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The primary research areas of the journal are change of human behaviors, community response, and social system in the field of criminal law, criminology, criminal justice and psychology. We welcome research contributions that achieve: (a) improving knowledge and understanding of the etiology and trends of crime (b) utilizing theoretical frameworks and research methodologies in evaluation of criminal legislations and policies in different jurisdictions and (c) undertaking analysis and research on enacting and amending the criminal codes and legislations in response to changing or evolving crime trends with an eye towards improving the effectiveness of the judicial system and criminal policies.

International Journal of Criminal Justice

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When You Hit a Fork in the Road, Take It: What the Latest Controversies and Data Tell Us About Our Field, Open Science, and the Way Forward

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Abstract

The latest controversies in our field highlight the chasm between the pursuit of rigorous, replicable, science and disciplinary incentives that reward the publication of novel findings, the use of questionable research strategies, and a preference for ideologically uniform narratives. To advance our discipline, I argue we should embrace the open science movement and leverage the empirical work that highlights the limits of social science generally, and criminology specifically. Embracing the open science movement, however, is more than changing the mechanics of our science. It will also require a cultural change -- one that prioritizes the pursuit of truth over all else.

INTRODUCTION

Criminology is perhaps better situated today, more than ever before, to provide answers to thorny policy issues and to make meaningful contributions to science on etiology. We have more Ph.D. programs and thus people trained in the discipline, more datasets from which to draw on and to analyze, more statistical techniques to dazzle readers with, more journals to publish in and consequently, more studies to read and to dissect. Our discipline, once shunned by other fields and disparaged as nothing more than a marginal offshoot of sociology, has by any measure, captured widespread intellectual attention and intellectual legitimacy. Today, criminologists from around the world contribute to an ongoing dialogue about crime, criminality, and the control of wayward behavior. Criminology, it seems, is at the height of its glory and influence.

Given our gains, it may seem odd to sound a warning about our future but that is precisely what I'm going to do. As many businesses have learned, often through insolvency, growth is relatively easy compared to maintaining a competitive edge or expanding further market shares. Examples are all around us of organizations, even academic disciplines, moving leaps and bounds ahead of others only to reach an apex where their decline was ruthlessly sudden or painfully drawn out. In the United States we've recently seen major retail outlets go bankrupt, including the once King of retail, Sears, as well as other perineal giants -- Enron, Compaq, E.F. Hutton, and Bear Stearns. In South Korea, too, the major shipping company Hanjin went bankrupt while the auto manufacturer General Motors Korea, remains on life support. The point, of course, is not that academic disciplines are subject to the same pressures as are major industries but that the arc of success can stop, sometimes suddenly, unless problems that expose the organization to risk can be mitigated or surmounted. Progress, in other words, is not guaranteed.

In this talk I will identify two interrelated risks to our continued expansion. The first is a set of practical or procedural issues that have become institutionalized in our field and in others. Collectively, these issues are embedded in a broader system that criminologists operate in, are affected by, and respond to. This system is rooted in incentives and disincentives that, when aligned, can induce excellent

science—science that is accurate, reliable, and replicable. When misaligned, however, the combination of incentives and disincentives can propel us away from rigorous and replicable science and into the land where falsehoods are embraced and touted as obviously correct. Let me suggest that we are not too far off from the latter and that an uncomfortable number of criminologists have already made that transition.

The second risk is one of intellectual culture, that if not addressed and changed will neutralize any gains made by altering the procedural issues I'll identify. Intellectual culture is a nebulous concept but what I'm referring to here is the collective willingness of our discipline to embrace the highest principles of science. Merton (1942), identified four: communism, or the sharing of ideas, information, and findings; disinterestedness (or objectivity), universalism, and organized skepticism (Macfarlane & Cheng, 2008) . Richard Feynman (1985), the famous physicist, summarized these principles as "a kind of scientific integrity…… that corresponds to a kind of utter honesty" (p. 311). For Feynman, "utter honesty" involved the meticulous reporting of anything that could invalidate your study, as well as embracing contradictory findings that may invalidate your theory (National Academy of Sciences, 1992). Before Merton or Feynman, however, the philosopher Friedrich Nietzsche defined and discussed "intellectual honesty" and, more specifically, "intellectual conscience." For Nietzsche, the "will to knowledge" involved the scrupulous exercise of logic and judgement in the pursuit of evidence that could, or may not, lead one to a belief. Nietzsche foreshadowed much of what cognitive psychology now tells us about the formation and continuation of beliefs – namely that beliefs that bestow benefits are more likely to be formed independent of evidence, that, as Jenkins (2012, p. 268) states, "our worldview is composed of "untruths" – firmly held beliefs for which our evidence is radically inadequate." These untruths, Nietzsche argued, and science now confirms, "shape our tendency to form and evaluate new beliefs" (Jenkins, 2012, p.268). Untruths, he thus concluded, are a "condition of life." Nietzsche would love today's obsession with "fake news!"

With Nietzsche's warnings in mind, what happens when researchers embrace untruths, or when entire disciplines "sacralize," as Jonathan Haidt calls it, broad areas of study—walling them off from inquiry and attacking those who violate the sacred boundaries? What then? And what happens when scholars fail to

embrace the highest principles of science, namely transparency, objectivity, and Feynman's "utter honesty?" What happens when the incentives of our scientific enterprise get misaligned and promote untruths and shoddy science? This is the question of culture I'll attempt to address as I believe it is far more pernicious than matters of methodology.

ISSUE ONE: METHODS, MAYHEM, AND REPRODUCIBILITY

All of us here owe a debt of gratitude to a psychologist named Daryl Bem. Professor Bem, from Cornell University, took eight years, nine experiments, and 1,000 subjects to show that humans were capable of precognition— yes, ESP (extra sensory perception) or knowing the future (Lowery, 2010). According to Bem, the odds that eight of his nine studies could be due to chance were 74 billion to 1. His results were published in the peer reviewed Journal of Personality and Social Psychology.

Bem's work was greeted with skepticism and a flash of dread. Nobody accused Bem of research fraud. His methods were standard experimental science in psychology and his work adhered to the basic precepts of science. Yet there it was: A study comporting to scientific standards showing something physically impossible. The implications were immediately clear: If Bem's study produce results that were not possible, how many other studies, employing equally or more rigorous designs, also produced incorrect results. LeBel and Peters (2011, p. 371) summed up the problem Bem's work posed for psychology:

> Bem (2011) deserves praise for his commitment to experimental rigor and the clarity with which he reports procedures and analyses, which generally exceed the standards of MRP (modal research practices) in empirical psychology. That being said, it is precisely because Bem's report is of objectively high quality that it is diagnostic of potential problems with MRP. By using accepted standards for experimental, analytic, and data reporting practices, yet arriving at a fantastic conclusion, Bem has put empirical psychologists in a difficult position: forced to consider either revising beliefs about the fundamental nature of time and causality or revising beliefs about the soundness of MRP.

Perhaps because psychologist make terrible theoretical physicists, most chose to revise their beliefs about the soundness of their scientific practices—practices that often include the use of experimental designs. Hence, the replication crisis was born not out of fraud or malfeasance, although psychology has suffered both, but by the faithful application of the scientific method. The story is rich in irony but there were voices prior to Bem calling for reform. One of those voices was John Ioannidis (2005) who, in a masterpiece of organized skepticism, boldly proclaimed that most published research findings were false. Ioannidis offered six corollaries to guide scholars on the likelihood findings in any one area were true. Consider his corollaries both as setting the stage for future replication efforts and for what they mean for criminology:

1: The smaller the studies conducted in a scientific field, the less likely the research findings are to be true;
2: The smaller the effect sizes in a scientific field, the less likely the research findings are to be true;
3: The greater the number and the lesser the selection of tested relationships in a scientific field, the less likely research findings are to be true;
4: The greater the flexibility in designs, definitions, outcomes, and analytical modes in a scientific field, the less likely research findings are to be true;
5: The greater the financial and other interests and prejudices in a scientific field, the less likely the research findings are to be true;
6: The hotter a scientific field, the less likely the research findings are to be true.

Ioannidis went on to explain that most findings in most research areas were false positives and "may often be simply accurate measures of the prevailing bias" (p. 700). To improve research quality, he suggested larger scale studies aimed at testing major concepts where the pre-study probability was already high, moving away from null hypothesis testing, and the pre-registration of studies. In other words, address scientific processes and methods. However, he also called for a change in research culture and the "curtailing of prejudices" (p. 701). He then recommended that "…large scale studies with minimal bias should be performed on research findings that are considered relatively established, to see how often they are indeed confirmed." Perhaps validating Bem's ESP, Ioannidis presciently forecasted the results, stating unequivocally "I suspect several established "classics"

will fail the test."

The period since Bem's ESP study has witnessed remarkable scholarly work in the area of replication. Research teams from around the world were mobilized and, guided by Ioannidis' insights, they keenly decided to attempt to replicate all of the major studies in psychology –studies that have been the core of teaching and research in psychology for decades. And one by one, just as Ioannidis (2005) predicted a decade earlier, they fell.

The first world-wide effort to examine replication of scientific work involved 100 studies published in three psychology journals analyzed by 270 researchers. Results were disappointing. Ninety-seven percent of the original studies reported significant results, but only 36 percent of the replication studies produced significant results; less than 50 percent of original effect sizes fell within the 95 percent replication confidence interval; 38 percent of effects were classified as having replicated, but replication effect sizes were half the magnitude of those initially reported. Studies from social psychology had a higher failure rate, 74 percent, than did studies from cognitive psychology (47 percent) (OSF, 2015). The take home message was clear: Studies that formed the backbone of psychology, many that involved experimental designs, could not be replicated, and those that could had effect sizes much lower in magnitude than originally reported. So not only did studies not replicate, even if they did many were accompanied by effect sizes that made their contribution marginal.

In short order, empirical attention turned to understanding the processes that imperiled replication efforts. Few believed, at least initially, that research fraud was sufficiently pervasive to account for the lack of replication. However, scholars for some time had been warning about the various intentional and unintentional processes researchers engage in that create unreliable findings. Charles Babbage, in 1830, for instance used the analogy of a cook "cooking" data to describe the process of selective reporting of observations. Summarizing the various degrees of freedom exercised by researchers, Simmons, Nelson, and Simonsohn (2011) discussed the "undisclosed flexibility in data collection and analysis," enjoyed by scholars. Many of the terms quickly entered researcher vernacular, including p-hacking, p-harking, asterisk hunting, and data dredging (see also, Bishop, 2019; Kerr, 1998; Obeauer & Lewandowsky, 2019). Wicherts et al., (2016) followed up and further systematized the various ways researchers can influence reported

results, enumerating 34 "degrees of freedom" that can occur throughout the research process.

These degrees of freedom have become better known as Questionable Research Practices (QRP) and involve everything from fraud and fabrication to manipulating data to boost p-levels. Research into QRP's typically involve the administration of self-report surveys that contain questions specific to individual behavior and individual reports of others behavior. Other studies, however, examine official databases. Research on QRP converge on three replicated findings: First, data fraud and data fabrication appear rare. Official estimates, which are clearly downwardly biased, suggest that fabrication, fraud, and plagiarism affect less than 1 percent of studies (George & Buyse, 2015). Self-report studies also find relatively low rates of serious data fraud, typically between 1 to 2 percent (for fraud) to 7 percent for plagiarism. That said, systematic fraud can go undetected for decades and can involve dozens of published papers. Diedrik Stapel, a Dutch social psychologist who published 130 articles and 24 book chapters, for example, was found to have falsified much of his work—work, I'll add, that was published in the top journals in the world, such as Science. When asked how he was so successful in publishing fraudulent studies, he stated simply "I told reviewers what they wanted to hear."

Second, the prevalence of less serious QRP, however, is substantial. Here, estimates range from 30 to almost 80 percent of researchers who admit to engaging in at least 1 QRP. John, Loewenstein, & Prelec (2012), for example, surveyed over 2,000 psychologists about their use of QRP. Their results were telling: About 10 percent of psychologists admitted to data fabrication, with large majorities admitting to other questionable practices, such as not reporting all dependent measures (78%), collecting more data after the results were known (72%), selectively reporting studies that worked (67%), and excluding data after knowing the impact of doing so (62%).

Third, when asked about the behavior of their peers, researchers report widespread use of QRP, including outright fraud. Fanelli's (2009) meta-analysis of QRP research, for example, found that 14 percent of researchers knew of colleagues who had committed serious fraud and 72 percent who engaged in QRP. Similar patterns have been found in studies of Medicine and the health sciences (George & Buyse, 2015; Gerrits, Janse, Mulyanto, van den Berg,

Klazinga, & Kringos, 2016).

Of particular concern to social scientists are the practices of p-hacking and of HARKing. P-hacking involves researchers trying various combinations of statistical models until their desired results are achieved. In a sense, the key variable reached the $p < .05$ threshold which then provides justification for attempted publication. Importantly, however, readers are never told of the efforts engaged in to obtain the published findings.

Studies show that p-hacking is widespread (Head, Holman, Lanfear, Kahn, & Jennions, 2015) and in some ways appears to be standard practice, even in our field. A lessor known, but equally problematic QRP, is that of HARKing. According to Rubin (2017, p. 2), HARKing refers to "hypothesizing after the results are known." HARKing involves researchers combing through data conducting various statistical tests until support is found for their hypotheses. If results are contrary to initial hypotheses, however, new post hoc hypotheses are created and then passed off in the research report as original. The reader is thus lead to believe the researcher confirmed their initial hypotheses. HARKing obviously produces significant findings, which journals are more likely to publish, but it also excludes falsification since the hypotheses are always confirmed. Rubin's summary of studies into self-reported HARKing, shown below, finds that between 27 percent and 58 percent of scholars engage in this behavior, with a mean of 43 percent.

