the section that follows, I present practical factors that may affect police investigators' decision-making.

Concerns About Convictability and Case Rejection

Alderden et al. (2018) conducted semi-structured interviews with assistant attorneys in an urban district attorney's office in the United States, asking the attorneys about their perceptions of criminal evidence. In the interviews, the majority of the attorneys highlighted the importance of the presence of DNA for their prosecutorial decision-making, because jurors expect to see such evidence even when DNA evidence should not matter for their decisions (Alderden et al., 2018). As prosecutors need to be concerned about whether a prosecution will successfully result in a conviction, they pay considerable attention when evaluating police-charged cases. Unless they are confident that the police hold strong evidence for a guilty verdict, they will not accept a case. To be more specific, the prosecution seeks to maintain a high prosecution rate of criminal cases, so prosecutors accept only cases that they perceive to be convictable (Frohmann, 1991).

I therefore argue that concerns about convictability can be a significant factor that affects officers' decision-making throughout the process of a police investigation. In this thesis, my main interests lie with the phases before and during interrogation. O'Neal et al. (2015) reported that prosecutors tended to reject cases when the police did not collect any physical evidence or when the available evidence in question was not sufficient to prove guilt. The strength of evidence plays a pivotal role in prosecuting a case (Alderden & Ullman, 2012). In turn, police investigators can be highly goal-oriented to keep their cases from being rejected. The goal may motivate them to maintain a certain amount of incriminating evidence before and during interrogation. For

instance, when the police find DNA evidence at a crime scene before interrogation, their belief that the DNA evidence is sufficient for prosecution may demotivate them from drawing out new critical information during interrogation, because prosecutors believe that jurors tend to render a guilty verdict when the police secure physical evidence, which they perceive to be highly probative (Alderden et al., 2018). Investigators would therefore focus on proving the suspect's guilt rather than on substantiating more evidence. On the other hand, when no evidence is found before interrogation, police investigators may attempt to relieve their concern about case rejection by eliciting new information or a confession from suspects.

It is probable that prosecutors' concerns about convictability may affect police officers' investigative decisions before and during interrogation. At the pre-interrogation stage, investigators will strive to collect as much physical evidence as possible. When they hold DNA evidence before interrogation, investigators' decisions can be influenced by different factors. They may believe that the suspect committed the crime, or that the evidence they hold is highly reliable for the prosecution. These perceptions may affect the investigators' decision to use specific types of interrogation tactics. Alison et al. (2008) found that police interrogators with higher discomfort of ambiguity were likely to employ significantly more tactics of all the types of tactics they knew, including even coercive and emotional tactics, than those with lower discomfort of ambiguity. Häkkänen et al. (2009) also suggested that Finnish police investigators with high discomfort of ambiguity (when holding personal evidence) were less hesitant to employ both humane and dominant types of tactics to a suspect in comparison with those with low discomfort of ambiguity (when holding physical evidence). To alleviate uncertainty, interrogators prefer to use more specific (vs. open-ended) questions to witnesses who provide ambiguous statements (Wright & Powell, 2006). Therefore, the type of available evidence can influence investigators' concerns about case rejection, and this can affect interrogators' motivation to use certain types of tactics. More will be elaborated on this in the following sections.

Given the legal relationship between the police and the prosecution and the role of criminal evidence in investigations, the type of available evidence may significantly affect police interrogators' decision-making in investigative phases. In the next section, I will review previous studies of police interrogation tactics and evidence use in interrogations. Then, I will discuss the potential effects of evidence on interrogation decision-making.

Interrogation Tactics

Police and law enforcement officers use a variety of interrogation tactics to exert social or psychological influence on suspects. Occasionally, interrogation tactics can be the only method the interrogators have to solve a case. Although interrogation tactics are crucial in police investigations, it is also true that miscarriages of justice can occur when interrogators use unethical or problematic tactics. DNA has exonerated thousands of wrongfully convicted people in the USA, resulting mainly from coercive interrogation tactics, and 12–28% of these people confessed to crimes that they had never committed (Innocence Project, 2020; The National Registry of Exonerations, 2020). Nonetheless, interrogators still strive to draw confessions from suspects because confession evidence is so compelling in the courtroom that most people regard it as the ultimate form of evidence (Kassin & Neumann, 1997; Leo & Davis, 2010).

I argue that previous researchers have paid insufficient attention to the possible effects of evidence on interrogators' use of tactics. As highlighted earlier, interrogators need to present evidence to suspects, so how suspects perceive evidence is one of the most influential factors affecting the outcome of an interrogation. Furthermore, the type of tactics employed can also affect suspects' perceptions of the evidence and their counter-interrogation strategies. Although a substantial body of the research on investigative interviewing and deception detection has focused mostly on examining the effectiveness of various interrogation tactics (Luke et al., 2018), no research has examined the potential effects of available evidence types on police investigators' diverse decision-making before interrogation (e.g., suspect's guilt and evidence reliability) or during interrogation (e.g., selection of interrogation tactics).

Evidence Use During Interrogation

Scholars have highlighted how criminal evidence affects investigators' use of particular tactics as well as suspects' use of counter-interrogation tactics (Granhag & Hartwig, 2015; Häkkänen et al., 2009; Soukara et al., 2002; Walsh & Bull, 2015; see also Luke et al., 2017). A host of factors can have a bearing on suspects' decisions to choose particular counter-interrogation strategies (e.g., denial, confession), and the strongest predictor of a confession is the suspects' perceptions of the evidence held by the police (Deslauriers-Varin, Lussier, & St-Yves, 2011; Granhag & Hartwig, 2015; Moston et al., 1992). Also, police interrogators' strategic disclosure of evidence can impact suspects' perceptions of the evidence and their behavior

(Bull, 2014; Dando & Bull, 2011; Dando et al., 2015; Hartwig et al., 2014). However, previous research on the use of evidence during interrogations has focused mostly on the suspects' perceptions of the evidence. Less research has explored how evidence influences police investigators before interrogation and how their perceptions of the evidence can affect their decision-making during interrogation.

Interrogators can encounter multiple types of criminal evidence before interviewing a suspect. In most cases, they collect some evidence or information prior to an interrogation (Häkkänen et al., 2009; Leo, 1996; Moston et al., 1992). Given that police investigators are concerned about case rejection, the type of available evidence can affect their selection of interrogation tactics (Häkkänen et al., 2009; Soukara et al., 2002). To be more specific, when they hold DNA evidence, investigators may become more confident and less worried that their case will be rejected. Their confidence in the DNA evidence can then lead them to think that eliciting more information is unnecessary (Leo, 1996; Sellers & Kebbell, 2011). Therefore, less time and energy may be invested in employing more tactics during interrogation, and investigators may be demotivated from preparing for interrogation. For example, they may study less about the details of the case (Soukara et al., 2002) or present all the available evidence to the suspect at the beginning of the interrogation (Leo, 1996), thereby adopting fewer interrogation tactics and tactic types (Leo, 1996; Moston et al., 1992; Sellers & Kebbell, 2011). Moreover, holding more reliable evidence could lead investigators to presume guilt even before interrogation and to ask direct questions of the suspect, such as guilt-presumptive or leading questions (Baldwin, 1993; Soukara et al., 2002; Walsh et al., 2016).

The opposite can also occur. When interrogators believe that the evidence is not reliable enough to secure a prosecution, they may be more concerned about case rejection. To decrease the likelihood of case rejection by the prosecution, they will be motivated to obtain more information or a confession from the suspect. They may then employ any available interrogation tactics even though these tactics may conflict with one another (e.g., humane vs. dominant types of tactics; Alison et al., 2008; Häkkänen et al., 2009; Leo, 1996). Furthermore, it was found that the number of tactics used more than doubled when investigators had weak evidence regarding the suspect (Leo, 1996). Interrogators can employ deceptive tactics by pretending to have incriminating evidence (bluffing), asking about hypothetical evidence that does not exist (baiting), showing case materials from similar cases, or connecting the crime with a prior criminal history. Also, police interrogators may use unsubstantiated or unreliable evidence to draw a confession (Kassin et al., 2007; Leo, 1996; see also Miller et al., 2018). For instance, investigators

in some countries tend to rely on polygraph tests when they do not have any decisive evidence (Gudjonsson, 2003; Johnson & Drucker, 2009).

Moreover, interrogators can rely on completely different tactics when presenting unreliable evidence. Rather than adopting questionable tactics, interrogators can use some tactics that are completely irrelevant to crime details or their available evidence. International surveys of practitioners have reported that interrogators prefer to use nonevidential and crime-irrelevant tactics (Miller et al., 2018; Redlich et al., 2014; Sivasubramaniam & Goodman-Delahunty, 2019). For instance, interrogators can ask suspects about what they need, find something in common, or listen actively to what the suspect says (Miller et al., 2018; see also Wachi et al., 2014). They can avoid stressing suspects while talking about crime-relevant topics and can also shift easily between topics (Moston & Engelberg, 1993). It was reported that interrogators lacking any proof of guilt would use open questions to gather information rather than to overtly accuse the suspect (Moston et al., 1992). For example, when the evidence is weak or absent, interrogators can attempt to ask suspects about their basic needs in police custody, find something in common with them, or listen actively to what the suspects say to elicit information (Bull, 2013, 2019; Bull & Baker, 2020; Redlich et al., 2014; Wachi et al., 2014).