QRP appear to be engaged in with an eye towards achieving statistical significance for parameters of interest. Examination of journal publications has decidedly shown that null effects are rarely reported, especially in the social sciences. Fanelli (2009) studied over 4,600 papers published between 1990 and 2007. In the social sciences, positive results were over twice as likely to be publish than were null results—a trend that increased over time from 1990 to 2007. By the end of the study period (2007), over 90 percent of study results found in social science journals were positive. Given standard statistical thresholds, a 90 percent confirmation rate would seem highly unlikely. Clearly, we have either achieved a level of insight into complex social behavior never before known, or our studies and the systems used to vet our studies are biased.

Researchers are not stupid people, but like anyone else they respond to incentives and disincentives that can affect their career. By any measure,

publishing articles, especially in high impact journals, has become the metric by which all else is judged. Graduate students hitting the job market now often have a dozen or more publications, compared to just a few publications no more than 10 years ago. Junior scholars now go up for tenure with 30, even 60 or more publications. And senior faculty can have produced hundreds of publications over their career. Publication, for all intents and purposes, has become the currency by which status is gained, wealth is increased, and value is evaluated. What this has led to is increasing expectations for the rapid accumulation of publications and for continuity in year-to-year publication rates. As our sociological brethren have found, unreasonable standards can cause people to employ alternative strategies to achieve success. The use of QRP thus becomes a rational reaction to careerist demands and, perhaps more importantly, to the demands of publishing outlets— namely that the results reported are novel, statistically significant, and tell a good story (Bishop, 2019; Young, Ioannidis, & Al-Ubaydli, 2008).

Since positive, novel findings are more likely to get published, there are few career incentives for scholars to pursue studies that may produce insignificant results. P-hacking and other QRM may thus be born out of both ignorance of scientific formalism and an accurate assessment of the conditions necessary to achieve success in publication. That said, the expectation of journal editors and reviewers have played a critical role in incentivizing the use of QRP and the resulting lack of reliability in the criminological literature base. To be blunt, I expect most published results in criminology are the product of QRP and that few studies would replicate if such attempts were made. We are no different in this respect than are other disciplines.

The almost exclusive reliance on reaching arbitrary statistical thresholds, combined with the widespread use of QRP, is both a response to and an effect of various publication biases. I've already mention a few of these biases, such as the strong preference for significant and novel findings, but there are others. Editors often have their own views of what constitutes good science, and sometimes these views don't actually mirror good science. And as anyone who has published can tell you, editors can either kill or smooth the path for a paper to be published simply by selecting specific reviewers. Reviewers, too, sometimes have their own agendas and while I'm certain most attempt to be neutral inquisitors, it is also clear many are not. Peer review is imperfect and subject to

many forms of bias. These issues were empirically examined by Gerber and Malhotra (2008), who studied 3 years of publications in the American Sociological Review, the American Journal of Sociology, and The Sociological Quarterly. Using a "caliper test," Gerber and Malhotra found strong evidence of publication bias across all three journals. Indeed, the chance of obtaining the distribution of statistically significant results culled from these journals exceeded 1:15,000 to 1:100,000 depending on the cutoff imposed. Publication bias distorts science by providing a false or misleading picture of scientific findings. Sometimes this distortion creates an illusion of scientific consensus on an issue, while at other times the absence of null results is taken as evidence they don't in fact exist. Either way, science becomes more illusory and misleading and scientific correction becomes less probable (Ioannidis, 2012).

Thus far I've imported much of my critique from research in psychology. A reasonable critic might ask whether we have a replication problem in the social science? A group of 24 scholars attempted to replicate social science experiments published in the journals Nature and Science between 2010 and 2015 (Camerer et al., 2018). Similar to the earlier OSF study on replication, this research team could only replicate 13 of the 21 original studies, with replication rates ranging from 57 to 67 percent. Effect sizes, too, were approximately ½ of those reported in initial studies. The authors argued that the presence of false positives combined with inflated effect sizes of true positives, contributed to replication failures. Combined, however, the results show that even with randomized experimental trials, from studies published in the top journals in the world, the chance for successful replication was not much better than a flip of a coin.

ISSUE TWO: DELIBERATE IGNORANCE BETRAYS SCIENTIFIC INTEGRITY

The problems I just discussed reflect deviations from the scientific process. Their fix, which I'll propose shortly, unsurprisingly involves changing our methods and research processes to better reflect fidelity to the scientific method. What I wish to discuss now, however, has less to do with method and measurement and more to do with the embrace of scientific principles. The embrace of scientific

principles seems, at least to me, to be the precondition for effective reform of our scientific processes. If we cannot embrace the most fundamental of scientific values, or if we embrace them only situationally, then changes in processes will be mute.

Now, too, seems an ideal time to discuss just how well we embrace core scientific values. Criminology, after all, is facing a crisis of legitimacy and, like many such crises, the warning signs have been visible for some time. Take, for example, the current handling of allegations of research impropriety made by a coauthor of a research team—allegations that affect a broad swath of papers published in top ranked journals and allegations that have now spilled outside of the field. Let me emphasize that I have nothing against the authors or other individuals involved in this complex drama. I do not envy any of their experiences. Nonetheless, it is fair to say that every mistake that could be made in handling this issue has been made, and that it is nothing short of astonishing how poorly these allegations have been managed. The comedy of errors has been an embarrassment to our discipline and, unfortunately, it appears as though every effort is being made to either avoid acting on the allegations or to simply sweep them away.

Accusations of research malfeasance, especially of data fabrication, are the most serious that can be leveled at a scholar. The mere accusation has the ability to forever taint one's career. However, once made two processes should kick into action—both of which are rooted in scientific values. First, in keeping with the highest principles of science, the accused should make every effort to solve the issue by providing access to the data in question. In situations where special conditions apply to the data, such as confidentiality requirements, alternative mechanisms can be arranged. Errors, if made, can be claimed and the scientific record corrected. Second, if the allegations cannot be resolved, innocence must still be presumed and all due process rights protected, but the allegations should still be adjudicated by an impartial panel of experts and the papers in question noted by the journals involved. The adjudicatory process should be guided by the principles of impartiality and objectivity.

Unfortunately, these principles gave way to collective self-interest, where each actor took steps to shield themselves or others or to adjudicate the motives of each other in public. The primary scientific questions concerning the accuracy and

reliability of published research results were treated as a tertiary issue of little import. Indeed, the editor of Criminology admitted that other "gibberish" had been published in the journal and that nothing was done. Even being charitable, I find it difficult to defend the cavalier disregard for scientific accuracy and integrity. The eventual retraction of four papers, with the potential for others looming on the horizon, did not resolve these issues.

 Again, my intention is not to cast aspersions at individual actors but to situate their actions in a broader context of institutional incentives and constraints —incentives and constraints that can easily become misaligned away from the values of science. If we valued transparency, for example, we would be able to examine the processes that led to so many papers being published in top journals without reviewers or editors catching some fairly obvious problems. We would know if the errors were caught and explained away, who reviewed these papers, and whether the reviews were sufficient. In short, we would know why the papers were accepted for publication by the editors and whether correctable errors were made. An emphasis on the scientific value of transparency would allow answers to these questions. After all, a good faith effort may have been made by all involved.

 Transparency, objectivity, and ruthless honesty are guiding scientific values that have proven, over many generations, to lead to better science. Scientific values matter, and like Bishop (2019, p. 3), it is important that we "understand the mechanisms that maintain bad practices in individual humans. Bad science," she astutely notes, "is usually done because somebody mistook it for good science." In this case, many people mistook bad science for good and we might want to know why. Perhaps, however, we don't want to know why and instead wish to remain deliberately ignorant?

 Before you dismiss my comment as that of a cynic, know that deliberate ignorance is often times a rational, even desirable, state. Hertwig and Engel (2016), for example, tell us that deliberate ignorance is often preferred because it increases regret avoidance, because it can be performance enhancing, and because it can be used strategically to avoid responsibility and liability. Deliberate ignorance is also often perceived to increase impartiality and to help us maintain a range of preferred beliefs. Deliberate ignorance is, in many ways, a sensible short-term response to information that may be accompanied by psychological and

emotional burdens. Not knowing, in other words, excuses our obligation to change in light of new information.

Of course, deliberate ignorance is contrary to the aims of science. Yet here too, I wish to point out that criminology has elected to remain willfully ignorant as a science. As some of you know, much of my work has been in an area called biosocial criminology. It's an area interested in how human biological variation and functioning affects human conduct. The area is more of a paradigm than a theory so many different methodological designs are employed, often from disciplines outside of criminology. One design is that of a twin study where standard quantitative genetics models are used to estimate how much variance in a trait or behavior can be attributed to unknown genetic influences, and common or unique environmental influences. Twin studies are used widely across disciplines as diverse as agriculture, to animal breeding, to brain studies, to studies of complex traits. Thousands of twin studies exist and they have yielded important insights into the origins and plasticity of human functioning and disease. Indeed, so consistently replicated are twin studies into human traits and behaviors that today it is common knowledge that all traits and behaviors are heritable, to varying degrees, and that unique environmental experiences account for more variance than do shared environments. These, by the way, are referred to as the Three Laws of Behavioral Genetics (Turkheimer, 2000).

Perhaps I exaggerated slightly when I said behavioral genetic findings were common knowledge. They are common knowledge in many sciences but not in criminology. Despite reams of replicated evidence, criminology has remained defiantly ignorant of research in this area. Let me explain: Name another area in criminology, for example, where journal editors would brag publicly about teaching their students to "hate read" specific scholarly studies, or another area where journals have banned the use of a national dataset because it was often employed by specific researchers, or where journal editors colluded to reject submissions from a specific academic area? You would be hard pressed to find such reactions. However, to better highlight the discipline's intellectual counter efforts, see if you can name any other area where critics would openly advocate banning research while simultaneously suggesting politically correct ways of discussing specific research findings. Now imagine those efforts were published in our top journal. I am, of course, referring to an exchange we had between

Professors Burt and Simmons (2014, 2015; see also, Barnes et al., 2014 and Wright et al., 2015) in the pages of Criminology. Burt and Simmons not only called for banning quantitative genetic models on grounds that they were "fatally flawed." I will be blunt. Their piece was factually wrong in almost every way imaginable, and had their criticisms been correct, they would have upended decades of research in multiple hard sciences while simultaneously calling into question everything we know about the mathematics of evolution. Their work would have been so revolutionary, they would have earned a Nobel Prize-- had they been correct.

THE WAY FORWARD

Having exhausted my time, and I'm sure your patience, let me quickly outline a few suggestions for reform. While my talk has been critical of our field, I'm also cautiously optimistic. My optimism springs not from a naïve belief that change will be easy but from the belief that change will be hard and challenging, yet worthwhile, and I believe that most criminologists, especially younger criminologists, are interested in change. Other fields, too, have faced these daunting challenges and can they provide us with keen insights into what will most likely work for us, and what will not. Looking at these fields, many are moving to an open science framework. While details vary, the general principle is that every effort is made to make available data and statistical code so that others can easily evaluate and replicate our analytical efforts. Some journals now require data and code to be deposited prior to publication, or for authors to explain why such arrangements are not possible. Other fields have also moved to a system of preregistered studies. Preregistration is an effort to compel scholars to more clearly think about their study design, selection of variables, and planned analytical techniques prior to engaging in the study. Preregistration is designed to reduce QRP and in at least one study has been shown to dramatically reduce the number of significant associations reported in clinical trials (from 57% prior to 2000, to only 8% after year 2000) (Kaplin & Irvin, 2015).

In their "manifesto for reproducible science," Munafo et al. (2017) recommend 10 proposals to systematize the collection and reporting of social

scientific data. Their recommendations run the gambit from rewarding scholars who participate in open science efforts, to creating and using protocol checklists for data reporting, to engaging in collaborative and team research efforts. If taken seriously, criminology could be improved by embracing these, and similar, practices to make our science more transparent and hopefully more reliable. Yes, retractions may increase but as others have noted, retractions are a sign of a healthy science (Fanelli, 2013). There is little reason why criminology should avoid moving in a similar direction.

Open science, however, is not a cure all for what ails our discipline. In recent years our major organizations and organization presidents have encouraged scholars to engage in political activism. The scholar-activist model they propose couples the passions for social and economic justice to scholarly research efforts. Such language has now been codified in the American Society of Criminology's Code of Ethics. This is a terrible mistake because it frames the scientific process in terms of providing evidence about favored narratives so as to justify specific policies. Under this scheme, science is highjacked and made slave to the political whims of its masters. As a host of studies show, ideological reasoning impairs logical judgement and reduces the safeguards science offers. In the end, such an approach is guaranteed to delegitimate our science and to divorce our work from reality (Martin, 2015).

Criminology stands at a fork in the road. May I suggest we take the path less traveled, that we embrace Feynman's "utter honesty" and Nietzsche's "intellectual conscience," and that we open our science and confront directly the challenges that will emerge. Progress, after all, is never guaranteed.

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Effects of Normative and Instrumental Factors on Compliance, Cooperation, and Obedience in South Korea

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Abstract

In recent years, studies began to pay attention to Tyler's process-based model of regulations, which is one of the efforts emphasizing the importance of normative practices to encourage people to obey the law over instrumental practices. Following Tyler's model, the current study tests procedural justice theory by investigating impacts of normative factors of procedural justice, normative alignment, and obligation to obey, along with instrumental factors of perceived police effectiveness and perceived risk of sanctions on citizens' compliance with the law and cooperation with the police. For this purpose, we collected data by surveying 520 individuals in South Korea between July 2017 and August 2017, using a questionnaire used by the European Social Survey (ESS). Data analyses demonstrate that compliance is negatively influenced by procedural justice, but positively influenced by normative alignment and perceived effectiveness; cooperation is positively influenced by perceived effectiveness and perceived risk of sanctions; finally, obligation to obey is positively influenced by procedural justice, normative alignment, and perceived risk of sanctions. These findings support the procedural justice theory partially. Discussion, implication, limitations are followed.

Keywords

INTRODUCTION

Among the major governmental institutions which sustain our society, the police are second to none in drawing the public attention. As an institution created to maintain essential social infrastructure, the police are obligated to handle socially inharmonious occurrences efficiently and effectively (Novak, Smith, Cordner, & Roberg, 2017). Inevitably, the nature of police work interferes with citizens' lives, and the police often face unfriendly responses from citizens that make their job harder (Kim, 2014). In order to achieve its institutional goals, it is important for the police to figure out how to perform their duties in ways that are accepted favorably by the citizens (Tyler, 2006b).

A substantial number of empirical studies demonstrate that the public perceptions toward and assessment of the police are significant in shaping police working environments (Dai, Frank, & Sun, 2011; Wells, 2007). For instance, citizens are more likely to support and cooperate with the police and less likely to commit crimes when they feel that the police are working legitimately and fairly (Tyler, 2006b). The citizens' perceptions of police legitimacy and fairness are promoted by the process-based model of regulation that emphasizes the importance of procedurally fair treatment and practices; and these perceptions in turn influence the citizens' willingness of compliance and cooperation with the law and authorities (Fagan & Tyler, Sunshine & Tyler, 2003; Tankebe, 2009).

Likewise, a substantial number of studies show that the citizens are more likely to be interested in how police do what they do, rather than what they actually do or what the results of their performances are: in other words, procedural factors appeal more to citizens than substantive ones (Fagan & Tyler, 2005; Reisig & Mesko, 2009; Sunshine & Tyler, 2003; Tyler, 2006b). Therefore, the police can benefit from discovering what factors have an influence on the public perception and assessment on police performance, especially in terms of procedural aspects (Walters & Bolger, 2019). For that purpose, factors determining the public perceptions and assessment of police activities are worth being disclosed and empirically measured.

One of the concerns about procedural justice studies comes from generalizability. Since most of the procedural justice studies so far have been conducted in Western nations, a generalizability concern across the countries with

different histories, cultures, and legal backgrounds surfaces (Johnson, Maguire, & Kuhns, 2014). Hence, more geographically diverse studies are warranted to contribute to the existent studies about the influence of procedural justice on compliance and cooperation. In an effort to expand a research site, the current study examined a dataset collected in South Korea, one of the far-east Asian countries.

Since the establishment of the modern organization, the South Korean police have undergone many insufferable hardships in terms of its official capacity and political neutrality (Kim, J., Wells, W., Vardalis, J., Johnson, S. & Lim, H., 2016). For example, while Imperial Japan ruled the Korean peninsula (1910-1945), Korean colonial police were utilized as a brutal apparatus to control Koreans and crack down on the efforts to achieve independence (Woo, Maguire, & Gau, 2018). The brutal, corrupted, and politicized impressions of the colonial police lasted longer even after the Korean peninsula was liberated from Japan in 1945 due primarily to turbulent political situations, such as the Korean war (1953 – 1953), military coups (1961 and 1979), military regimes (1961 – 1992), and multiple suspected election frauds (see Moon, 2004; Woo et al., 2018). For pro-democratic civilians were inaugurated as presidents since 1992, the South Korean police were considerably eased from the blame of a minion of the regime (Kim et al., 2016); still its nationally centralized structure and president-appointed leadership cast doubts over political neutrality of the police (Lee, 2004). In this vein, process-based policing may have implications for the South Korean police to the efforts of restoring its legitimacy and regaining public trust.

In order to examine the process-based model of policing in South Korea, especially focusing on the influence of police legitimacy fostered by procedural justice factors on the public compliance and cooperation with the law and the police, this study adopted the modified European Social Survey (ESS) which has been utilized to analyze the public attitudes, beliefs, and behavioral patterns in a number of prior U.S. studies (Tyler, 2006a; Sunshine & Tyler, 2003).

PREVIOUS STUDIES

Theoretical Frame Note

Traditionally, laws and policies have been established and enforced by professionally educated and trained personnel in centralized groups (Tyler, 2006b). This practice is based on an idea of hierarchical bureaucracy with a pyramidal social structure. In this frame, while the power elite at the top level suggests, establishes, and directs the law and policy, the lower level bureaucrats carry them out, and those at the bottom level of the pyramid are ruled accordingly (Tyler, 2006b). Compliance with the enforcement of law is guaranteed by punishing the disobedient, specifically law violators (Piquero & Pogarsky, 2002). However, in the modern democratic society, which is philosophically based on the social consensus, citizens' unconditional obedience to the authority's intention is losing its antiquated foundation (Novak et al., 2017). While the traditional criminal justice system still relies heavily on hedonistic utilitarianism which instrumentally encourages people to obey the law in order to avoid pain (punishments), alternative efforts on the criminal justice system based on Kantianism have emerged which encourages people to behave morally and in turn, abide by the law voluntarily because it is the right thing to do (Sandel, 2010).

In his seminal work, *Why people obey the law*, Tyler (2006b) encapsulated these two perspectives. He accounted for the reasons why people obey the law with two principal approaches: an instrumental approach which compels people to obey the law by punishing law violators; or a normative approach which persuades people to comply with the law by promoting voluntary obedience (Tyler, 2003). The instrumental approach is mainly based on cost-benefit analysis. If the cost is greater than the effect of behavior, e.g., if a person feels a higher risk of sanctions with fewer rewards as a result of the behavior, then the person would give up the act; however, if the benefit of a behavior is greater than the cost, e.g., a lower risk of sanctions with more rewards as a result of the behavior, then the person would go for it (Bottoms, 2002; Sunshine & Tyler, 2003). In this vein, in order to deter a potential criminal, an instrumental approach tries to raise a risk of sanctions via possibly effective criminal justice institutions with severe punishments (Johnson et al.,

2014; Tyler, 2003). On the other hand, in order to facilitate a sense of morality, a normative approach attempts to enhance legitimacy via the procedural justice model in regulations, possibly with normative alignment (Tyler, 2003).

If a normative approach could induce citizens to voluntarily comply with the law, then the police can perform their jobs better with the same quantity of resources or even less (Tyler, 2006b). On the other hand, the police must continually monitor citizens and punish lawbreakers under an instrumental approach, which will likely be more pricey than the voluntary-based policing (Tyler, 2006b). Therefore, implementing the normative approach would be more promising for achieving favorable goals in policing strategies. This procedural justice theory, however, is still under development in exploring the influence of legitimacy via procedural justice on the public compliance and cooperation with the law and legal authorities (Woo et al., 2018). The current study investigates the impacts of normative factors of procedural justice, normative alignment, and obligation to obey, along with instrumental factors of perceived police effectiveness and perceived risk of sanctions on citizens' compliance and cooperation with the law and legal authorities.

Compliance with the Law

Voluntary compliance, an external appearance of a sense of duty to obey the law, is one of the key concepts in legitimacy study (Johnson et al., 2014). The traditional legal system assumes that people would follow the law passively to avoid punishment for violating it (Tyler & Jackson, 2014). However, as people have become to be considered as beings who interact actively with their environments, a new approach of the legal system has emerged. Instead of considering citizens as passive beneficiaries of the legal system, this new perspective sees people as active participants who provide feedback by interacting with the system (Tyler, 2006b). In this type of interaction, people do not accommodate the authority unconditionally, but examine it critically and react accordingly. Therefore, instead of soliciting citizens for unconditional compliance, the modern authority is motivated to seek citizens' agreement to accomplish a favorable goal in policing (Reiner, 2000).

Cooperation with Legal Authority

In addition, the extent to which citizens assess the legitimacy of the police has a significant impact on their cooperation with the police and acceptance of the police work (Jackson, Huq, Bradford, & Tyler, 2013), respect for the police (Tyler & Huo, 2002), observing the rules, and supporting the police (Sunshine & Tyler, 2003). Beetham (1991) argues that legitimacy provides a moral justification to people in obeying the authority. Merphy and Cherney (2012) found that when the level of citizens' recognition of the police legitimacy was higher, their willingness to cooperate with the police increased in Australia. Sunshine and Tyler (2003) confirmed similar findings in New York City. On the other hand, Tankebe (2009) demonstrated that, in Ghana, citizens' perceptions of the outcomes of police performance had a bigger impact on their willingness to cooperate with the police than their perceptions on police legitimacy.

Obligation to Obey

Tyler (2003) posits that obligation to obey directly represents legitimacy. Two components in legitimacy are perceived moral appropriateness of the institution and internalized sense of consent to the authority (Tyler, 2003). Perceived moral appropriateness of the institution is a matter of judgment on whether the agency has a rightful authority and exercise it normatively. When citizens believe the agency exercises its authority properly and fairly in line with their expectations, then citizens would have a sense of obligation to obey the agency (Jackson et al., 2012). An internalized sense of consent to the authority is a matter of judgment on whether the agency is entitled to dictate how citizens behave. When citizens recognize that an agency is legitimately entitled to dictate their behavior, they would follow the directions and obey the law voluntarily (Hough, Jackson, & Bradford, 2016). On the other hand, Tankebe (2013) suggests that obligation to obey is a *component* of legitimacy, not *antecedent*.

Normative Factors: Procedural Justice and Normative Alignment

Being frequently considered as an antecedent of legitimacy, procedural justice is typically conceptualized and operationalized with quality of treatment and decision making (Gau, 2011; Johnson et al., 2014). Legitimacy is defined as "a

quality possessed by an authority, a law, or an institution that leads others to feel obligated to obey its decisions and directives voluntarily" (Tyler & Huo, 2002, p. 102), and it is considered to promote the public compliance and cooperation with the law and legal authorities via the sense of obligation to obey (Sunshine & Tyler, 2003; Woo et al., 2018). Baker, Meyer, Corbette, and Rudoni (1979) found that equal treatment in procedure was especially important in increasing satisfaction with the police, evaluation of effectiveness in police performance, and assessment of police respect for civil rights. However, Tankebe (2013) argues that procedural justice is a component of legitimacy, not an independent antecedent. As the dimensions or components of the legitimacy of law and legal authorities in the previous studies, the majority of studies posit that procedural justice facilitates the sense of obligation to obey, which is one of the core components of legitimacy (Woo et al., 2018).

Some studies consider that, in procedural justice theory, procedural justice and normative alignment are the most crucial elements in cultivating or preserving institutional legitimacy (Hough et al., 2013; Jackson et al., 2012). Conceptualizing normative alignment as a belief that citizens and police officers' share the same purposes, goals, and values in the community, Tyler and Jackson (2014) found that normative alignment is significantly associated with compliance with the law, helping the police, obligation to obey, and trust and confidence. Normative alignment is relevant to the effect of what people view as just and morally contrasted with their self-interest (Tyler, 2006b). People who have a sense of normative alignment are more likely than people without it to abide by law and order voluntarily regardless of instrumental considerations (Tyler, 2006b). Some elaborated that, in researching procedural justice, normative alignment along with procedural justice is the most crucial factor to cultivate and preserve institutional legitimacy (Hough, Jackson, & Bradford, 2013; Jackson et al., 2012).

Instrumental Factors: Perceived Effectiveness and Risk of Sanctions

Theories and research on procedural justice explain that people who are inspired by procedurally fair police behavior are more likely to have a higher sense of obligation to obey, and the sense, in turn, increases the level of voluntary compliance and cooperation with law and legal authorities via normative

judgments (Tyler, 2006b). On the other hand, alternative explanations suggest that people behave based on a hedonistic calculus which causes a sense of obligation to obey, complying and cooperating with the law and legal authorities on behalf of self-interest via instrumental judgments (Johnson et al., 2014; Woo et al., 2018). While, in their study with 25 European countries, Hough et al. (2016) found in most countries that perceptions on the effectiveness of police performance were significantly related with perceptions on procedural fairness, Bradford (2014) uncovered that both evaluations of effectiveness in police performance and procedural fairness were significantly associated with citizens' cooperation with the police. In his study in Ghana, Tankebe (2009) found that perceived police effectiveness was associated with public cooperation with the police while legitimacy was not. In addition, citizens' perceptions about the risk of sanctions are a potential factor that can have an influence on citizens' perceptions of legitimacy and their social behavior. Kaiser (2016) found that, for the police, procedurally just interactions with citizens have more impact on citizens' social behavior than threatening them with potential sanctions.

Current Study

Basic conceptual model

Given the unique conditions the Korean police are placed in, as well as the presumed association between the legitimacy of the law/legal authorities and citizens' behavior toward them, it is hypothesized that exogenous variables of procedural justice, normative alignment, obligation to obey, perceived police effectiveness, and perceived risk of sanctions have positive impacts on endogenous variables of compliance with the law, cooperation with the police, and obligation to obey. Obligation to obey is included in exogenous variables and endogenous variables since it is considered as a mediator. Such a causal relationship is represented by a single-headed arrow in Figure 1, basic theoretical model. In addition to the direct effect, which is consistent with Tyler's procedural justice theory that authority figures' procedurally just manner inspires citizens' sense of obligation to obey and in turn enhances their behavior, we also investigate the indirect effects of procedural justice, normative alignment, perceived police effectiveness, and perceived risk of sanctions mediated by obligation to obey on

compliance with the law and cooperation to the police. Also, the impacts of a series of observed control variables of age, gender, family monthly income, and education on cooperation and compliance are examined.
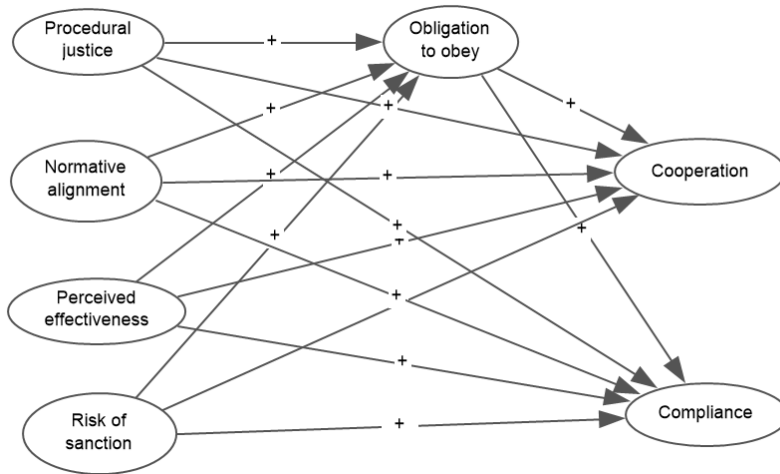
Figure 1. Basic Theoretical Model

Research hypotheses

The current study inspects the basic conceptual model with research hypotheses below:
1. People who perceived a higher level of procedural justice are more likely to (1) comply with the law (2) cooperate with the police, and (3) have a sense of obligation to obey.
2. People who normatively align themselves with the police are more likely to (1) comply with the law (2) cooperate with the police, and (3) have a sense of obligation to obey.
3. People who highly evaluate police performance are more likely to (1) comply with the law (2) cooperate with the police, and (3) have a sense of obligation to obey.
4. People who perceive a higher risk of sanctions are more likely to (1) comply with the law (2) cooperate with the police, and (3) have a sense of obligation to obey.
5. The sense of obligation to obey mediates impacts of procedural justice, normative alignment, perceived police effectiveness, and perceived risk of sanctions on compliance with the law and cooperation with the police.