In light of the above, it is possible that the type of evidence available before interrogation can affect interrogators' selection of tactics. Study II examines the effect of evidence in the interrogation stage. In the following section, I introduce one of the crucial notions in this thesis, namely, suspects' perceptions of evidence. Also, I look into the potential mechanisms proposed in the literature that may underlie the suspects' perception of evidence.

Impacts of Evidence on Suspects

Irrespective of whether suspects are guilty or innocent, they need to go through more or less elaborate decision-making processes both before and during interrogation (e.g., decisions to confess or remain silent; St-Yves & Deslauriers-Varin, 2009). For instance, suspects can change their initial decision not to confess during interrogation (Deslauriers-Varin, Beauregard, & Wong, 2011). Whether or not to confess is a complex decision, because a variety of factors can influence it (Granhag & Hartwig, 2015; Houston et al., 2014; Meissner et al., 2012; St-Yves & Deslauriers-Varin, 2009). Nonetheless, much research has shown that suspects' perceptions of the evidence have a significant impact on the confession (Cassell & Hayman, 1996; Gudjonsson, 2007; Moston & Engelberg, 2011; Sellers & Kebbell, 2009), suspects' initial decision to confess (Deslauriers-Varin, Lussier, & St-Yves, 2011), and the selection of counter-interrogation strategies (Brimbal & Luke, 2019; Hartwig

et al., 2014; Luke et al., 2014; Srivatsav et al., 2020). Moston et al. (1992) reported that when suspects perceived the incriminating evidence as strong, they would admit their crime (66.7%), while a few suspects would make an admission (9.9%) when the evidence seemed weak. Recently, Brimbal and Luke (2019) also provided empirical support: When the interviewer presented more reliable evidence (e.g., CCTV evidence), suspects were more likely to adopt counter-interrogation strategies that were more consistent with the evidence (e.g., disclosing information) than when less reliable (e.g., eyewitness testimony) or no evidence was presented. The empirical findings have consistently suggested that understanding the relationship between interrogators' use of available evidence and suspects' perceptions of the evidence is of utmost importance.

Differences Between Guilty and Innocent Suspects

Guilty and innocent suspects have at least one thing in common: a desire to avoid being perceived as guilty and to convince the interrogator that they are honest. However, they differ in one essential thing: crime-relevant knowledge (for a review, see Granhag & Hartwig, 2008). Guilty suspects have exclusive information about the crime (e.g., how the victim was met or where the weapon was buried). Crime-related information can be an aversive stimulus for guilty suspects, which can incriminate them (Granhag & Hartwig, 2015). They accordingly attempt to avoid the aversive situation by inferring how much incriminating evidence or knowledge the police hold about them and the crime. Making an accurate assessment can ease the uncertainty about whether the interrogator possesses critical information, and suspects can be successful in choosing their strategic decision-making (e.g., avoid or escape strategy; for a review, see Granhag & Hartwig, 2015).

When guilty suspects overestimate or underestimate the amount of the interrogator's knowledge, they may fail to appear credible to the interrogator (Granhag & Hartwig, 2008, 2015). Guilty suspects need to maintain a balance between concealing and disclosing the truth to appear honest. Overestimation of the interrogator's evidence can make them provide self-incriminating information. However, suspects who underestimate the evidence can make themselves appear dishonest by hiding information that the interrogator already knows (e.g., being vague about or denying their presence at the crime scene). This failure can then lead to a potential conviction. That is, when a guilty suspect can minimize the discrepancy between the exact amount of evidence held by the interrogator and the suspect's perception of that evidence, the suspect can make more flexible adaptations in order to control ensuing behaviors (e.g., counter-strategies; Granhag & Hartwig, 2008). As such, their

ensuing strategies (e.g., confession or denial) can be significantly contingent on the accurate perception of the actual evidence held by the police.

Potential Mechanism: Pragmatic Inference

Pragmatic inference or implication may explain the suspect's evidence perception as an underlying mechanism (for a review, see Harris & Monaco, 1978; see also Luke & Alceste, 2020). Oral communication is the most important method for exchanging thoughts, by sending linguistic signals (i.e., utterances) to one another (Sperber & Wilson, 1987). People make pragmatic inferences when the speaker's utterances suggest other information that is not directly asserted or logically implied (Harris & Monaco, 1978). Frederiksen (1975) explained pragmatic inferences as follows: "A listener or reader attempts to infer the knowledge structure of a speaker or writer by using the available linguistic message, contextual information, and his own knowledge store as 'data structures' from which the inference is to be made" (p. 371). Pragmatic inferences occur in everyday life when people communicate with each other. For example, person A states, "the karate champion hit the cement block," and this sentence can then pragmatically imply to person B that the karate champion broke the cement block (Harris & Monaco, 1978, p. 3). Although person A did not say that the block was broken, the one who heard that the karate champion hit the block inferred that this was the case.

Research has demonstrated that pragmatic inferences occur in an interrogation context (Horgan et al., 2012; Kassin & McNall, 1991; Luke & Alceste, 2020). Recently, Luke and Alceste (2020) demonstrated that some tactics (e.g., saying that the suspect is not an immoral person) lead people to draw a specific inference (i.e., that the suspect will receive a more lenient sentence). Srivatsav et al. (2020) provided support that questioning a suspect about a specific topic can lead the suspect to perceive the interviewer to hold more evidence than is actually the case.

Drawing from this understanding of pragmatic inferences, I argue that some types of interrogation tactics imply the existence of more evidence than do other types of tactics. For example, research has shown that disclosing evidence late (Hartwig et al., 2014), disclosing evidence incrementally (Granhag et al., 2013), the type of evidence (Brimbal & Luke, 2019), and the content of investigative questions (Srivatsav et al., 2020) affect suspects' perceptions of the evidence. During interrogation, interrogators are known to employ a wide range of tactics to obtain new and relevant evidence from

suspects (Kelly et al., 2013), who can interpret the employed tactics to infer the available evidence.

Luke et al. (2014) suggested that mock guilty suspects who had been provided with information about the possibility of incriminating evidence were more likely to employ a forthcoming strategy and to remain consistent with the evidence in their answers than were innocent suspects. The awareness of possible evidence can induce guilty suspects to adapt to their perception of the evidence, because guilty suspects are sensitive to the threat of existing evidence. I therefore hypothesize that when an interrogator employs more tactics that are related to evidence use (i.e., evidential-types of tactics) than tactics not related to evidence use (i.e., nonevidential-types of tactics), the awareness of possible existing evidence may make the guilty suspects believe that the interrogator holds incriminating evidence.

Previous studies have tested the effects on perceptions of evidence of a limited number of interrogation tactics, especially those involving how and when to use the evidence (Granhag et al., 2013; Hartwig et al., 2014; Sorochinski et al., 2013). However, we know little about the dynamics between interrogators' tactics and suspects' perceptions of evidence. Study IIIa is designed to examine the extent to which suspects' inferences about the evidence can vary depending on the type of interrogation tactics used with them. In Study IIIb, I further explore the variations of tactic types by comparing the suspects with laypersons who have had no experience of police interrogation.

SUMMARY OF EMPIRICAL STUDIES

Overview

A substantial body of research examining the effects of evidence types has focused on laypersons' legal decision-making (e.g., guilty verdict, confidence, evidence reliability) in the courtroom. Laypersons can serve on a jury in a trial, and their decisions can have a significant impact on the outcome of criminal cases. However, few studies have paid attention to how police investigators perceive each type of criminal evidence, or to how their perceptions may affect their decision-making in the initial phases of a police investigation. Police investigators collect evidence and interrogate suspects. The success of police investigations can depend on how investigators judge the evidence or information. Their investigative judgments can affect people's decisions throughout the legal proceeding by initiating a snowball effect (Dror, 2018). Much research suggests that both laypeople and practitioners believe that physical evidence is more reliable than personal evidence (Martire et al., 2019). However, much less is known about the extent to which the available evidence can impact police investigators' perceptions and decisions before and during interrogation. Moreover, how investigators use evidence can affect suspects' perceptions of the evidence and their counter-interrogation strategies (Brimbal & Luke, 2019; Luke et al., 2014).

In this thesis, I am interested in the effects of evidence types on both interrogators and suspects during interrogation. The thesis sets out to gain a better understanding of the effects on investigators and suspects in different investigation phases. The basic assumption is that evidence significantly affects the two parties' decision-making. The thesis's primary aim is to examine the degree to which different types of evidence affect both police investigators and suspects in a criminal investigation.

Specifically, in Study I, I aimed to examine the effect of the type of evidence on investigators' perceptions of (a) suspects' likelihood of commission and (b) the reliabilities of four different evidence types (i.e., DNA, CCTV, fingerprint, and eyewitness evidence). It was predicted that the type of evidence would influence the investigators' perceptions. I created investigation scenarios based on the investigation reports used by the KNPA. The scenarios included a piece of critical evidence leading to the identity of a suspect. I manipulated the critical evidence using the four types of incriminating evidence. The scenarios provided officer participants with precisely the same information except for the critical evidence. In the online experiment set-up, officers were instructed to read four different evidence

scenarios and rate their perceptions of culpability and of the reliability of the evidence. In Study II, I examined the effects of five types of available evidence on investigators' selection of interrogation tactics using the same scenarios. I hypothesized that the type of evidence available before interrogation would affect officers' decision-making during interrogation, namely, that holding a particular type of evidence would affect investigators' decision to choose certain types of tactics when interrogating a suspect. Studies IIIa and IIIb were conducted to shift the focus to the perspective of the suspect during interrogation. In Study IIIa, the aim was to examine the extent to which prison inmates and real suspects in police custody perceived the available evidence when interrogators employed tactics of two types based on whether the tactics were related to presenting evidence to a suspect during a simulated interrogation situation. The prediction was that tactics related to evidence use would significantly increase participants' ratings of the perceived evidence. I conducted the same experiment in Study IIIb with a sample of laypersons who had experienced no prior criminal investigations. I compared the ratings of the perceived evidence between the two groups by tactic type. Table 1 provides an overview of the four empirical studies that constitute this thesis.

Table 1. *Overview of the Empirical Studies Constituting the Thesis*

Study	Method	*N*	Independent Variables	Dependent Variables
I	Online	202	4 (Evidence Type: DNA, CCTV, Fingerprint, Eyewitness)	1. Suspect's likelihood of commission, 2. Evidence reliability
II	Laboratory	106	5 (Evidence Type: DNA, CCTV, Fingerprint, Eyewitness, No Evidence) × 5 (Tactic Type: Evidential/Substantiated, Evidential/Unsubstantiated, Nonevidential/Crime-Relevant, Nonevidential/Crime-Irrelevant, Context-Manipulation)	The Proportion of Selected Tactics in Five Types
IIIa	Laboratory	59	2 (Tactic Type: Evidential, Nonevidential)	Perception of Evidence
IIIb	Online	117	2 (Tactic Type: Evidential, Nonevidential)	Perception of Evidence

Study I

In Study I, we used a repeated measures design with one independent variable (evidence type: DNA, CCTV, fingerprints, and eyewitness). The study aimed to investigate whether the type of collected evidence would affect police investigators' (a) judgment of a suspect's likelihood of commission and (b) perception of reliability of critical evidence that led to the identity of the suspect. We asked officers to read four police report scenarios and to imagine that they were engaged in actual investigations. After reading each police report, they provided ratings of the suspect's culpability and the reliability of critical evidence. We hypothesized that the type of evidence would influence the officers' ratings: If an eyewitness statement (vs. DNA, CCTV, and fingerprint) was provided as the critical evidence, participants would be less likely to think that the suspect committed the crime (Hypothesis 1). Also, we predicted that when the critical evidence was an eyewitness statement, participants' ratings of the reliability of the evidence would be significantly lower in comparison with DNA, CCTV, and fingerprint evidence (Hypothesis 2). Next, we predicted that participants' rating of the suspect's estimated likelihood of commission would increase when they perceived critical evidence as reliable (Hypothesis 3). We hypothesized that participants' investigative experience would predict their reliability perceptions, such that as participants' experience increased (as measured by the number of years of investigative work), their ratings would decrease for both the reliability of all the evidence given (Hypothesis 4) and the reliability of 11 types of evidence in general (Hypothesis 5).

Method

Participants

We used snowball sampling (i.e., participants who completed the survey were encouraged to distribute the link to their colleagues). We obtained a sample of $N = 202$ South Korean police officers between the ages of 23 and 57 ($M = 40.54$, $SD = 7.41$, Median = 40). The sample consisted of assistant inspectors (32.18%), inspectors (29.21%), senior police officers (22.77%), senior inspectors (7.92%), police officers (6.93%), and superintendents (0.99%). The officers had spent an average of 13.59 years ($SD = 7.61$) in the police and 10.72 years ($SD = 6.99$) as criminal investigators. In addition, they had been involved in an average of 783.92 criminal investigations ($SD = 630.47$).

Procedure

We administered the survey using the online survey software Qualtrics (https://www.qualtrics.com) and circulated an anonymous link via a police administrative intranet system (POL-net), social network services, and individual contacts. Officers read four sets of a mock police report on four crime types (homicide, robbery, burglary, and fraud). Every report scenario consisted of two pages. The first page contained information about how the crime occurred and that the police had started an investigation. The second page described how the police identified a suspect on the following day using (a) a piece of critical evidence that did not decisively indicate the suspect's guilt but led to the identification of the suspect and (b) several pieces of noncritical evidence. The noncritical evidence included information that would result from basic investigative procedures, such as crime scene investigation, autopsy, and/or gathering eyewitness statements. This information was included to increase the realism of the reports and to disguise the importance of the manipulation. Unlike the critical evidence, the noncritical evidence only established that a crime had occurred but did not provide information that could directly identify the perpetrator. We manipulated the critical evidence by introducing the four different types of evidence (i.e., DNA, CCTV, fingerprint, and eyewitness evidence – the independent variable). Each time after reading a report, officers reported their estimate of the suspect's likelihood of commission on a 100-point scale (0 = *not at all likely* and 100 = *extremely likely*) and the reliability of the critical and noncritical evidence on a 10-point scale (1 = *not at all reliable* and 10 = *absolutely reliable*). All participants responded to the instructional attention check after the second report and provided their demographic information.

Results and Discussion

Hypothesis 1

We fit a linear mixed-effects model predicting participants' estimates of the suspect's likelihood of commission. The model included a fixed effect for evidence type (DNA, CCTV, fingerprint, and eyewitness evidence) and random intercepts for participants and crime type (total N = 808 valid observations). There was a significant effect of evidence type. Participants tended to think that the suspect was less culpable when an eyewitness statement (B = 60.96, SE = 4.06; the reference group) was given as the critical evidence than when DNA (B = 10.64, SE = 1.16), CCTV (B = 12.55, SE = 1.16), or fingerprint (B = 8.81, SE = 1.16) evidence was given. The data supported Hypothesis 1 (for descriptive statistics, see Table 3 in Manuscript I).

Hypothesis 2

Each participant provided four measures of reliability ratings for the critical evidence in four police reports. The model included a fixed effect for evidence type and random intercepts for participants and crime type (total N = 808 valid observations). We found a main effect of evidence type on the perceived reliability of critical evidence, such that participants reported that the eyewitness evidence (B = 6.15, SE = 0.27; the reference group) was significantly less reliable than was DNA (B = 2.27, SE = 0.11), CCTV (B = 1.96, SE = 0.11), or fingerprint (B = 1.52, SE = 0.11) evidence. The results supported Hypothesis 2.

Hypothesis 3

We used the dataset including all the ratings for both critical and noncritical evidence, and each participant provided 17 measures in four police reports. The model consisted of one fixed effect for the reliability of critical and noncritical evidence and random intercepts for participants, evidence type, and crime type (total N = 3,418 valid observations). The results indicate that there was a main effect of the perceived reliability of the evidence on the estimated likelihood of commission, such that participants' estimated likelihood of commission ratings increased (B = 63.42, SE = 4.07) when their reliability ratings went up (B = 0.86, SE = 0.11). The analysis supported Hypothesis 3.

Hypothesis 4

The dataset including all the ratings for both critical and noncritical evidence was used; each participant provided 17 measures in four police reports (total N = 3,418 valid observations). The model comprised one fixed effect for investigative experience and random intercepts for participants, information type, and crime type. The results show that the main effect of the number of years of investigative experience was present such that participants' reliability ratings for critical and noncritical evidence significantly decreased (B = 6.76, SE = 0.44) as their experience increased (B = -0.03, SE = 0.01).

Hypothesis 5

We used the dataset including all the reliability ratings for 11 evidence types; each participant provided 11 measures (total N = 2,222 valid observations). This model consisted of one fixed effect for investigative experience and random intercepts for participants and evidence type. The results show that the main effect of the number of years of investigative experience was present, such that participants' reliability ratings for 11 physical and personal evidence significantly decreased (B = 7.86, SE = 0.36) as their experience increased (B = -0.04, SE = 0.01). The data supported Hypothesis 5.