METHODOLOGY

Survey Instrument

The current study utilized a modified version of the European Social Survey (ESS) to conduct research in South Korea. Since 2002, the ESS continues to collect data from about 25 to 30 European countries every two years to analyze the public attitudes, beliefs, and behavioral patterns (Jowell, R., Roberts, C., Fitzgerald, R., & Eva, G., 2007). The survey questionnaires, which already used in a number of prior procedural justice studies in the United States (Tyler, 2006a; Sunshine & Tyler, 2003), translated in Korean is composed of 104 items to examine the public perceptions toward police activities. Before conducting the survey, we had five pilot test sessions with 20 Koreans to deal with issues from translating English in Korean.

Sample

Data were collected across the country through Do It Survey (DIS), a Korean online survey company, for a month from July 2017 to August 2017. To raise the survey's representativeness based on the census data, the survey was proportionately assigned to 16 regions among various groups of gender and age. Survey participants who already had memberships with the DIS were notified of our survey via DIS website and emails and participants were given cashable points for taking the survey. When assigned gender and age in a certain region were filled, the survey for the region was closed. As a result, 520 participants completed the survey. Among 520 participants, 49.4% were male, and 50.6% were female; in terms of age, 16.9%[1] were 20-29, 17.5% were 30-39, 22.5% were 40-49, 34.4% were 50-59, and 8.7% were 60 and above; as for family monthly income, 29.5% were below $3,000, 42.9% were $3,000-$59,999, 27.7% were $60,000 and above[1]); with regard to education level, 28.1% were high school graduate and below, 19.6% were two years college graduate or studying in a four years college, 45.4% were four years college graduate, 6% had master's degree, and 1% had Ph.D. degree (Table 1).

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1) The currency rate was calculated as 1,000 Korean won for $1.

Table 1. Sample Demographic Characteristics (N = 520)

Variable	Frequency (%)	Mean	SD
Gender (male = 0, female = 1)		.51	.50
Male	257 (49.4)		
Female	263 (50.6)		
Age (1 – 5)		3.00	1.24
20 – below 29	88 (16.9)		
30 – below 39	91 (17.5)		
40 – below 49	117 (22.5)		
50 – below 59	179 (34.4)		
60 and above	45 (8.7)		
Family monthly income (1 – 7)		3.91	2.05
Less than $2,000	83 (16.0)		
$2,000 – $2,999	70 (13.5)		
$3,000 – $3,999	89 (17.1)		
$4,000 – $ 4,999	78 (15.0)		
$5,000 – $5,999	56 (10.8)		
$6,000 – $6,999	58 (11.2)		
$7,000 and above	86 (16.5)		
Education (1 – 5)		2.32	.98
High school	146 (28.1)		
2-year college grad or withdraw from 4-year college	102 (19.6)		
4-year college grad	236 (45.4)		
Master	31 (6.0)		
Doctoral	5 (1.0)		

Masures

Predicted variables

Compliance. Compliance with the law was measured using a five-point Likert scale with the question, "How often have you done each of the following five criminal activities in the last five years?" (Never; once; twice; 3-4 times; 5 times or more; do not know). Three crimes were measured by asking about the following: "Making an exaggerated or false insurance claim," "Buying something you thought might be stolen," and "taking something from a store without paying for it." When the compliance items were factor analyzed, all loaded on a single factor (factor loadings >.90), demonstrating unidimensionality of the construct. Cronbach's alpha demonstrated an excellent reliability (α = .90).

Cooperation. Cooperation with the police was measured by three survey items: How likely would you be to "Call the police to report a crime," "Report a suspicious person near your home," and "Provide information to help police to find a suspected criminal." Respondents were given answer choices with a four-point Liker scale: (1) not at all likely to (4) very likely. When factor analyzed, all the items loaded high (>.75) on a single factor, and Cronbach's alpha demonstrated an acceptable reliability (α = .70).

Obligation to the police. The following questions were administered to measure the variable of obligation to the police: "You should support the decisions of police officers even when you disagree with them," "You should do what the police tell you even if you do not understand or agree with the reasons," "You should do what the police tell you to do even if you do not like how they treat you," and "The police in your community are legitimate authorities so you should do what they tell you to do." Respondents were given a four-point Liker scale choice: (1) strongly agree, (2) agree, (3) disagree, (4) strongly disagree. When factor analyzed, all the items loaded high (>.82) on a single factor, and Cronbach's alpha demonstrated a good reliability (α = .87).

Explanatory variables

Procedural justice. Participants were given eight questions: How often do the police "Make fair and impartial decisions in the cases they deal with," "Give people a chance to tell their side of the story before they decide what to do," "Make decisions based upon the law and not their personal biases or opinions," "Treat people with dignity and respect," "Respect people's rights," "Try to do what is best for the people they are dealing with," "Explain their decisions and actions in ways that people can understand," and "make decisions that are good for everyone in the community" with a four-point Likert scale (never to always). When factor analyzed, all the items loaded high (>.90) on a single factor, and Cronbach's alpha demonstrated an excellent reliability (α = .90).

Normative alignment with the police. Participants were given the questions of: "The police generally have the same sense of right and wrong that you do," "The

police stand up for values that are important to you," "The police usually act in ways consistent with your own ideas about what is right and wrong," "You and police want the same things for your community," "The values of most police officers who work in your community are similar to your own," "The police stand up for values that are important to you" with a four-point Likert scale (strongly disagree to strongly agree). When factor analyzed, all the items loaded high (>.72) on a single factor, and Cronbach's alpha demonstrated an excellent reliability ($\alpha = .90$).

Perceived effectiveness. Two items were measured with an 11-point Likert scale ranging from (1) Extremely unsuccessful to (11) Extremely successful: "How successful are the police at preventing crimes where violence is used or threatened in your community?" and "How successful are the police at catching people who commit house burglaries?" One item was measured by an 11-point Likert scale ranging from (1) Extremely slowly to (11) Extremely quickly: "If a violent crime were to occur near your home and the police were called, how soon would they arrive at the scene?" When factor analyzed, all the items loaded high (>.81) on a single factor, and Cronbach's alpha demonstrated a good reliability ($\alpha = .84$).

Perceived risk of sanctions. The questions were: How likely are you to be caught and punished for "Making an exaggerated or false insurance claim," "Buying something you think might be stolen," "Taking something from a store without paying for it, with a four-point Likert scale (very unlikely to very likely). When factor analyzed, all the items loaded high (>.86) on a single factor, and Cronbach's alpha demonstrated a good reliability ($\alpha = .85$).

Control variables

The current study controls four demographic characteristics, gender, age, family monthly income, and education level, to avoid a bias in the detected estimates in the multivariate analyses (See Cao, Frank, & Cullen, 1996; Reisig, Tankebe, & Mesko, 2012; Tyler & Jackson, 2014). Bivariate zero order correlations between key variables are presented in table 2. We have investigated multicollinearity among key variables using SPSS 26 and found that no Variance Inflation Factor (VIF) value was above 3.0, which indicated no multicollinearity concern in our data (Kline, 2005).

Table 2. Zero Order Correlation Between Key Variables

	COMP	COOP	OBLI	PJUC	NOAL	PEFF	PRIS
COMP	1						
COOP	.001	1					
OBLI	.012	.115*	1				
PJUC	-.043	.170**	.406**	1			
NOAL	.065	.108*	.403**	.409**	1		
PEFF	.054	.210**	.257**	.394**	.460**	1	
PRIS	.027	.158**	.093*	.013	.025	.050	1

*p < .05, **p < .01, ***p < .001
Note: **COMP**: Compliance, **COOP**: Cooperation, **OBLI**: Obligation to obey, **PJUC**: Procedural justice, **NOAL**: Normative alignment, **PEFF**: Perceived effectiveness, **PRIS**: Perceived risk of sanctions

Statistical Analyses

To measure the relationship among predicted, explanatory, and control variables, descriptive statistics, zero-order correlation analyses, multivariate regression analyses, and path analyses using structural equation modeling (SEM) were conducted.

DATA ANALYSES AND FINDINGS

Results of Multivariate Analyses: Structural Equation Modeling

The multivariate analysis for this study is structural equation modeling (SEM) via Mplus 7.4. Our hypothesized SEM is described graphically in Figure 1, basic theoretical model. The hypothesized model appears to be a good fit to the data. The RMSEA is .037 which indicates an excellent fit; CFI is .954 and TLI is .948 both indicate a good fit (CFI, TLI > .95); and SRMR is .046 which also indicates a good fit (SRMR < .08) (Hu & Bentler, 1999; Kline, 2005). Therefore, we accept the measurement models and proceeded with the structural models. The results of data analyses are displayed in figure 2.
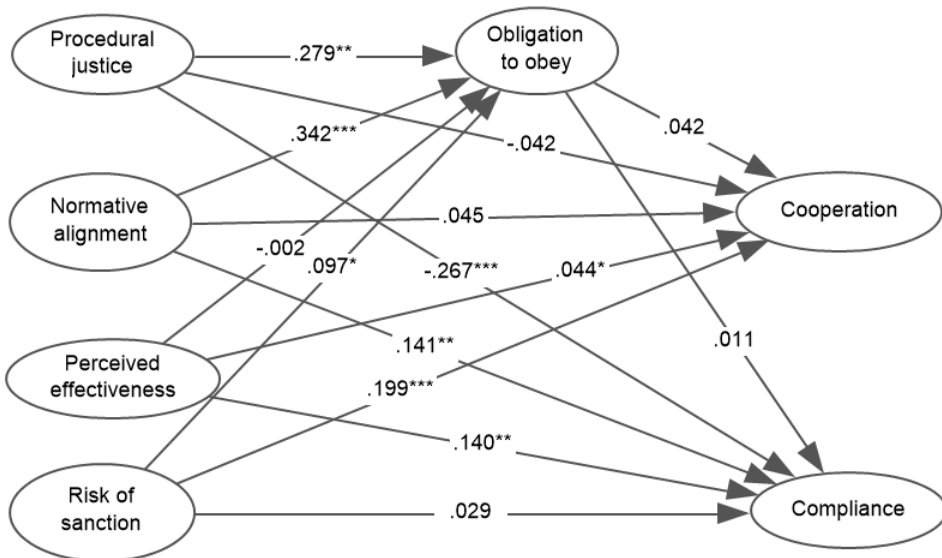
Figure 2. Path Model of The Effects of Normative and Instrumental Factors on Compliance, Cooperation, and Obedience

Note: χ^2 = 836.341 492 d.f., p ⟨ .001, CFI = .954, RMSEA = .037 (confidential interval = .032 − .041); p = two-tailed value (*p ⟨ .05, **p ⟨ .01, ***p ⟨ .001).

We begin by presenting the SEM results for compliance with the law (see Table 3). The predictors included in the model explain 8.9% of the variation in compliance (p < .01). Three of the four exogenous variables exerted a statistically significant direct effect on compliance: two normative factors of procedural justice

and normative alignment, and one instrumental factor of perceived effectiveness. Respondents who perceive that the police behave in procedurally right manner are less likely to comply with the law than those who view that the police behave in procedurally unjust manner (β = -.315, p < .001). This finding is not expected since typical effect of procedural justice on compliance found in this body of research is positive (Tyler, 2003, 2006; Walters & Bolger, 2019). By analyzing data collected from South Korea, Woo et al. (2018) also found negative impact of procedural justice on compliance, albeit the impact was not statistically significant at the conventional alpha level of .05 (β = -.220, p = .079). They interpreted the negative association between procedural justice and compliance with speculation that South Korean people might take process-based policing as lenient policing and take advantage of it. In other words, when people see the police treat citizens with respect and dignity, they may think that they can get away with what they have done and, even in the worst case, the police would not shift to use of force mode, such as physically enforcing the law including arrest. Compared to American police, South Korean police are relatively tolerant to citizens' resistance and are slow to using force. Some of the reasons might come from an ethnic homogeneity in population, a sense of common identity, strict gun policy, and multiple controls on the police. Ethnically, most of population in South Korea is Koreans who share more than 3,000 years-long history and culture. Gun possession is strictly prohibited by law with extremely limited exceptions, and the police are under multilayered monitoring of Police Headquarter, Prosecutor Office, Board of Audit and Inspection, Office of Prime Minister, and unofficial monitoring of mass media. In this context, South Korean people believe that the police would not use lethal force to them; and the Korean police are relatively hesitant to use force because police use of force is particularly sensitive issue and frequently undergo exhaustive internal and external investigations. These circumstances may provide citizens with a room to test police tolerance, which sometimes emerge as deviant behavior. More research is warranted on this negative relationship between procedural justice and compliance.

Normative alignment has a significant effect on compliance, which means that respondents who identify themselves with the police, thinking they share similar social norms, values, and virtues with the police are more likely to comply with the law than those who do not think so (β = .182, p < .01). Perceived effectiveness

also has a significant effect on compliance with the law, which indicates that respondents who perceive that the police work effectively are more likely to comply with the law than those who feel that the police work less effectively (β = .046, p < .01). The mediator variable, i.e. obligation to obey, did not exert a statistically significant effect on compliance with the law. One of the four control variables exerted a statistically significant effect on compliance with the law: gender. The significant positive coefficient for gender (β = .121, p < .01) indicates that females are more likely than males to comply with the law. The remaining controls, age, family monthly income, and education, did not have a statistically significant effect on compliance.