Participants' ratings of the suspect's estimated likelihood of commission were significantly lower with the eyewitness evidence than with the three physical types of evidence (Hypothesis 1). These effects occurred even though the evidence implied essentially the same facts in the case regardless of whether it came from a witness, CCTV, fingerprints, or DNA. This effect appears to be attributable to the type of evidence, not the pattern of facts implied by the evidence. Also, we found that officers tended to perceive the critical evidence to be significantly less reliable when it was presented as eyewitness testimony compared with the three physical evidence types (Hypothesis 2). Investigators' evidence reliability judgments predicted their judgments of the suspect's culpability (Hypothesis 3). Lastly, our findings suggest that when investigators had more experience, they tended to perceive most types of both collected evidence and evidence in general to be less reliable (Hypotheses 4 and 5). Thus, the degree to which officers are experienced may influence their perceptions of the evidence and of investigative decision-making.

Study II

In Study II, we used a mixed design. This study primarily aimed to examine how evidence types could affect police interrogators' choice of tactics in a simulated homicide scenario. We measured five types of interrogation tactics selected by officer participants. South Korean interrogator participants were randomly allocated to one of five homicide scenarios in each of which only one type of critical evidence (i.e., DNA, CCTV, fingerprint, eyewitness, or no evidence) identified a suspect (between-subject factor). After reading the fictitious crime reports, participants were asked to imagine what tactic they would choose to use against the suspect if they were in an actual interrogation. We provided a list of 27 tactic names and tactic descriptions (within-subject factor). These 27 tactics were classified into five categories based on their evidential properties (for the tactic classification, see Appendices A and B in Manuscript II). Finally, we measured the proportions of the types of tactics that participants selected. We hypothesized that interrogators in the no-evidence condition would select more tactics of the Nonevidential/Crime-Irrelevant type than would those in the DNA, CCTV, fingerprint, and eyewitness conditions (Hypothesis 1). We also predicted that participants in the DNA, CCTV, and fingerprint evidence conditions would choose significantly more tactics of the Evidential/Substantiated type than would those in the eyewitness and no-evidence conditions (Hypothesis 2). We expected that the participants in the eyewitness condition—compared with those in the DNA, CCTV, and fingerprint conditions—would choose more tactics of the Evidential/Unsubstantiated (Hypothesis 3) and the Context-Manipulation (Hypothesis 4) types. Finally, it was predicted that the participants in the eyewitness and no-evidence conditions (vs. the CCTV, DNA, and fingerprint conditions) would select significantly more tactics of all five tactic types (Hypothesis 5).

Method

Participants

We recruited a total of $N = 106$ officers who were trainees in regular interrogation expert courses held in the National Police Investigation Academy in South Korea (NPIA). Before the first session of the courses began, an instructing officer from the NPIA fully explained the purpose of our study and informed all the trainees that they could choose not to participate. Officers were between the ages of 24 and 58 ($M = 38.68$, $SD = 7.817$, Median = 37). Officers were mostly inspectors (33.96%), assistant inspectors (28.30%), senior police officers (23.59%), police officers (8.49%), senior inspectors (4.72%), and superintendents (0.94%). On average, participants had spent

12.83 years (*SD* = 8.18) in the police and 7.33 years (*SD* = 6.89) as criminal investigators.

Procedure

Officers were randomly allocated to one of five homicide report scenarios in which we manipulated the critical evidence by introducing the five different types of evidence (i.e., DNA, CCTV, fingerprint, eyewitness, and no evidence; between-subject factor). Participants were instructed to read a list of 27 interrogation tactics. The list contained names and brief descriptions of the 27 interrogation tactics, which were classified into five tactic types. Next, they were asked to analyze all the evidence and investigative information that the police held. They were instructed to imagine that they were in a real investigation and had to interrogate the suspect. Then, we informed them that they could choose any tactics to draw critical information or a confession from the suspect. The proportions of the selected tactics were calculated for each type for the main analyses. Additionally, we measured how frequently they had used the 27 tactics in their daily work for the exploratory analyses. The participants rated the frequency of using the tactics on a 10-point scale (1 = *I rarely use it* to 10 = *I frequently use it*).

Results and Discussion

To test our Hypotheses 1, 2, 3, and 4, we fit a linear mixed-effects model predicting participants' choice of interrogation type. Each participant provided five measures of the selected tactic type (total *N* = 530 valid observations). The model included (a) fixed effects for evidence type (DNA, CCTV, fingerprint, eyewitness, and no evidence) and tactic type (Evidential/Substantiated, Evidential/Unsubstantiated, Nonevidential/Crime-Relevant, Nonevidential/Crime-Irrelevant, and Context-Manipulation), and their interaction terms and (b) random intercepts for participants (see Table 1 in Manuscript II for the test results).

Hypothesis 1

We hypothesized that interrogators in the no-evidence condition would select more tactics of the Nonevidential/Crime-Irrelevant type than of the other four evidence conditions. The results suggested that officers without any evidence did not select significantly more tactics of the Nonevidential/Crime-Irrelevant type than did those who had incriminating evidence. The data did not support Hypothesis 1.

Hypothesis 2

We hypothesized that participants in the DNA, CCTV, and fingerprint conditions would select significantly more tactics of the

Evidential/Substantiated type than would officers in the eyewitness and no-evidence conditions. We did not find a significant difference between the physical and nonphysical evidence conditions. The results did not support Hypothesis 2.

Hypothesis 3

We hypothesized that the participants in the eyewitness condition (vs. the DNA, CCTV, and fingerprint conditions) would be more likely to choose tactics of the Evidential/Unsubstantiated type. The results indicated that participants in the eyewitness condition did not choose significantly more tactics of the Evidential/Unsubstantiated type than did those in the physical evidence conditions. The data did not support Hypothesis 3.

Hypothesis 4

We hypothesized that the participants in the eyewitness condition (vs. the DNA, CCTV, and fingerprint conditions) would be more likely to choose tactics of the Context-Manipulation type. The results showed that participants in the eyewitness condition did not choose significantly more tactics of the Context-Manipulation type than did those in the three physical evidence conditions. The data did not support Hypothesis 4.

Hypothesis 5

Each participant provided five measures of the five types of interrogation tactics used against the suspect (total $N = 530$ valid observations). The model included one fixed effect for evidence type (i.e., DNA, CCTV, fingerprint, eyewitness, and no evidence) and random intercepts for participants (see Table 3 in Manuscript II for the results). It was predicted that participants in the eyewitness and no-evidence groups would select more tactics of the five types than would those in the physical evidence conditions. The results did not support Hypothesis 5. The results suggest that participants selected a similar number of interrogation tactics irrespective of the type of evidence.

Notably, the results of our analyses indicate that none of our hypotheses was supported. Contrary to our predictions, the present results show that the type of available evidence did not significantly affect South Korean interrogators' selection of tactics depending on the type of evidence that they possessed, even when they had no evidence pointing to the suspect's guilt. That is, evidence types did not influence our respondents' decision-making in selecting particular types of interrogation tactics.

Exploratory Analyses

The South Korean officers reported having used the Nonevidential/Crime-Irrelevant (M = 6.28, SD = 1.42; for descriptive statistics, see Table 4 in Manuscript II) and the Evidential/Substantiated (M = 5.52, SD = 1.13) tactic types. The most frequently used tactics were *employ active listening skills* (M = 9.19, SD = 0.52), *disclose evidence gradually* (M = 7.25, SD = 2.07), *interrogate suspect in a comfortable setting* (M = 6.91, SD = 2.29), *identify suspect's basic needs and emotional status* (M = 6.85, SD = 2.16), and *present self in a helpful role other than being an investigator* (M = 6.66, SD = 2.14). The least used tactic types were the Context-Manipulation (M = 3.84, SD = 1.12) and Evidential/Unsubstantiated (M = 4.32, SD = 1.29) types. Officers reported that the following tactics had been used infrequently: *interrogate suspect at a late time* (M = 2.14, SD = 1.58), *in an uncomfortable setting* (M = 2.64, SD = 1.76), and *in an isolated setting* (M = 2.76, SD = 1.97); *disparage/dismiss information suspect provides* (M = 2.67, SD = 1.88); and *disclose evidence early* (M = 2.94, SD = 1.81).

Study IIIa

In Study IIIa, we used a repeated-measures design. This study aimed to examine how different forms of evidence (i.e., evidential vs. nonevidential) affected the suspects' perceptions of the amount of evidence held by the interrogators. To examine the effect of the tactic types, we recruited prisoners and real suspects in police custody in South Korea. We asked participants to look at a list of tactic descriptions (which did not include the names of the tactics; for the tactic classification, see Appendices A and B in Manuscript III). Then, we measured participants' perceptions of the evidence when interrogators used certain tactics, on a 10-point scale (1 = *it is not at all likely that the interrogator has much evidence against me* and 10 = *it is extremely likely that the interrogator has much evidence against me*). We predicted that prisoners' perceived evidence ratings would be higher with the evidential types (i.e., Evidential/Substantiated and Evidential/Unsubstantiated types) than with the nonevidential types (i.e., Nonevidential/Crime-Relevant, Nonevidential/Crime-Irrelevant, and Context-Manipulation types) of tactics.

Method

Participants

We recruited a sample of 59 prisoners. Specifically, 38 inmates in a prison and 21 suspects detained in local police stations took part in our survey study. We recruited participants in two different ways. First, we recruited them in collaboration with the Criminal Investigation Divisions of South Korean Provincial Police Agencies and with a South Korean prison. All the collected data were obtained and processed according to the corresponding law, regulations, and agreements made in the internal meetings with the Provincial Police Agencies and the prison.

Procedure

The independent variable was *tactic type*: (a) Evidential/Substantiated, (b) Evidential/Unsubstantiated, (c) Nonevidential/Crime-Relevant, (d) Nonevidential/Crime-Irrelevant, and (e) Context-Manipulation. The dependent variable was the perception of the evidence. We intended to measure the extent to which participants perceived the amount of evidence a police interrogator might hold. Participants responded to a questionnaire briefly describing 27 tactics, each classified into one of five tactic types. After reading each tactic description, participants rated their inference of the available evidence.

Results and Discussion

Hypothesis

To test the effect, we fit a linear mixed-effects model predicting participants' ratings for their perceptions of available evidence. Each participant provided five measures of the evidence perception ratings for the five tactic types (total $N = 295$ valid observations). We calculated the five mean values for each tactic type by averaging the ratings of the constituent tactic items, and these five measures were used for the analyses. The model included a fixed effect for *Tactic type* (i.e., Evidential/Substantiated [reference group], Evidential/Unsubstantiated, Nonevidential/Crime-Relevant, Nonevidential/Crime-Irrelevant, and Context-Manipulation) and random intercepts for participants.

The hypothesis was partially supported. The results indicated that participants' ratings for the Evidential/Substantiated type ($B = 5.62$, $SE = 0.20$) were significantly higher than those for the Nonevidential/Crime-Relevant ($B = –0.52$, $SE = 0.24$), Nonevidential/Crime-Irrelevant ($B = –1.83$, $SE = 0.24$), and Context-Manipulation ($B = –1.20$, $SE = 0.24$) types, but that the ratings for the Evidential/Unsubstantiated type ($B = –0.73$, $SE = 0.24$) did not differ significantly from those for the three nonevidential types. The data suggest that substantiation of evidence can be a factor influencing suspects' perceptions of the evidence during interrogation.

Study IIIb

To supplement the results of Study IIIa, we conducted another similar study. We aimed to retest the hypothesis in Study IIIa with South Korean laypersons who had no prior criminal experience with any police investigation. We used the same design, procedure, and materials, but implemented them via an online survey and collected demographic information from the lay participants.

Method

Participants

We recruited a sample of N = 117 South Korean jury-eligible laypeople (20–93 years old). The mean age of the participants was 39.51 years (SD = 13.66); 50.4% (59) of the participants were male, 47.9% (56) were female, and 1.7% (2) of them did not identify their gender. The majority of participants had a university degree (55.6%, 65); the rest had a high-school diploma (18.8%, 22), college degree (12.8%, 15), master's degree (9.4%, 11), and PhD degree (1.7%, 2), respectively.

Procedure

The survey was administered using the online survey software Qualtrics (https://www.qualtrics.com). The online questionnaire, identical to the paper questionnaire used in Study IIIa, consisted of four sections: (a) consent form, (b) perceptions of available evidence for 27 interrogation tactics (in randomized order), (c) debriefing, and (d) demographics. To filter out participants who had experienced a police investigation as a suspect, we asked in the consent form whether they had ever committed a crime. Only those who answered *no* could participate in the survey. After reading each tactic description, they rated their perceptions of the evidence.

Results and Discussion

Hypothesis

We fit a linear mixed-effects model predicting participants' evidence perception ratings. Each participant provided five measures (i.e., mean scores for the five types) of the ratings for the five types (total N = 585 valid observations). The five mean values were calculated for each tactic type by averaging the ratings of the constituent tactic items. These measures were used for the analyses. The model included a fixed effect for tactic type (i.e., Evidential/Substantiated [reference group], Evidential/Unsubstantiated,

Nonevidential/Crime-Relevant, Nonevidential/Crime-Irrelevant, and Context-Manipulation) and random intercepts for participants.

Similar to Study IIIa, the hypothesis was partially supported. Participants' perceived evidence ratings were significantly higher for the Evidential/Substantiated type (B = 6.03, SE = 0.13) than the Nonevidential/Crime-Relevant (B = -1.23, SE = 0.12), Nonevidential/Crime-Irrelevant (B = -1.09, SE = 0.12), or Context-Manipulation (B = -1.34, SE = 0.12) types. However, the ratings for the Evidential/Unsubstantiated type (B = -1.21, SE = 0.12) did not differ significantly from the nonevidential types. Consistent with the results of Study IIIa, the factor substantiation of evidence seems to be the one influencing laypersons' perceptions of the evidence. That is, when an interrogator used Evidential/Unsubstantiated tactics rather than Evidential/Substantiated ones, laypersons tended to perceive that the interrogator did not hold much evidence.

Exploratory Analyses

Differences in Tactic Types

We used *t*-tests to compare the ratings of evidence perception between the two groups (for descriptive statistics and *t*-test results, see Table 2 in Manuscript III). A significant difference in the ratings was observed only for the Nonevidential/Crime-Irrelevant type, such that the degree to which prisoners (vs. laypersons) inferred the interviewer's evidence was significantly lower for the Nonevidential/Crime-Irrelevant tactics. No significant difference in the ratings was observed for the other four types of tactics between the groups.

In particular, prisoners (vs. laypersons) were less likely to perceive that the interrogator held much evidence when the interrogator employed Nonevidential/Crime-Irrelevant tactics. To gain deeper insights into the differences between individual tactics, the ratings for the 27 individual tactics were compared between the groups. It was observed that the prisoners' ratings fluctuated much more across the 27 individual interrogation tactics than did the laypersons'. The results are presented in Figure 1.

Differences in Tactics

The ratings differed significantly between the groups for 18 of the 27 tactics. Notably, the tactic *find common ground or shared experiences* (Nonevidential/Crime-Irrelevant) displayed the greatest difference, followed by *use suspect's prior criminal history* (Evidential/Unsubstantiated) and *present self in a helpful role other than being an investigator* (Nonevidential/Crime-Irrelevant). The data indicate that when the interrogator

attempted to find common ground or shared experiences with the suspect or when the interrogator presented her/himself as a helper rather than an investigator, prisoners were more likely than laypersons to infer that the interrogator did not hold much evidence.

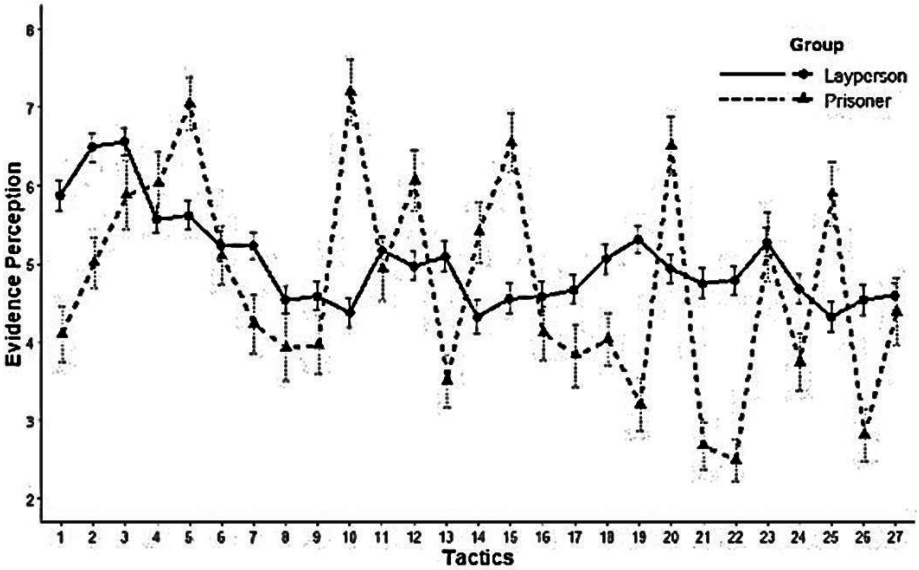

Figure 1. Variation in Mean Ratings of Evidence Perception for 27 Tactics between Prisoner and Layperson Groups

In contrast, the prisoners' perceptions of the evidence (vs. the laypersons') were significantly higher when the interrogator used the tactic *use suspect's prior criminal history*. Also, prisoners' ratings were significantly higher when the interrogator used the tactics *emphasize expertise or authority over suspect*, *exaggerate the power of evidence*, and *offer tangible or intangible incentives* than were the laypersons'. In addition, we observed significant differences in participants' inferences when minimization and maximization tactics were used. Prisoners' perceptions of the evidence were significantly higher than laypersons' for maximization. The opposite result was found for minimization: prisoners (vs. laypersons) tended to infer that the interrogator did not have incriminating evidence when the interrogator minimized the seriousness of the offense.