The second model shows the results for cooperation with the police (see Table 3). The predictors included in the model explain 13.5% of the variation in willingness to cooperate with the police (p < .001). Two of the four exogenous variables exert a statistically significant direct effect on cooperation with the police: perceived effectiveness and perceived risk of sanctions, both instrumental factors. This result means that respondents who perceive that the police work effectively are more likely to cooperate with the police than who perceive that the police work less effectively (β = .044, p < .05). In addition, respondents who think that there is a high chance to be caught and punished if one violates the law are more likely to cooperate with the police than those who evaluate the chance is low (β = .199, p < .001). The mediator variable of obligation to obey, however, does not exert a significant effect on willingness to cooperate with the police. Among the four control variables, only gender exerted a statistically significant effect on cooperation with the police. The significant positive coefficient for gender (β = -.011, p < .05) indicates that males are more likely than females to cooperate with the police.

In the SEM results for obligation to obey the police shown in Table 3, the predictors included in the model explain 26.4% of the variation in obligation to obey (p < .001). Three exogenous variables exert a statistically significant effect on obligation to obey: two normative factors of procedural justice and normative alignment, and one instrumental factor of perceived risk of sanctions. The results imply that South Korean people who perceive that the police behave procedurally right feel a stronger sense of obligation to obey the police (β = .279, p < .01). Also, those who think that their norms and values align with those of the police

tend to feel more sense of obligation to obey police directives (β = .342, p < .001). In addition, those who think that there is a high chance to be caught and punished if one violates the law are more likely to feel a sense of obligation to obey than those who evaluate the chance is low (β = .097, p < .05). Two of the four control variables exerted a statistically significant effect on obligation to obey: gender and education. The significant negative coefficient for gender (β = -.86, p < .05) indicates that males feel more obligation to obey than the females. The significant negative coefficient for education (β = -.103, p < .05) indicates that people with higher levels of education are less likely to feel an obligation to obey. The remaining controls, age and family monthly income, did not have a statistically significant effect on the obligation to obey the police.

Table 3. Structural Equation Modeling Results

Description	Compliance		Cooperation		Obligation to obey	
	b	β	b	β	b	β
Latent variables						
Procedural justice	-.315***	-.267	-.009	-.042	.362**	.279
Normative alignment	.182**	.141	.003	.045	.485***	.342
Perceived effectiveness	.046**	.140	.055*	.044	-.001	-.002
Perceived risk of sanctions	.022	.029	.150***	.199	.073*	.097
Obligation to obey	.010	.011	.043	.042		
Control variables						
Age (in years)	.002	.044	.000	-.021	.004	.081
Gender (0=male, 1=female)	.125**	.121	-.011*	-.104	-.090*	-.086
Family income (year)	.007	.026	-.002	-.043	.012	.044
Education	.000	.000	.004	.045	-.059*	-.103
Explained variance (R^2)		.089**		.135***		.264***
Model fit statistics						
RMSEA	.037					
CFI	.954					
TLI	.948					
SRMR	.046					

Notes: N = 520 for all models; b = unstandardized coefficient, β = fully standardized coefficient; p = two-tailed p-value (p* < .05, p** < .01, p*** < .001).

Finally, Table 4 shows that no exogenous variable has a statistically significant indirect effect on the exogenous variables via obligation to obey. In summary, our first research hypothesis in this study, which predicted that people who perceived higher level of procedural justice are more likely to (1) comply with the law, was proven to be false, (2) cooperate with the police, was also proven to be false and (3) obey the police, was proven to be true. Second research hypothesis, which predicted that people who normatively align themselves with the police are more

likely to (1) comply with the law, was proven to be true (2) cooperate with the police, was proven to be false and (3) obey the police, was proven to be true. Third hypothesis, which predicted that people who highly evaluate police performance are more likely to (1) comply with the law, was proven to be true (2) cooperate with the police, was proven to be true and (3) obey the police, was proven to be false. And the fourth hypothesis, which predicted that people who perceive a higher risk of sanctions are more likely to (1) comply with the law, was proven to be false (2) cooperate with the police, was proven to be true and (3) obey the police, was also proven to be true. Finally, the fifth hypothesis, which predicted that the sense of obligation to obey mediates impacts of procedural justice, normative alignment, perceived police effectiveness, and perceived risk of sanctions on compliance with the law and cooperation with the police, was proven to be false.

Table 4. Indirect Effects via Obligation to Obey

Exogenous variable	Mediator	Endogenous variable	b	S.E.	Est./S.E.	p
Procedural justice		Compliance	.008	.013	.634	.526
		Cooperation	.009	.015	.623	.533
Normative alignment		Compliance	.016	.025	.663	.057
	Obligation to obey	Cooperation	.019	.030	.634	.526
Perceived police effectiveness		Compliance	.000	.001	.422	.673
		Cooperation	.000	.001	.421	.674
Perceived risk of sanctions		Compliance	.003	.004	.634	.526
		Cooperation	.003	.005	.617	.537

DISCUSSION

The current study assessed the applicability of Tyler's theory of procedural justice with a sample of Korean citizens. Since the relationships between citizens and the police in South Korea are different from those in the United States and Western European countries, the current study tests the universality of procedural justice theory in one of the Asian countries. Within Tyler's model, our findings are focused on the impacts of normative elements (procedural justice, normative alignment, and obligation to obey) and instrumental elements (perceived police effectiveness and perceived risk of sanctions) on citizens' compliance with the law

and cooperation with the police. Some of our findings are consistent with previous studies in Western countries, such as normative elements of procedural justice and normative alignment have positive impacts on the sense of obligation to obey (see Donner, Maskaly, Fridell, & Jennings, 2015). While procedural justice shows a negative impact on compliance with the law and a positive impact on obligation to obey, it does not show any impact on cooperation with the police. The normative alignment demonstrates a positive impact on compliance with the law and obligation to obey, but it does not have any impact on cooperation with the police. As aforementioned, the negative affiliation between procedural justice and compliance with the law might come from South Korean citizens' confusion of procedural justice with lenient policing and relatively lenient police response to citizens' non-compliant behavior, which likely stems from different ethnical, cultural, and socio-political settings from the United States and Western European countries. While our finding supports Woo et al.'s (2018) study in South Korea, Sun et al.'s study (2017) in China found that procedural justice was linked with willingness to cooperate with the police. Mazerolle et al.'s study (2013) also found that procedural justice was correlated with both a person's willingness to comply with the law and cooperate with the police, but they evaluated cooperation and compliance together rather than separately (Walters & Bolger, 2019). More studies with a solid methodology in international settings are desired to test the generalizability of procedural justice theory. Findings of the positive influence of normative alignment on compliance and obligation to obey are consistent with previous studies (Hough et al., 2013; Jackson et al., 2012). Woo et al.'s study (2018) in South Korea discovered that procedural justice only exerted a significant direct effect on obligation to obey but no effect on compliance and cooperation. However, consistent with the procedural justice theory, they found indirect effects of procedural justice on willingness to cooperate with the police. Still, we did not find indirect effects of procedural justice or normative alignment on compliance and cooperation as shown in Table 4. These our findings deviate from Tyler's process-based model of regulations. Interpretation of our findings is tentative, but possibly a social atmosphere to avoid legal engagement in South Korea may shed some light on it. Recently, in South Korea, increasing retaliation crimes against witnesses and/or complainants have caused national anxiety (Choi, 2016). Along with the conviction that the

current legal and physical protections by legal authorities for crime victims, witness, and complainants are not adequate enough, daunting criminal justice procedure which citizens will face once involved in a criminal case can make them reluctant to engage in the cases including cooperate with legal authorities. This might be one of the reasons why procedural justice and normative alignment did not elicit cooperation with the police via promoted obligation to obey in South Korea. To locate the exact reason for the broken link between obligation to obey and willingness to cooperate with the police in South Korea, more research using constructs of individual concerns for troubles accompanied by cooperation with the legal authorities would be insightful. A part of theoretical frame of this study borrowed from Tyler's process-based model of regulations is that, as a civic duty, obligation to obey promoted by procedural justice and normative alignment would inspire citizens' willingness to comply with the law and cooperate with the police. However, our study findings show no statistical significance of obligation to obey on compliance and cooperation, and this is a major deviation from the theoretical expectations. This deviation also might be explained by unique South Korean contexts stated above.

While one instrumental factor of perceived effectiveness predicts compliance and cooperation but obligation to obey, another instrumental factor of the perceived risk of sanctions predicts cooperation and obligation to obey but compliance with the law. These findings are partially consistent with deterrence perspectives, i.e., people comply with the law and cooperate with the police when they recognize a threat of arrest and punishment by effective policing for illegal conducts (Sunshine & Tyler, 2003; Tankebe, 2009). These findings indicate that police effectiveness affects citizens' compliance with the law and cooperation with the police, but not their obligation to obey. Given that the obligation to obey is an intrinsically normative concept, it may not be generated by an instrumental factor of police effectiveness. However, as we see that another instrumental factor of perceived risk of sanctions affects obligation to obey, it seems that fear of sanctions leads a person to obey the law and legal authorities and deters a possible criminal behavior. The degree of impact on obligation to obey was in the order of normative alignment (β =.342), procedural justice (β =.279), and perceived risk of sanctions (β =.097). While previous procedural justice studies emphasize the significance of normative factors over institutional factors on

citizens' normative behavior (Tyler, 2006b; Tyler & Jackson, 2014), the current study based on South Korean sample shows that not only normative factors but also instrumental factors are valuable in securing citizens' normative behaviors.

Our findings suggest several policy implications, primarily on the lines of policing practice. If police officials would like to guarantee citizens' compliance with the law, they should perform their work in a procedurally just manner (procedural justice) while sending out a clear signal to the citizens that the use of force could be an option if they do not comply with police directives. In addition, the police need to identify themselves with citizens so that, in turn, the citizens would align themselves with the police (normative alignment) too. In order to let citizens perceive police effectiveness, the police need to improve their systems and job skills as well as develop a public relations (PR) plan (perceived effectiveness). If police officials are interested in citizens' cooperation with the police, they need to work on perceived effectiveness and letting citizens perceive that lawbreakers must be caught and punished (perceived risk of sanctions). To promote cooperation with the police, convincing legal and practical protections of crime victims, witnesses, and complainants should be established. If the police would like to inspire citizens' sense of obligation to obey, they need to target the enhancing of procedural justice, normative alignment, and perceived risk of sanctions. To make these implications happen, procedural justice and normative alignment should be incorporated in police training, including police academy and in-house training, and community-oriented policing. Performance evaluations for police officers should be developed to reflect officer's normative activities. Simultaneously, institutional efforts on perceived police effectiveness and perceived risk of sanctions by elaborated PR should not be neglected. Most of all, to save time and resources, all these efforts should be performed with empirically proved practices.

The current study is not free from limitations. The data used for the current study were collected by a non-random sampling method, which causes generalizability concern. More specifically, the survey was conducted by an internet-based survey company on its already existing members. As a result, only a person who was a member of the company and had internet access could participate in the survey, hence causing a representativeness concern. The survey used for the current study is translated in Korean from English; this may have

resulted in subtle differences in study findings. The current cross-sectional data are rarely able to disclose causal relationships between independent variables and dependent variables (Babbie, 2017). Finally, like other studies relying on a survey questionnaire, the current study may not be free from human memory errors or insincere answers. Studies in the future are desired to adopt a random sampling method to ensure the representativeness in its findings. In addition, the sophistication of translation in the survey questionnaire should be guaranteed. In terms of data, instead of cross-sectional data, time-series data should be collected to discover more accurate causal relationships among independent and dependent variables. Finally, more sophisticated research methods should be applied to overcome human recollection errors and insincere responses.

CONCLUSION

Efforts to enhance citizens' perceptions toward the law and legal authorities employing evidence-based practices are promising approaches. Tyler's process-based model of regulations, which mostly developed in the United States and Western European countries, has been considered as a useful tool to support the efforts to enhance citizens' perceptions. Recently, test sites of procedural justice have been geopolitically and socioculturally expanded and built-up global findings, which are adding more dynamic shape to the body of procedural justice research. Based on South Korea, one of the countries located in far-east Asia, which has unique historical, political, and oriental culture backgrounds, the current study increases the number of studies on the generalization of procedural justice theory. Findings state that citizens' voluntary-basis law abiding behaviors, compliance with the law, cooperation with the police, and obligation to obey, could be promoted by two approaches: normative approach and instrumental approach. Although, in changing people's legal behaviors, a substantial number of studies of procedural justice theory put more weights on normative factors over instrumental factors, our study found that on citizens' perceptions toward the law and legal authorities, not only normative factors are influential, but also instrumental factors have solid impacts. These findings can be utilized for the public health policy since policing is one of the public safety and health matters.

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Appendix A. Means (Standard deviations) for Variables in The Study

Variable	Range	High means	Number of cases	Mean (SD)
Compliance with the law	1 – 5	Comply	519	3.86 (.52)
Cooperation with the police	1 – 4	Will help	512	3.09 (.65)
Obligation to obey	1 – 4	High	508	2.67 (.67)
Normative alignment	1 – 4	High	507	2.50 (.58)
Perceived police effectiveness	1 – 11	Effective	520	5.57 (1.87)
Perceived risk of sanctions	1 – 4	High risk	516	2.84 (.79)

Impact of the Perceived Crime at the Local and National Levels

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Abstract

The cognition mechanism on crime rather than the actual cause of crime has become an important topic of interest for criminologists and the public who have experienced concern and fear rather than an actual criminal victimization. We compared the effects of population and condition variables at the local and national levels on the perceived crime through the 'Korean Crime Victims Survey' of 28,416 South Koreans. This study presents that there are significant differences in the influence of independent variables such as the environment around the neighborhood, interaction with the neighborhood, policing in the neighborhood, fear of night, victimization of crime and media consumption at the local and national levels. Variables such as dissatisfaction with the environment around the neighborhood, experience of crime victimization, and more media consumption elevated the perceived crime across both the local and national levels. Moreover, we found that the lack of interaction with neighbors had the only significant impact on increasing the perceived crime at the local level, and dissatisfaction with policing in the neighborhood had little influence on increasing the perceived crime at the local level. However, good policing in the neighborhood had a significant effect on decreasing the perceived crime at the local and national levels. According to the results, the consumption of media had a significant effect on increasing the perceived crime at the local and national levels. However, the consumption of media affected the perceived crime at the national level as the second highest effect after victimization of crime, while the perceived crime at the local level was found to have the least significant effect among the independent variables. This study presents the relationship between the perceived crime and other individual indicators while controlling for socio-demographic variables. We also provide differences of the indicators' effects on the perceived crime at the local and national levels.