GENERAL DISCUSSION

Police investigators are deeply involved in the collection of evidence, and their judgments made early in an investigation can influence the outcome of a criminal case. Despite the importance of this, scholars have paid comparatively little attention to how evidence influences investigators' decision-making. The main objective of this thesis was to examine the effects of evidence on investigators' decision-making processes before and during police interrogations. Additionally, the thesis aimed to broaden the scope of this objective by examining the effect of interrogation tactic types on suspects' perceptions of the evidence. In Study I, the primary focus was to examine the degree to which the type of evidence might influence police investigators' judgments of (a) the suspect's estimated likelihood of commission and (b) the reliability of a piece of critical evidence. In Study II, the effects of evidence types on the types of interrogation tactics selected by interrogators were studied. To examine the extent to which suspects' perceived evidence varied depending on the type of interrogation tactics, Study IIIa was conducted using a sample of prisoners and suspects in police custody. In Study IIIb, an online survey was performed with a group of laypersons (i.e., naïve suspects) without any prior criminal experience. The thesis attempted to reach the main objective by providing empirical evidence for the potential effects of evidence on investigators' judgments and by examining the potential relationship between suspects' perceptions of the evidence and the evidential and nonevidential types of interrogation tactics.

I start by discussing the main findings regarding the effects of available evidence on investigators' decision-making. Then, I introduce the results for prisoners' and laypersons' inferences of evidence and compare the two samples. Finally, I present theoretical and practical implications drawn from the findings and then discuss the limitations, future directions, ethical considerations, and conclusions.

Evidence Before Interrogation

Impacts of Evidence Type on Investigators

Martire et al. (2019) reported that both practitioners and laypersons had similar perceptions of diverse physical and personal evidence types, such that they generally believed that DNA and fingerprint evidence were more reliable than eyewitness testimony. Similarly, the presence of physical evidence is one of the significant factors when prosecutors make charging

decisions, and whether the police hold physical evidence can affect the outcome of the prosecutor's decision to reject a case (Alderden & Ullman, 2012; Alderden et al., 2018; O'Neal et al., 2015) or the police's decision to charge or release a suspect (Moston & Engelberg, 1993).

Study I in this thesis corroborated the findings of previous work regarding evidence judgments: the type of available evidence indeed affects police officers' investigative judgments. To be more specific, officers tended to perceive the evidence to be significantly less reliable when it was presented in the form of eyewitness testimony than other physical evidence types. In addition, the investigators' perceptions of evidence reliability predicted their judgments of the suspect's estimated culpability. As expected, this indicates that when an investigator perceives the evidence to be reliable, s/he is likely to believe the suspect to be culpable. It is notable that these effects occurred even though the evidence implied the same facts in the case regardless of whether it came from a witness, CCTV, fingerprints, or DNA. These findings suggest that investigators' presumption of their suspect's culpability at the early stage of an investigation can depend on the reliability of the available evidence.

Another finding from Study I was that investigative experience predicted skepticism about incriminating evidence. In the existing literature, only a few studies have tested the effect of investigative experience on decision-making (Ask & Allison, 2010; Fahsing, 2016; Wright, 2013). Research has indicated that more experienced investigators were significantly better at positing more alternative explanations and taking more investigative actions than were less experienced investigators (Fahsing & Ask, 2016). Also, experienced detectives (vs. less experienced) could generate more diverse investigative inferences for real-life homicide cases (Wright, 2008). However, no studies have examined the extent to which investigative experience may influence police officers' judgments about the quality of evidence. This study's findings suggest that investigators with more experience tended to perceive almost all types of evidence to be less reliable, except suspects' confession evidence. In short, this points to the fact that the level of investigative experience may influence investigators' perceptions of the evidence and decision-making.

The more experienced the investigator, the more likely the investigator was to have encountered situations in which evidence was flawed or limited in its usefulness for securing a conviction. Perhaps these situations are more easily remembered than are situations in which evidence was reliable and useful. The memory can lead investigators to a kind of availability bias (Kahneman et al., 1982). Thus, experienced investigators may be more likely to doubt the usefulness of evidence. It is also possible that experience may lead

investigators to be subjected to greater oversight and accountability, so experienced investigators adopt a generally more cautious approach. Because experienced investigators generally work in senior management positions, they should carry out their investigations with a higher level of objectivity or skepticism than do novice investigators. Therefore, the police environment may put a great deal of pressure on senior officers because they hold high responsibility, justify their actions, and face legal consequences when they make wrong decisions (Eyre et al., 2008).

Evidence During Interrogation

Impacts of Evidence Type on Interrogators and Suspects

Study II in this thesis did not provide empirical support for the predictions that the type of available evidence at the pre-interrogation stage would affect investigators' decisions to choose particular interrogation tactics during interrogation. South Korean interrogators' choice of the five types of tactics did not significantly vary depending on whether they possessed either physical or personal evidence. The South Korean interrogators seemed to employ the Nonevidential/Crime-Irrelevant tactics most frequently in their daily interrogations. In contrast, the results of studies IIIa and IIIb imply that some of the interrogators' tactics can have an impact on the suspects' perceptions of evidence. The findings also reveal that prisoners (vs. laypersons) tended to perceive that less evidence had been collected when police interrogators used more Nonevidential/Crime-Irrelevant tactics. Based on the variations in the results between investigators, prisoners, and laypersons, I speculate that investigators and prisoners may have different views of the Nonevidential/Crime-Irrelevant tactics. For instance, interrogators may use the Nonevidential/Crime-Irrelevant tactics with an expectation that those tactics will elicit more information or confessions from suspects than will the other tactics. In contrast, those tactics can lead to unexpected results in terms of suspects' counter-interrogation behaviors (e.g., withholding information). However, this interpretation should be regarded with caution, considering that I measured different dependent variables for investigators (i.e., selection of tactics) and suspects (i.e., evidence perception).

Perhaps the South Korean interrogators' tendency to use Nonevidential/Crime-Irrelevant tactics for all five evidence conditions may be explained by the specific cultural context. Wachi et al. (2014) argued that cultural influence could be a significant factor affecting police interrogations in Asian countries. South Korea, as well as other East Asian nations such as Japan and China, are countries that have been influenced by Confucianism,

which emphasizes keeping harmony in the community and respecting others (Hahm, 2002). The influence of Confucianism may affect even police interrogators' tactic selection. It was also reported that South Korean investigators generally believed task-irrelevant social interactions with interviewees (e.g., socialization, being informal, and showing respect) to be crucial in drawing information from them (Goodman-Delahunty & Howes, 2016). This cultural influence may encourage South Korean interrogators to believe that having a good relationship and providing social support can be more effective in making the suspect confess to them than taking an accusatory or inquisitorial stance (Wachi et al., 2014).

Furthermore, there might be some legal differences between the South Korean and Western law systems, leading interrogators to rely on particular tactics. For instance, legal punishment can be mitigated or remitted for those who make a voluntary confession to the police and prosecutors in the South Korean legal system (Article 52 of the Korean Criminal Code). This mitigation law might have influenced both suspects' and investigators' behaviors. Given that most research on interviewing has been conducted in Western countries (e.g., Kelly et al., 2016; Leahy-Harland & Bull, 2017; Miller et al., 2018; Walsh & Bull, 2016), we would be remiss not to mention cultural and legal differences.

Therefore, in Study II, the participants' cultural belief that the task-irrelevant interactions with a suspect (i.e., Nonevidential/Crime-Irrelevant tactics) would help South Korean interrogators elicit information might have driven the participants to employ Nonevidential/Crime-Irrelevant tactics when questioning the suspect, no matter whether they held DNA or eyewitness statement evidence. Otherwise, participants might have difficulties in assessing critical evidence of physical and personal types or in choosing tactics in different evidence situations. The South Korean police investigators have limited access to training in or knowledge of interrogation tactics and how to evaluate criminal evidence in the interrogation context. Only approximately 30 investigators are selected for annual training in which they can acquire advanced interrogation skills (https://www.kpia.go.kr/). Furthermore, the Bureau of Criminal Investigation published a manual in 2016 concerning how to interview suspects (*Techniques for Writing an Investigation Dossier*, available at https://www.police.go.kr). However, it failed to provide up-to-date knowledge of *what tactics* to use, or of *when* and *how* to use them properly, as introduced in the current literature.

Null Findings for Investigators' Selection of Tactics

I provide several practical and conceptual explanations for the null findings in Study II. First, the laboratory setting might have failed to fully motivate officer participants to select specific types of tactics because police investigators interrogate a suspect after a series of additional investigative activities, ranging from collecting evidence to collecting information from human sources. Therefore, responding to our questionnaire without any access to further evidence might have failed to motivate participants fully. Besides, I suggested in the Introduction that concerns about convictability and case rejection would be a factor that might psychologically drive participants to elicit more or less information from the suspect. However, no information about the prosecution's follow-up supervision regarding the evidence was given in the questionnaire. This might not have triggered the concern that participants' cases could be rejected, affecting the results.

Second, the fact that I used only one type of crime for the scenarios might have impacted the participants' choices. Study I adopted 16 crime scenarios of four crime types (i.e., homicide, robbery, burglary, and fraud). However, only five scenarios of a homicide case were used in Study II. Homicide cases require more complex work, which can put investigators under more psychological, time, and organizational pressure (Innes, 2003; Wright, 2008). I speculate that officer participants might become more cautious about choosing their tactics when they were provided with the homicide scenarios (vs. usual crimes). Perhaps the effect of crime type could have affected their selection of tactics.

Third, the crime scenarios involved some noncritical evidence, which could have contributed to the null results in Study II. Noncritical evidence was included to increase the realism of the reports and to disguise the importance of the manipulation of critical evidence. All the participants were given the same information about noncritical evidence, but the participants in the no-evidence condition did not have any information about critical evidence identifying the suspect. It was predicted that participants in the DNA, CCTV, and fingerprint conditions would use more tactics of the Evidential/Substantiated type than did those in the eyewitness and no-evidence conditions. However, the data suggest that although participants in the no-evidence condition did not have the critical evidence, they chose approximately as many tactics of the Evidential/Substantiated type as did those in other evidence conditions. Possibly, the noncritical evidence might be perceived as more incriminating or presentable to the suspect, especially for those participants in the eyewitness and no-evidence (vs. physical) conditions. In contrast, participants holding physical evidence would also present the noncritical evidence to the suspect by choosing tactics of the Evidential/Unsubstantiated type to a greater extent than expected. Presumably,

the inclusion of the noncritical evidence in the crime reports may have affected the participants to select the evidential tactics more than if this evidence had been excluded. In future research, the effects of the noncritical evidence in scenarios need to be taken into account. Excluding noncritical evidence may decrease the realism of scenarios or the motivation to participate when using police officer participants because they often encounter these types of evidence in real-life investigations.

Main Findings for Prisoners and Laypersons

The first crucial finding in studies IIIa and IIIb is that some tactics appear to have more influence on prisoners' perceptions of the evidence than do others. Convicted offenders are known to have opposing views of police tactics such that they believe both evidential (e.g., presentation of evidence) and nonevidential (e.g., ethical interviewing) types of tactics to be crucial for eliciting a confession from a suspect (Cleary & Bull, 2019; Deslauriers-Varin, Beauregard, & Wong, 2011; Kebbell et al., 2010; Wachi et al., 2016). Suspects' perceptions of the interrogator's evidence can also change as a function of the strategic use of evidence (Dando & Bull, 2011; Dando et al., 2015; Granhag et al., 2013; Hartwig et al., 2014; Sorochinski et al., 2014). In the current studies, prisoners' perceptions of the evidence fluctuated more across the 27 individual interrogation tactics than did the laypersons'. Based on these findings, I argue that some of the evidential and nonevidential types of tactics can be effective in affecting the perceptions of the evidence in real-life suspect interrogations. However, we are still not sure what mechanism underlies the relationship between tactic types and suspects' evidence perceptions and what could really have influenced the variations in the ratings.

Second, criminal experience or history may explain the different behaviors of prisoners and laypersons. Suspects can exhibit different behaviors when being interrogated, depending on their prior criminal experience (Cassell & Hayman, 1996; Granhag et al., 2009; Leo, 1996; Moston & Engelberg, 1993; Moston et al., 1992). Also, criminal experience can influence how suspects perceive interrogation tactics. For example, offenders who had committed serious crimes (e.g., murder and assault) were more likely than those who had committed sex crimes to believe that using dominance-based tactics (e.g., being aggressive toward the suspect) would be ideal to help interrogators elicit a confession from a suspect (Kebbell et al., 2010). On the other hand, sex offenders reported that using ethical interrogation tactics would be ideal for interrogation (e.g., giving suspects more time to talk). Cleary and Bull (2019) also reported a similar finding that jail inmates with conviction experience were less averse to dominant/control tactics (e.g., yelling and interrupting) than were those who lacked the same experience. Moreover,

student mock suspects without any prior criminal record displayed different counter-interrogation behaviors from those of experienced suspects who had already been convicted (Granhag et al., 2009). Based on these results, I suppose the difference in criminal experience between prisoners and laypersons could have affected the variations of evidence perception ratings. Drawing on this supposition, I argue that researchers should be more careful about the generalizability of data when using lay participants. However, it is worth noting that suspects who are about to undergo an interrogation do so with different levels of criminal experience (e.g., Leo, 1996; Moston et al., 1992). Data produced using lay or student samples can therefore also be useful for research. Nonetheless, the different patterns of the data between the two groups in studies IIIa and IIIb suggest that data provided by laypersons need to be interpreted carefully.

In addition, evidential tactics increased prisoners' and laypeople's perceptions of the evidence significantly more than did nonevidential tactics. The degree to which a tactic is related to using evidence can be an essential factor when suspects make inferences regarding the available evidence. To be more specific, I found that prisoners tended not to believe that the interrogator held more evidence when Evidential/Unsubstantiated tactics were employed rather than Evidential/Substantiated tactics. However, these Evidential/Unsubstantiated tactics are quite often adopted in interrogators' daily interrogations (Kassin et al., 2007; Miller et al., 2018). For example, when interrogators do not hold incriminating evidence, they are known to rely on polygraph tests (Gudjonsson, 2003; Johnson & Drucker, 2009). Such inaccurate or unreliable information can make suspects believe that the incriminating evidence is weak and that they will not be convicted (Kebbell et al., 2006). Also, the presented evidence affects investigative (e.g., the decision to release the suspect; Moston & Engelberg, 1993) and prosecutorial (e.g., the decision to reject a case) decision-making (Alderden & Ullman, 2012; Alderden et al., 2018; O'Neal et al., 2015). Therefore, suspects may be sensitive to the possibility of incriminating evidence, especially reliable evidence. Their perceptions of the evidence can guide their behavior in terms of adopting withholding or forthcoming strategies (Luke et al., 2014). Furthermore, jury-eligible persons can believe a suspect's confession evidence to be more reliable when an interrogator has presented substantiated (vs. unsubstantiated) evidence of guilt (Mindthoff et al., 2018). The evidence's reliability needs to be taken into consideration because it can affect how suspects perceive the evidence, and this will eventually affect a case's outcome in court as well.

Methodological Considerations

Outcome Measures

Evidence Reliability

In Study I, one of the main outcome measures was the perceived reliability of evidence. Evidence reliability was used to determine whether the evidence predicted officers' estimation of the suspect's likelihood of commission. We defined reliability as "how certain you are of any conclusions or judgments drawn from a certain piece of evidence." It may be useful to examine this definition more closely. In the literature, many researchers have used the reliability of evidence as either an independent or dependent variable (Ask & Granhag, 2007; Ask et al., 2011; Golding et al., 2000; Kaplan et al., 2020; Lieberman et al., 2008; Maeder et al., 2017; Martire et al., 2019; Ribeiro et al., 2019; Schklar & Diamond, 1999). I observed that previous studies had adopted diverse definitions of evidence reliability (e.g., credibility, error rate, and accuracy).

From a scientific perspective, the President's Council of Advisors on Science and Technology (2016) has provided a broad definition of reliability, meaning repeatability (i.e., the probability of obtaining the same result from the same examiner), reproducibility (i.e., the probability of obtaining the same result from different examiners), and accuracy (i.e., the probability of obtaining correct results). Many scientists and legal scholars may be familiar with or favor this definition. However, in this thesis, I used a definition that was more based on a psychological construct of reliability, such as credibility (i.e., how credible the evidence is). This definition is not based on the construct often used in forensic science societies.

Defining reliability was quite challenging because scientists and judges cannot establish the ground truth for every evidence type, and reliability (error rates) can vary depending on the contextual factors (e.g., physical characteristics of the evidence, handler's experience, and training; Dror, 2020). Furthermore, because people generally have a poor understanding of scientific techniques (Ribeiro et al., 2019), increasing the understandability of the definition for each evidence type (DNA, CCTV, fingerprint, and eyewitness evidence) was difficult for our participants. As done in previous psycho-legal studies (Ask & Granhag, 2007; Ask et al., 2011), participants in Study I were provided the simple definition of reliability, which I believed to be more feasible than using the scientific definition of reliability. Future researchers need to take this limitation into account when measuring or using the construct of evidence reliability.

Perception of Evidence

Another methodological consideration with regard to evidence was how the perception of the evidence was measured. In studies IIIa and IIIb, I examined the variation in *how much evidence* participants would perceive to be held by the police as a function of the evidential and nonevidential tactic types, which is known to play a key role in interrogations (Deslauriers-Varin, Lussier, & St-Yves, 2011; Granhag & Hartwig, 2015; Moston et al., 1992). Previous research has also demonstrated that the quantitative perception of the evidence (i.e., how much evidence the police hold) can be a good predictor of suspects' counter-interrogation strategies (Hartwig et al., 2014; Luke et al., 2014; Srivatsav et al., 2020; Tekin et al., 2015). For future studies, it may be worth addressing how different ways of measuring evidence perception may affect the outcome.