Keywords

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INTRODUCTION

Background

Crime itself has a great impact on everyday life in various ways. Individuals often restrict their range and time of activities, such as where to eat out, shop, travel and socialize, when considering perceived neighborhood safety (Jackson & Gary, 2010). This negative response is more likely to spread around the family, the neighbors, and even the whole nation. This avoidance behavior reduces the interactions with neighbors and damages social cohesion (Lee, 2010). The fear of crime has drawn much attention related to this phenomenon, and there have been international studies on the fear of crime and the perceived crime. The main objective of such scientific research is to explain the fear of crime and the perceived crime using a number of individual and contextual variables, which are considered to be the most plausible correlates of the mentioned phenomena (Reese, 2009; Hummelsheim, Hirtenlehner & Oberwittler, 2011; Visser, Scholte & Scheepers, 2013; Vauclair & Bratanova, 2017).

Especially, in South Korea (hereafter, Korea), the concept of the fear of crime has received attention. The fear of crime has been studied over the past decades, resulting in personal health deterioration, various socioeconomic costs and lowering the residential satisfaction in Korea. However, many studies have been conducted to analyze those various definitions, because there has been no unified conceptualization of the fear of crime (Kim, 2018; Cho, 2019). As Yun (2015) suggested, the fear of crime is that 'people can be harmed by crime that can happen in their own neighborhood'. Roh and Cho (2014) also revealed that the fear of crime is subdivided into the fear of general and specific crimes. The general fear of crime is how much people feel about the fear of staying home alone and walking alone at night, and the specific fear of crime is how much fear people may have about a particular crime (Jang, Jung & Kim, 2010). In addition, Kim (2017) defined the fear of crime as constituting a general and specific fear as well as the frequency of recognition of the crime.

With regard to this hodgepodge-use, Ferraro and Grange (1987) pointed out that there is a necessity to distinguish different types of perception when analyzing the fear of crime and the perceived crime or risk. Regarding the

perceived crime, Mesch (2000) explicitly refers to 'the judgement of crime and assessment of safety in the immediate surrounding area'. According to Krulichová (2019) who studied the relationship between the fear of crime and risk perception, the perceived crime reveals to be a major predictor of the fear of crime and the mediator between the fear of crime and other individual and contextual indicators. From this point of view, the fear of crime and the perceived crime need to be explained separately. However, there have been some studies on the fear of crime, but few has been conducted on the perceived crime.

The purpose of this study is to investigate the impact of neighborhood conditions on the perceived crime at the local and national levels in Korea, controlling for the socio-demographic variables. We aim to find the details of cognition on the neighborhood and to identify the general perception and attitude of crime. We also study the relationship between the perceived crime and other individual indicators, controlling for socio-demographic variables, which provide the statistic effects of the indicators in the perceived local and national crime. It is meaningful to understand the effect of the perceived crimes and the conditions because it is a core element of community safety for people's well-being.

Theoretical Background

Those who do not feel safe at places may live with social anxiety. Therefore, people with social anxiety do not participate in community activities that they belong to. The public perception of crime, also known as the perceived risk or perceived crime, prevents people from going outside, which keeps them at home. There may be some discrepancies between the perceptions of crime and the actual levels of recorded crime. In Korea, the actual number of reported criminal offenses have decreased for five years according to the Korea Institute of Justice (2020). However, the Social Survey Report (Statistics Korea, 2018) surveyed the perception of South Koreans about social safety and found that crime itself (20.6%) was the biggest risk factor in Korean society, followed by national security (18.6%), environmental pollution (13.5%), and economic risk (12.8%). To figure out this phenomenon, we propose that the perception of crime is one of the important dependent variables in criminal research.

According to Uniform Crime Reporting (UCR) in the United States, the violent crime rate has fluctuated over the past decade but has declined overall

from 458.6 to 380.6 per 100,000 people. This trend was also evident in property crime, which steadily declined by one decade from 3214.6 in 2008 to 2199.56 in 2018 per 100,000 people. This decreasing trend in officially reported national homicide rates has occurred globally in the United Kingdom, Japan, France, and Korea in the past decade (UNODC, 2019). As explained previously, there are often mismatches between the perceived crime and the actual number of crimes (Weatherburn, Matka & Lind, 1996; Jackson, 2004; McGinn et al., 2008; Larsen & Olsen, 2020).

Across the past 30 years, Gallup (2019) has documented that most Americans think that the number of crimes is increasing when it is actually decreasing. This discordance of the perception of crime and police-reported crime has caught the attention of many criminologists. According to the previous studies, various indicators such as gender, socioeconomic status, education level, personality, cultural measure of crime, media, and other life differences were revealed to influence individuals' perception of crime (Forgas, 1980; Truman, 2005; Alcala, 2017), which encouraged people to create their own belief on current crime trends irrelevant to the actual crime incidents. Jackson (2004) suggested that and police-reported crime have caught the attention of many criminologiest.. to their homes. ly to participate in commthe public perception was subjective and based more on an inaccurate belief rather than the real experience, and people sometimes expressed their fear/concern on the general social crisis by raising their fear/concern of crime since crime could easily represent the disorder of society (Jackson, 2004; LaGrange, Ferraro, & Supancic, 1992).

Considering that the public receives information about crime indirectly from the media or their neighbors, we assume that the perception of crime is subjective and may differ from the actual crime rate. In particular, media channels, such as television news and newspapers, have an influence on developing fear because watching crime-related news evokes a stronger emotional and visceral response (Callanan, 2012). The coverage is likely to include a bloody and cluttered crime scene, but the emphasis on the crime scene from the media usually covers egregious and rare crimes (Surette, 2007). This behavior of the media may be assumed as the community right to know, whereas this phenomenon evoking such inconsistency by the media should not be overlooked.

When people are more concerned about perceived crimes, their daily lives are

less warranted, which affect people's perception of the quality of life negatively and causes them to feel anxious and scared. Meanwhile, inappropriate and excessive public interest in crime rates may interfere with government policies by directing unnecessary costs to correctional facilities and the Department of Justice rather than other important areas of public services such as health and education (Weatherburn et al., 1996). Many studies have been conducted to examine which indicators, such as education level and socio-economic status, would possibly have an influence on the perception of crime. Highly educated people tend to have a more realistic perception of crime (Baier, Hanslmaier, & Kemme, 2016). In addition, the victimization of crime affects the perception of crime. A person's past experience of victimization significantly increases his/her anxiety or fear of crime, thus changing the perception of crime from no-risk to high-risk.

There has been the influence of news media on crime perception. Most of the general public relies on media reports for their information, and the media exaggerates negative news which would have more exaggerated perceptions of crime. The widely perceived influence of media representations of crime has stimulated various concerns about mass media representations of crime and disorder that have accompanied their development. For example, news media reports fictional or exaggerated facts about crime, leading people to believe that crime is on the rise (Pfeiffer, Windzio, & Kleimann, 2005).

The perception of crime is affected by a variety of indicators. In our literature review, we found that the perceived crime was closely related to the factors in the community. Therefore, we aim to investigate the variables related to these indicators using the social disorganization model, which explains the weakening of social ties and cohesion. Sampson indicated that these variables could increase the crime rate and the level of perceived crime (Sampson, 1993). The disintegration of communities also weakens informal social control among respondents, causing them to feel unsafe and insecure in the place where they live (Sampson & Raudenbush, 2004; Sampson, 2009). In other words, those respondents living in socially integrated communities are expected to have strict control over their own areas, and this expectation causes them to have a low level of the perceived crime. On the contrary, those who feel that there is no strict control over their community are more likely to have the perceived crime.

Even though the social disorganization model was used to help us understand

and reduce levels of criminal activity, Wilson (1996) argued that even the high ties among the respondents in areas where they were too lenient with crime, would result in higher crime rates. However, the model consistently revealed low level results of the perceived crime when the social integration level was relatively high (Skogan & Maxfield, 1981; Rountree & Land, 1996). In other words, an urban area with a higher level of social disorganization showed a higher level of the perceived crime than that of a rural area and an area with a lower socioeconomic status (Allen, 2006; Kershaw & Tseloni, 2005; Sampson, 2009). Therefore, it is necessary to examine all underlying factors related with the perceived crime using the social disorganization model.

Visser (2013) argued that countries with lower social protection expenditure had higher levels of the perceived risk of crime. The impact of social safety nets is not consistent depending on the nature of the person or community. Wyant (2008) found that the perceptions of crime risk or fear correlate with crime, personal vulnerability, socioeconomic status, neighborhood integration, and neighborhood racial composition. However, these factors are not completely operated fragmentarily. He argued that the perceptions of crime risk should be estimated in a multilevel model because the perceptions provided a stricter investigation of the ecological impacts of the sources than seen previously. We believed that the perceived crime could possibly show a dissimilar pattern when people considered the perceived crime at the local and national levels.

Korean criminologists have researched to understand the causes of perceptions of crime and fear. Studies on gender (Yun, 2017), routine activity (Kim, Song, & Kwak, 2017), age (Park, 2017), and victimization (Kim, 2018) are related to these efforts. As stated earlier, many authors have researched people's fear of crime which is highly correlated to the perception of their safety with demographic and criminological variables. Based on these previous studies, the aim of this study is to examine the impact of various demographic and criminological variables on the perceived crime and these effects at the local and national levels.

METHOD

Data Collection

We conducted this study using the data of the '2014 Korean Crime Victims Survey', which was reported by the Korean Institute of Criminology. The data collection for this study was conducted by interviewing and self-entry questionnaire. The trained interviewers collected the data through the interview and self-survey method. The samples collected in this study were 6,960 households with family members aged 14 and older. Of those persons who completed the study, 28,416 respondents with evaluable data were eligible.

Data Analysis

The perceived crime

The dependent variable was comprised of two estimates of the perceived crime: perceived crime at the local level and perceived crime at the national level where the respondents resided. Two research questions were asked about the perceived crime: "How do you expect the crime rate will change in the neighborhood?", "How do you expect the crime rate will change in the country?"

The perceived crime was measured using a five-point Likert-type scales from 'significantly decreasing' to the 'significantly increasing'. The five-point scale was readjusted into three respondent groups: 'decrease', 'does not change' and 'increase' to facilitate the investigation of the effect of causes. At the local level, 59.7 percent of the public believed that the crime rate would not chang (Table 1), while at the national level, 56.7 percent believed that the crime rate would increase. To explain this dissimilar phenomenon, we employed various socio-demographic and independent variables that affected the perceived crime as discussed in the literature review.

Table 1. Descriptive Statistics by the Perceived Crimes

Perceived crime	At the Local Level			Total
At the National Level	Decrease (15.1%)	Does not change (59.7%)	Increase (25.1%)	
Decrease (10.4%)	2,352(8.3%)	558(2.0%)	43(0.2%)	2,953
Does not change (32.9%)	968(3.4%)	8,021(28.2%)	368(1.3%)	9,357
Increase (56.7%)	981(3.5%)	8,395(29.5%)	6,730(23.7%)	16,106
Total	4,301	16,974	7,141	28,416
χ^2	15280.152[***]			

$^*p\langle.05,\ ^{**}p\langle.01,\ ^{***}p\langle.001$

Control variables

Socio-demographic information was collected through the survey, which included indicators such as sex, age, income level, education level, and city size. According to previous studies, various indicators such as sex, age, socio-economic status, education level, personality, a cultural measure of crime, and other differences of life influenced the individual's perceived crime (Forgas, 1980; Truman, 2005; Alcala, 2017). Some studies reported that those who were female, younger, and had a lower economic level, were more likely to have the perceived crime (Rountree & Land, 1996; Wyant, 2008; Roh & Cho, 2014; Hong & Jang, 2015; Krulichová, 2019; Cho, 2019). Among these studies, there was no consensus in the way that they deal with the perceived crime.

Independent variables

Table 2 presents all the variables related with the perceived crime. For the neighborhood setting, the respondents were asked about a series of conditions separately and to categorize their satisfaction with the neighborhood conditions as 'very satisfied', 'somewhat satisfied', 'neutral', 'somewhat dissatisfied', or 'very dissatisfied.' The factor, Environment around the neighborhood, was measured with six items prefaced by asking "What's your opinion about the environment around your neighborhood?" (Cronbach's alpha=.836). The factor of Interaction with neighbors was measured by asking "How do you like your neighborhood?"

(Cronbach's alpha=.846). The factor, Policing in the neighborhood, was measured by asking "What do you think about your local sheriff?" (Cronbach's alpha=.804). The factor, fear of night, was measured by asking "How much do you fear when walking alone at night on the street and staying at home alone?" The scale of fear of night had a Cronbach's alpha of 0.874. As for the factor, victimization of crime, we classified the respondents into two categories: experienced group and inexperienced group. The respondents who had any experiences of criminal victimization such as deceit, larceny, property invasion or damage, and sex crime that was committed in 2014 were classified into the experienced group. Garland (2001) considered crime reporting by the mass media and in particular on television as a factor that had significantly altered social perceptions of crime in his analysis of crime policy and sentencing in the UK and the US. To verify the influence of media consumption on the perceived crime, the question was measured in the present study on how often people watched news or programs about crime.