The qualitative property of evidence (e.g., how strong DNA evidence is and the probative value of evidence) is essential and commonly referred to in the legal system. However, it may make more sense to think that evidence strength is not a crucial factor for suspects to consider in an interrogation situation (i.e., when planning counter-interrogation strategies). What really matters to the suspects may be to know how knowledgeable the interrogator is about specific crime facts, and this construct proved to be a valid factor for suspect's counter-interrogation strategies (Granhag & Hartwig, 2015; Hartwig et al., 2014). Namely, in the interrogation phase, inferring the interrogator's knowledge about when, what, how, where, and why the crime occurred and who was involved can be more important for suspects' choice of counter-interrogation strategies than inferring how strongly the evidence can prove their guilt in the trial. For instance, if the police seem to know that the suspect was with the victim, the suspect will admit that they were together (where), but the suspect can choose to deny or lie about the exact time (when) to avoid involvement. In other cases, suspects can attempt to conceal how and what happened or the motive ("why") of the crime. Therefore, the suspect's perception of the evidence (vs. evidence strength) may be more reflective of and valid for the suspects' decision-making in the interrogation context.

From a practical or legal perspective, measuring evidence strength may be of no use because judges and jurors are the main legal bodies assessing the probative value of evidence in court. Moreover, judging the evidence strength at the investigation stage is extremely difficult and complex for investigators because it usually requires considerable time and human resources even for judges to consider the many factors that can affect their judgment (e.g., chain of custody, admissibility, validity, and expert testimony).

Limitations and Future Directions

Tactic Descriptions and Scenarios

There is another limitation that results from the survey method used in studies IIIa and IIIb. It is possible that the evidence provided in the descriptions of the evidential tactics could have made participants uncertain as to what evidence they were inferring. For instance, some descriptions of tactics of the Evidential/Substantiated type (i.e., *disclose evidence early, late, or gradually*) imply that the interrogator had already presented available evidence to the participants. More specifically, the *disclose evidence gradually* tactic of the Evidential/Substantiated type was described as: "the investigator discloses all the evidence gradually to you." This information might have confused participants about whether their perception of the evidence had to be reported based on the given evidence or "beyond the evidence" provided in the descriptions. In other cases, participants might have believed that inferring the interrogator's additional evidence was not necessary. Also, we did not provide specific contextual information for the simulated interrogation, such as the type of crime and how and why participants would be interrogated as suspects. Possibly, the information about the evidence in the tactic descriptions might have been used for inferring the interrogator's evidence.

The null results in Study II might have resulted from the scenarios adopted. I created simulated police investigation scenarios for studies I and II based on real criminal cases from South Korea. In Study I, I used 16 scenarios of four crime types to examine the effects of evidence type on investigators' pre-interrogation decisions (i.e., estimated likelihood of suspect's commission and evidence reliability). In Study II, I examined the effects of evidence type on investigators' interrogation decision-making using five scenarios of a homicide case. The scenarios differed between the two studies in the type of crime. It is important to note that homicide cases do not represent the majority of criminal cases. Thus, the type of crime scenarios in Study II might have affected the results because homicide is different from high-volume crimes (e.g., thefts and cyber-crimes) in that it rarely takes place but can have a major impact on societies (Liem et al., 2019). In homicide investigations, investigators are typically under relatively more psychological, time, and organizational pressure (Innes, 2003; Wright, 2008). Police investigators may become more cautious about choosing tactics, especially when they handle homicides (vs. usual crimes), so the available evidence may not affect the selection of tactics. I encourage future researchers to consider the crime type when conducting a scenario-based study.

Realism, Motivation, and Sample

In addition, Study II's experimental setting could have affected the participants' motivation to choose particular types of tactics for the suspect. I argued that interrogators' selection of tactics may be influenced by psychological pressure resulting from the legal environment (i.e., concerns about case rejection). Because I used the same homicide scenario format as adopted in Study I, I did not consider providing information in the questionnaire about the prosecutor's follow-up supervision regarding the evidence. This lack of the possibility of prosecutor supervision might not have triggered the concern that participants' cases could be rejected. Also, police investigators typically interrogate a suspect after a series of diverse investigative activities, ranging from collecting evidence at the crime scene to gathering information from eyewitnesses. Reading the simulated police report and responding to the survey without any access to the hands-on evidence might have failed to motivate the participants. For future research, it would be important to add more information about the prosecutorial process to the crime report vignettes to increase realism and participants' motivation.

Lastly, our participants in the studies were South Korean. The results might not generalize to police investigator, prisoner, and lay populations of all the nations in the world due to cultural and legal differences. For instance, it is known that police groups around the world have different organizational cultures and operate in different legal systems, which can affect the results of criminal investigations (Innes, 2002, 2003; Wachi et al., 2014). However, the data in these studies were consistent with previous studies: Study I showed that physical (vs. personal) evidence affected police investigators' decision-making (Alderden & Ullman, 2012; Alderden et al., 2018; Martire et al., 2019); Study II showed that police investigators use nonevidential tactics most frequently (Miller et al., 2018; Sivasubramaniam & Goodman-Delahunty, 2019; Wachi et al., 2014); and studies IIIa and b also provide consistent support that evidential tactics increase the perceived evidence (Hartwig et al., 2014; Luke et al., 2014).

Ethical Considerations

In studies I and II, active duty police officers in South Korea were recruited to participate. The two studies were conducted in accordance with instructions and regulations provided by the KNPA and the NPIA concerning ethics and the legal rights of the police participants. In Study I, participants were surveyed online using snowball sampling; for instance, the respondents were encouraged to circulate the survey link to their investigator colleagues.

The first page of the link provided brief information about the purposes of the study and asked all the link-receivers for their consent. Those who had voluntarily agreed to participate in the survey could move on to the main pages of the questionnaire. To promote voluntariness, the potential participants were also informed that they were free to withdraw anytime. Also, I did not gather any demographic information regarding the participants' personal identity (e.g., name and affiliation) except for their rank, experience in years, and amount of investigation cases. Study II recruited trainees in regular interrogation expert courses held in the NPIA in South Korea. Prior to the first session of the training, an instructing officer from the NPIA informed the trainees of the purpose of the study and of the compensation. They were also free to choose not to participate and could withdraw at any time without any penalty from the interrogation training.

Another concern arose with the participants in Study IIIa, who were in vulnerable situations of police custody or imprisonment. Therefore, I was cautious about potential ethical and human-rights issues that might result from survey participation. I did not collect any demographic information from the participants in Study IIIa. All the collected data were obtained and processed according to the applicable laws and regulations as well as to agreements made in internal meetings with the Provincial Police Agencies and the correctional institution. As a precautionary measure, each participant was informed of the purpose of the survey. I received direct consent from the participants, who signed a written consent form. Before the survey, we notified them that they could withdraw at any time and that we would not collect their personal information. After the survey, only the prisoners were compensated with 10,000 Won (€7.4) in cash, because giving money to police detainees was prohibited by law.

In Study IIIb, South Korean jury-eligible laypeople were recruited using an online research company in South Korea. The research company informed the laypersons of their freedom to withdraw at any time. The survey was conducted online. The participants' demographic information (i.e., age and education level) was collected. Participants were each paid 5,000 Won (€ 3.7) for their participation. Participants did not report any issues concerning their participation in the online study.

Conclusions

This thesis is the first to examine the effects of evidence type on (a) investigators' and (b) suspects' judgments in police investigations. Studies I

and II expand our knowledge by examining how police investigators view the evidence they have at their disposal. Police investigators play a central role in the criminal justice system, from the initial investigation stage to the final verdict stage. They collect first-hand evidence at crime scenes, and sometimes elicit confessions by interrogating suspects. Despite the importance, previous research has mostly focused on laypersons' views of evidence, and the understanding of this matter has been deficient. Our findings suggest that evidence types are also influential on police investigators' decisions as well as other groups of people. In addition, the findings of this thesis also shed new light on the influence of experience on investigative judgments of evidence. Despite the null results, Study II makes an additional contribution by laying some groundwork for future research on how physical and personal evidence can impact interrogation decision-making. For scholars and practitioners, studies IIIa and IIIb provide an overall view of how differently experienced and naïve suspects perceive evidence given various interrogation tactics. These findings suggest that criminals and laypersons have different perspectives towards the interrogation tactics depending on their types. This delivers an important message to practitioners and scholars that some tactics are more influential on the perception of evidence than the other ones. In sum, I hope that the studies of this thesis contribute to our understanding of how different types of evidence can affect decisions made by interrogators as well as suspects during a police investigation.

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APPENDICES

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