Table 2. Definition of Variables

Variables	Description	Cronbach's α
Dependent variable		
perceived crime at the local level	1=Decrease; 2=Does not change; 3=Increase	
perceived crime at the national level	1=Decrease; 2=Does not change; 3=Increase	
Control variable		
sex	0=Male; 1=Female	
age	1 to 7(per 10-year increase)	
level of income	0=Low; 1=Middle; 2=High	
level of education		
level of city size	0=Urban area; 1=Rural area	
Independent variable		
environment around the neighborhood	1=Very satisfied; 2=Somewhat satisfied; 3=Neutral; 4=Somewhat dissatisfied; 5=Very dissatisfied	.836
interaction with neighbors		.846
policing in the neighborhood		.804
fear of night	1=Not fearful at all; 2=not very fearful; 3=Neutral; 4=Somewhat fearful; 5=Very fearful	.874
victimization of crime	0=None; 1=Over one time	
media consumption	1=None; 2=rare; 3=often, 4=frequently; 5=always	

Analytic Methods

We used statistical software program, Stata 13.0 to analyze the data. To find out statistical characteristics of the perceived crime, descriptive statistics and a chi-square test were utilized to analyze the socio-demographic variables, and the correlation analysis was also used to consider the correlation between variables. The three respondent groups, 'decrease', 'does not change' and 'increase' about the perceived crime, are might be analyzed by ordinal logistic regression. However, Long (1997) claimed that the ordinal dependent variable could be used as models for nominal outcomes despite a loss of efficiency as ordinal information was being ignored, which was "out-weighed by avoiding potential bias." Having considered the important debates regarding the socio-demographic and independent variables of the perceived crime, we could proceed more formally to assess the strength of their relationship with 'unchanging' and 'increasing' the perceived crime. A multinomial logistic regression model was applied to provide an assessment of whether different values in the explanatory variables are associated with different odds of falling into each of the three respondent groups. For this reason, multinomial logistic regression was estimated to verify the distinction between the options of the perceived crime while controlling for socio-demographic differences. Moreover, this approach provided it possible to differentiate the impact of one variable from another on the perceived crime. Especially, we could compare those two values of a variable 'unchanging' with 'increasing' that accounts for almost all of the responses to the perceived crime at the local and national levels. In order to determine the difference in the impact of the perceived crime between local and national levels, designating the 'unchanging' group as a reference group seemed to be effective in comparing both local and national levels.

RESULTS

Descriptive Statistics and Bivariate Correlations

The results from the bivariate correlations among the variables used in this study are presented in Table 3. Descriptive statistics, such as means, standard deviations, skewness and kurtosis for all individual variables, were presented. First, we tried to confirm the normality of the variables before testing the multinomial logistic regression analysis. Kline (2011) suggested that the absolute values of each skewness and kurtosis should not exceed 3 and 10, respectively. The skewness of the variables ranged from -0.88 to 1.24 and the kurtosis ranged from 1.01 to 2.98, except for the victimization of crime. The victimization of crime was measured over the suggested reference standard because it was composed of a binary variable. The results of pairwise correlations showed that they did not have multicollinearity as correlation coefficients ranged from -0.319 to 0.561 and were lower than $r=.7$. In addition, we calculated variance inflation factor (VIF) values of variables for having a value greater than 10 (Belsley, 1991) as an indicator of multicollinearity. The VIF of all variables ranged from 1.043 to 1.649, confirming no multicollinearity.

Table 3. Pairwise Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) PNC	1												
(2) PLC	.561***	1											
(3) SEX	.012	.002	1										
(4) AGE	-.001	-.078***	.047***	1									
(5) LI	.000	.037***	-.056***	-.332***	1								
(6) LE	.018**	.064***	-.137***	-.528***	.409***	1							
(7) LC	.027***	-.060***	.007	.208***	-.209***	-.254***	1						
(8) EN	.091***	.192***	.006	-.151***	-.011	.060***	-.085***	1					
(9) IN	.007	.108***	-.039***	-.343***	.155***	.281***	-.319***	.099***	1				
(10) PN	.011	.106***	-.013**	-.189***	.034***	.119***	-.061***	.223***	.324***	1			
(11) FN	.079***	.145***	.356***	-.150***	.032***	.049***	-.085***	.300***	.082***	.124***	1		
(12) VIC	.032***	.038***	.021***	-.028***	.001	.037***	-.009	.061***	.006	.056***	.062***	1	
(13) MC	.099***	.040***	-.036***	.056***	.029***	.062***	-.010	.051***	-.110***	-.086***	.043***	.043***	1
Mean	2.463	2.100	1.525	4.219	1.849	2.102	1.236	2.267	3.176	2.690	2.270	.041	2.190
S.D	.676	.627	.499	1.786	.667	.798	.425	.770	.859	.798	1.051	.198	.787
Skewness	-.88	-.08	-.10	-.074	.18	-.19	1.24	.29	-.21	.27	.49	4.63	-.35
Kurtosis	2.58	2.51	1.01	2.035	2.22	1.60	2.55	2.98	2.80	3.12	2.41	22.4	1.69

*p<.05, **p<.01, ***p<.001

Note. PNC=Perceived National Crime; PLC=Perceived Local Crime; LI=Level of Income; LE=Level of Education; LC=Level of City Size; EN=Environment around the Neighborhood; IN=Interaction with Neighbors; PN=Policing in the Neighborhood; FN=Fear of Night; VIC=Crime Victimization; MC=Media Consumption.

Socio-demographic Variables for the Perceived Crime and Chi-square Test

Before examining the hypothesis of this study, we analyzed the differences between socio-demographic variables of the perceived crime. According to Table 4, there seemed to be different tendencies between the perceived crime at the local and national levels. 59.7 percent of the public assumed that the crime rate at the local level would not change the following year. However, 56.7 percent answered that the perceived crime would increase the following year at the national level. The respondents seemed to assume that the crime rate in the country would increase two times more than in the neighborhood. The socio-demographic variables showed a more significant difference for the perceived crime at the local level than at the national level. The respondents with more income and a higher level of education were more likely to respond that the crime rate would increase. However, at the national level, the socio-demographic variables were not associated with the perceived crime. Especially, the differences of the perceived crime at the national level for gender and income level were not statistically significant. A study by Roh and Cho (2014) on the fear of crime at the local level revealed that there were differences in both general fear and specific fear regarding sex, and level of income and education. Therefore, it is suggested that individual characteristics should be dealt with more seriously at the local level than at the national level.

Table 4. Proportion of Perceived Crime Rate by Socio-demographic Variables

		Sex		Income			Education		
		Male	Female	Low	Middle	High	Low	Middle	High
		%	%	%	%	%	%	%	%
Perceived crime at the local level	Decrease (N=4,301, 15.1%)	49.2	50.8	31.0	52.4	16.6	27.5	36.4	36.1
	Does not change (N=16,974, 59.7%)	46.8	53.2	33.0	52.1	14.9	30.0	34.3	35.7
	Increase (N=7,141, 25.1%)	48.3	51.7	26.0	56.5	17.5	20.6	36.8	42.5
	χ^2	10.22**		122.15***			236.05***		
Perceived crime at the national level	Decrease (N=2,953, 10.4%)	49.2	50.8	30.0	52.9	17.1	25.8	38.1	36.1
	Does not change (N=9,357, 32.9%)	47.6	52.4	31.7	53.2	15.1	28.7	35.2	36.0
	Increase (N=16,106, 56.7%)	47.1	52.9	30.7	53.3	16.0	26.6	34.8	38.6
	χ^2	4.34		9.29			31.97***		

*p<.05, **p<.01, ***p<.001

Multinomial Logistic Regression Analysis

A series of multinomial logistic regression analysis was conducted at the local and national levels to assess the impact of independent variables on the perceived crime. The analysis strategy was identical for both dependent variables. In the previous finding, 59.7% of the respondents believed that the perceived crime at the local level would remain 'unchanged', while 25.1% responded that the perceived crime would 'increase'. However, when it comes to the perceived crime at the national level, 56.7% of respondents said that the perceived crime would increase, while 32.9% believed that the perceived crime would 'not change'. To figure out this discordance, the reference category of the dependent variable, 'does not change', was used to compare with the 'decrease' and 'increase' category of the perceived crime.

Table 5 and Table 6 showed the estimated parameters for a multinomial logistic regression of the perceived crime at the local and national levels for the demographic characteristics of the respondents and independent variables. As the validity of the multinomial logistic regression model was applied with the odds ratio test, we found a significant value of χ^2=2031.37 (df=22, p<.001) (Table 5) as well as the value of χ^2=827.12 (df=22, p<.001) (Table 6). The pseudo-R2

provided a measure of the extent of correlation as shown in Table 5 and Table 6, accounting for the proportion of variance, which is explained in the dependent variable by the covariate.

Table 5. Multinomial Logistic Regression of the Perceived Crime at the Local Level

Perceived crime at the local level		Decrease		Increase	
		Coefficient	SE	Coefficient	SE
Control variables					
Sex	Male(Ref.)				
	Female	-.020	.037	-.182***	.032
Age		-.039**	.012	-.027**	.010
Level of income		.048	.029	.114***	.024
Level of education		.034	.027	.077***	.023
Level of city size	Urban(Ref.)				
	Rural	-.228***	.044	-.268***	.039
Independent variables					
Environment around the neighborhood		-.140***	.025	.439***	.020
Interaction with neighbors		-.165***	.023	.128***	.020
Policing in the neighborhood		-.179***	.024	.015	.020
Fear of Night		-.115***	.019	.186***	.016
Victimization of crime	No(Ref.)				
	Yes	-.007	.095	.253***	.068
Media Consumption		-.045**	.017	.083***	.015
Constant		.449	.142	-3.002***	.126
N		28,416		28,416	

*p<.05, **p<.01, ***p<.001
χ^2=2031.38(df=22), Pseudo-R^2 = 0.038, Log likelihood = -25713.669

Based on the previous studies for indicators relating to the perceived crime, it was reported that 'physical disorganization', 'interaction with neighbors', 'policing in the neighborhood', 'fear of night', 'victimization of crime', and 'media consumption' were related to the perceived crime. Assuming that the indicators affected differently between the perceived crime at the local and national levels, Table 5 and Table 6 reported β coefficients of various independent variables on both the perceived crime at the local and national levels.

Table 6. Multinomial Logistic Regression of the Perceived Crime at the National Level

Perceived crime at the national level		Decrease		Increase	
		Coefficient	SE	Coefficient	SE
Control variables					
Sex	Male(Ref.)				
	Female	-.018	.046	-.027	.029
Age		.000	.015	.017	.009
Level of Income		.051	.035	.026	.022
Level of Education		.037	.033	.067**	.021
Level of City size	Urban(Ref.)				
	Rural	-.267***	.057	.130***	.034
Independent variables					
Environment around the neighborhood		-.130***	.030	.152***	.019
Interaction with neighbors		-.083***	.028	.020	.018
Policing in the neighborhood		-.131***	.029	-.091***	.018
Fear of night		-.057*	.024	.098***	.014
Victimization of crime	No(Ref.)				
	Yes	-.023	.120	.243***	.069
Media consumption		.029	.021	.228***	.013
Constant		-.243	.174	-.762***	.110
N		28,416		28,416	

*$p<.05$, **$p<.01$, ***$p<.001$
$\chi^2=827.12(df=22)$, Pseudo-$R^2 = 0.016$, Log likelihood = -25810.783

There were coefficient differences between control variables affecting the perceived crime at the local and national levels. The socio-demographic characteristics on the perceived crime at the local level reflect that the respondents who were male, younger, more educated, the urban dwellers and had a higher income level were associated with the 'increase' category when compared to the 'does not change', while younger respondents and urban dwellers were more likely to be associated with the 'decrease' category when compared to the 'does not change'. However, the characteristics on the perceived crime at the national level reflected that the respondents who were more educated and the rural dwellers were associated with the 'increase' category, while the urban dwellers were associated with the 'decrease' category. When compared to those who lived in the urban area, the rural dwellers were more likely to believe that the perceived crime at the local level would not change, while the perceived crime at the national level would increase.

According to the results, there was a gender difference in the perceived crime at the local level, showing that women had a positive correlation (r=.002, p>.05) (Table 3). In other words, when the perceived crime was analyzed as an ordinal variable, the results of the correlation analysis showed higher perceived crime rates in the female group than in the male group. If we analyze the perceived crime as a categorical variable, the odds ratio from the 'does not change' to 'increase' can be interpreted to be greater in the male group than the female group. This result is similar to the Hong and Jang study (2015) that compared Korea with the United States. The fear of crime had a high correlation with each other in the perceived crime. Females were more likely to have a higher fear of crime than males, which was statistically significant in the U.S., but not statistically significant in Korea (Hong & Jang, 2015).

In terms of age, Krulichová (2019) who studied cross-national comparisons of fear of crime across 23 European countries, reported that the elderly was more likely to have a fear of crime, which is consistent with the crime vulnerability model. However, Rho and Cho (2014) revealed that the younger age group might have higher rates of the fear of crime in Korea. They conducted a multi-level analysis of the impact of crimes, foreigners, and disorders on the fear of crime in a neighborhood. Also, LaGrange and Ferraro (1989) explained that the results were curvilinear and largely negative. In summary, the variables of sex and age have shown contradictory results in international and Korean studies. These results are due to the fact that the perceived crime was not analyzed as an ordinal variable, but as a categorical variable.

We found that similar independent variables, such as the environment around the neighborhood, interaction with neighbors, policing in the neighborhood, and the fear of night, had a significant effect on decreasing the perceived crime at the local and national levels. The odds ratio for those who had a high level of the perceived crime ranged from the absolute value of 0.115 to 0.179 at the local level and 0.057 to 0.131 at the national level. If we compare the 'does not change' with the 'increase' category, the perceived crime between the local and national levels shows a different aspect. First, we found that the respondents who were not satisfied with the neighborhood environment and reported night fear in the neighborhood conditions, have a significant odds ratio of the 'increase' on the perceived crime at the local and national levels when compared with the 'does

not change'. The odds ratio of the perceived crime at the local level when comparing the 'increase' group to the 'does not change' group was significant with the value of 0.128 when the respondents were not satisfied while interacting actively with neighbors. On the other hand, this was not meaningful for the perceived crime at the national level. Interacting actively with neighbors served a more powerful mechanism to repress the increase and to facilitate the decrease of the perception of the crime (Wyant, 2008).

On the other hand, a lack of satisfaction with *policing in the neighborhood* had an insignificant impact at the local level. Surprisingly, when there is dissatisfaction with *policing in the neighborhood*, the effect is greater for the 'does not change' when compared to the 'increase' in raising the odds ratio for the perceived crime at the national level. For this reason, Scheider et al. (2003) reported that improving the perception of community policing activities has a positive effect on resident's satisfaction with the police but does not directly reduce the perception of crime. Therefore, a better policing strategy was one of the important factors that led the public to believe that perceived crimes would decrease. Even though poor policing had nothing to do with raising the perceived crime, the isolated living environment and the devastation between neighbors could raise the perceived crime.

In addition, recent victimization experience was associated with a greater odds ratio of perceiving the *increase* when compared to perceiving the *does not change* (a coefficient of 0.253 and 0.243 in the perceived crime at the local level and national level, respectively). However, given the fact that the residents did not experience crime damage, the effect of changing people's perceived crime from 'does not change' to 'decrease' at both levels did not occur. This suggests that the victimization of crime is one of the major factors that increase the perceived crime at both the local and national levels, which has already been researched by Balkin (1979), Yin (1980), Skogan (1987), Liska et al. (1988), and Krulichová (2019).

As expected, consuming more crime-related news remains significant and positively associated with the perceived crime at the local and national levels when comparing the *increase* to *does not change* (a coefficient of 0.083 and 0.228 at the local and national levels, respectively). According to Callanan (2012),

consumption of crime-related news elevated the perceived crime significantly for all demographic groups. In terms of crime-related media consumption and the perceived crime at the local level, the respondents who were not dependent on the media consumption, belonged to the 'decrease' group rather than the 'does not change' group with statistical significance. However, this was not applicable for the perceived crime at the national level.

As already mentioned, the multinomial logistic regression analysis enabled us to examine whether the indicators, which we discussed in the literature review, predicted the perceived crime of the three respondent groups. According to the results of Table 1, 59.7% of the respondents thought that their perceived crime at the local level would not change. However, 56.7% of the respondents thought that the perceived crime at the national level would increase. Based on those results, it was hypothesized that there would be significant differences between independent variables of the perceived crime at the local and national levels. To summarize the findings of our study, although it is not possible to directly compare β coefficients of the two models (Table 5 and Table 6), we ordered the β coefficients calculated from each model in order of the magnitude to compare if there are differences between the two results.

For the perceived crime at the local level (Table 5), the β coefficient of *environment around the neighborhood* is the highest (0.439), followed by the *level of city size* (0.268), *victimization of crime* (0.253), *fear of night* (0.186), and *interaction with neighbors* (0.128). For the perceived crime at the national level (Table 6), the *β* coefficient of *victimization of crime* is the highest (0.243), followed by *media consumption* (0.228), *level of city size* (0.186), *environment around the neighborhood* (0.152), and the *fear of night* (0.098). In other words, the victimization of crime was found to have huge significant effects on the local and national levels. In particular, *the environment around the neighborhood* was most influential at the local level, while the media consumption had a strong influence at the national level. Therefore, considering the results of this study, the perceived crime-reduction strategies should be separately devised to reduce the perceived crime at the local and national levels.

CONCLUSIONS

The perceived crime and the fear of crime are known as distinctive variables (Krulichová, 2019). The perceived crime that people may have includes several indexes of the fear of crime (Hummelsheim et al., 2011; Vauclair & Bratanova, 2017). In the Introduction, we clarify the concept of the perceived crime in comparison to the fear of crime, and we highlight future studies for the perceived crime itself as distinct from the fear of crime. A survey by the Korean Institute of Criminology in 2014 on Korean perceptions of crime investigated as part of the study of Korean crime victimization showed that the perceived crime at the local level would not change, while the perceived crime at the national level would increase. Unlike the previous research results of the perceived crime in other countries, Korean studies reported that people with a higher level of education and a higher level of income might be more sensitive to the perception of crime (Roh & Cho, 2014). We confirmed their theories in our study. They were statistically significant in the perceived crime at the local level. However, we found that these factors, except for the education level, were not statistically significant in the perceived crime at the national level. The results of the analysis according to the socio-demographic variables are as follows. Those respondents who were male, younger, more educated, and had a higher income level would have the higher perceived crime especially at the local level.

A central contribution of the present study is that the findings clarify a structural difference on the perceived crime between the local and the national levels. The results indicate that the significant factors differ by the local and national levels when respondents perceived the crime.

First, our review notes the main distinction of two factors on the perceived crime between the local and national levels. The *dissatisfactory interactions with the neighborhood* was a significant factor at the local level when the respondents assessed the perceived crime, whereas this was not the case at the national level. In addition, the *policing in the neighborhood* did not have a statistically significant effect on the perceived crime at the local level. However, *policing in the neighborhood* was statistically meaningful at the national level.

Second, the results indicate that there is a difference in the main factors in determining the perceived crime depending on the local and national levels. The findings show that the main causes were the *environment around the neighborhood*, the *victimization of crime*, and the *size of the city* at the local level, and the *victimization of crime*, *media consumption*, and the *environment around the neighborhood* at the national level.

Third, all of the findings suggest that the major differences affecting the perceived crime vary across the local and national levels. While the neighborhood-related factors have a main impact on the perceived crime at the local level, the media is a leading factor at the national level. This distinction can be interpreted as follows.

According to the social disorganization model, the community disintegration and the weakening of the cohesion of members in the area are related with the perceived crime. That is to say, as the perceived crime could affect the integration of the community and the cohesion of the dwellers, those who are socially interactive and integrated with their neighbors have a lower level of the perceived crime than those who are not (Taylor & Hale, 1986; Lee & Earnest, 2003). In addition, when the community's environment has more social and physical disorders, the community has higher crime rates by strengthening the perception that its community control is weakened and poorly managed (Sampson & Groves, 1989; Choi, 2009).

In terms of the circumstances in Korea, interactions with the neighborhood is also important to the perceived crime. Even if emotional bonds are considered to be disappearing more than before, the emotional bonds with neighbors in the region or the concept of community have still traditionally induced bonds between neighbors. According to the Better Life Index proposed by the Organization for Economic Co-operation and Development (OECD), Korea ranked the lowest country in the 'Community' sphere. This indicator estimates the quality of the social support network, which is the percentage of people who believe they can rely on their social network in case of need. In Korea, 78% of the people know someone they could contact frequently and receive emotional support in a time of need. Korea has the lowest rate in the OECD, where the average is 89% (OECD, 2020). Meanwhile, Korea ranked 25th in terms of 'Safety', indicating that Koreans

feel safe when walking alone at night. About 67% of Koreans assess that they feel safe walking alone at night, which is slightly less than the OECD average of 68%. However, according to the latest OECD data, Korea's homicide rate is 1.0, which is lower than the OECD average of 3.7 (OECD, 2020). In summary, Koreans perceived crime more severely than the actual crime rate, and dissatisfaction with their neighborhood can be implicated in the perceived crime. This tendency is consistent with the current study and previous studies in that the satisfaction with their neighbors is a proximate factor of the perceived crime (Morenoff, Sampson, & Raudenbush, 2001).

The victimization of crime consists of direct criminal harm and indirect criminal damages caused by the exposure to the news media (Maxfield, 1984). The vicarious victimization model describes that if people are frequently exposed to crime through the media, the perceived crime can increase even if they do not directly experience crime damage (Fox, Nobles, & Piquero, 2009). Recently, the seriousness of the problem related with media consumption has been emphasized as experiencing indirect crime damage through media increases of other kinds of the perceived crime (Lim, 2018). The perceived crime of the public, in particular, is less dependent on direct victimization experience, and is very much affected by media contact (Heo & Im, 2015). According to Choi and Han (2014), when people are frequently exposed to crime-related media, they have the higher perceived crime because they identify their real world with the virtual world in the media and internalize the image by recognizing it as a universal fact.

Furthermore, as the public has little direct contact with the police, the media takes an important role in building their perceptions of law enforcement (Surette, 2015). According to a prior study, the greater awareness of negative media coverage is associated with the perceptions of police legitimacy (Graziano & Gauthier, 2018). In the case of the circumstances in Korea, a high level of crime-related media consumption reduces the confidence in the police (Choi, Yim, & Hicks, 2020). This might be an indirect effect in that the public experiences the increased level of the perceived crime through the media. They may think that the policing is not effectively controlling the crime (Choi et al., 2020).

Given the above results, the measures to reduce the perceived crime will require a different intervention at the local and national levels. First, the idea at the local level is to lower the perceived crime through fostering an organized and

secure community to interact with their neighbors actively. Crime Prevention Through Environmental Design (CPTED) is highlighted as a crime prevention activity focused on the environment, which refers to a strategy that reduces citizens' rate of the perceived crime and reduces the chances of crime through urban planning (NPA, 2005). Removing risky environmental factors that can lead to crime, can encourage people's outdoor activities and build a bond between neighbors. In fact, CPTED in Korea has shown the effect of lowering the rate of perceived crime as a monitoring factor, as well as inducing respondents to participate in activities in public places such as parks and squares (Lee & Lee, 2014). Thus, the CPTED model can be used to reduce the perceived crime at the local level. Moreover, previous studies suggest that the institutions may play an important role for crime prevention at the local level (Triplett, Gainey, & Sun, 2003). The institutions provide conventional values to community members and this process induces informal social control (Warner, 2003). According to Warner and Konkel (2019), an institution such as a church can be a crime prevention strategy that provides bonding and bridging the social network in neighborhood processes. Therefore, to encourage people to participate in a social program from the institutions can decrease the perceived crime at the local level.

Attention should also be paid to the influence of the media in order to reduce the perceived crime at the national level. The public will recognize the perceived crime indirectly through the media experiencing crime damage. In addition, as the contact of the media related to crime increases, the perceived crime of individuals increases, which causes social turmoil and anxiety from a macroscopic perspective. Therefore, the media should avoid an excessive sensational report when reporting on crimes and should be able to lower the perceived crime of the public by reporting not only crime facts but also crime prevention measures together. Moreover, the media should be the key to understanding the crime policies and initiatives. According to Pickett et al. (2015), the reliance on the media for criminal information is related to lower levels of knowledge about criminal justice. Thus, the media can be used as a strategy to provide public education about the criminal justice system as well as correct crime-related information. Especially, scholars have the responsibility to inform the factual information against an irrational or emotional response and to give the public information based on statistics about crime rates and the demographic

characteristics of criminals. (Pickett et al., 2015).

The limitations of the study and suggestions for subsequent research are as follows. First, the model explanatory power (pseudo-R2) in this study was shown to be low, which can be inferred from the interaction effect between variables. As there have been few studies on the perceived crime in Korea, we have other limitations when we research this field. Second, in this study, the association of demographic indicators with the perceived crime was examined by setting the perceived crime as a category variable, which showed more different results than when we viewed the perceived crime as an 'ordinal' variable. In other studies, there is no consistent results of gender and age on the perceived crime and the fear of crime. This suggests that the following studies should be conducted to classify and examine the perceived crime and fear of crime in depth. Third, it is reported that the perceived crime and the fear of crime are distinct in international studies, and that the perceived crime serves as a predictor and mediator on the fear of crime. Therefore, future work needs to reveal the relationship between the two concepts of the perceived crime and the fear of crime and then apply this relationship to the circumstances in Korea.

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Factors Affecting the Disciplinary Misconduct of Prisoners in Thailand

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Abstract

The purpose of this study is to examine factors affecting prisoners' disciplinary misconduct and obtain solutions to rectify the problem of disciplinary infractions in Thai prisons. A multiple regression analysis was employed to examine data from a sample of 202 prisoners conveniently selected from 434 disciplinary violators in Thailand's Nakhon Pathom Central Prison. Preliminary findings based on a bivariate correlation analysis examining the relationships between the independent factors and the level of disciplinary infractions in prison revealed four factors significantly related to the level of disciplinary misconduct, including classification of prisoners, association and learning, rational decision making, and low self-control. However, results from a multiple regression analysis found that rational decision making, and low self-control were the only two factors that were statistically significant. This finding supports the rational choice theory and self-control theory. To solve the disciplinary misconduct problem, prisons are recommended to improve measures of checking and employing harsher penalties. Additionally, policy recommendations to address prison overcrowding to facilitate the prevention of disciplinary misconduct were also discussed.

INTRODUCTION

In recent years, Thailand's prisons have been faced with the overcrowding problem. According to statistics from the Correction Department, the total number of prisoners in Thailand amount to over 300,000, far exceeding the 110,000 capacity (Pootrakul & Khruakham, 2015; Pootrakul, Terdudontham, Khruakham, & Poonyarit, 2019). Prison overcrowding is a source to various problems and affects correctional programs resulting in ineffective penological rehabilitation for prisoners to return to society. The overcrowding problem not only contributes to deteriorating prison environment but also impacts prisoner's daily routine manipulated by prison officers. As a result, it causes difficulty in managing welfare, training and treating prisoners. Living populously in overcrowded prisons also means a number of prisoners are at leisure given the lack of space and insufficient work to be distributed among all prisoners. This causes distraction among prisoners leading to more rule breaking. Overcrowding also presents an obstacle for developing, training and correcting prisoners to return to society without the tendency to reoffend. Moreover, the number of prisoners continuously increase while the number of prison officers remain the same, causing a disproportion that further exacerbates the problems. As such, a central issue in managing the prison is the disciplinary infraction problem that increases accordingly with the number of prisoners.

People are put in confinement in prisons according to the judgment or legal order as a means to separate them from the external society, to be rehabilitated and ameliorated into good citizens of society. Nevertheless, some prisoners still exhibit deviant behaviors against prison rules such as gambling, altercation, tattooing, smuggling prohibited items into the prison and using drugs. These misbehaviors should not occur in prisons where criminals are being controlled and punished as well as rehabilitated. Therefore, disciplinary procedure is another crucial function which prison officers must meticulously carry out to run prisoners' daily activities in an orderly manner. Moreover, disciplinary procedure regulates prisoners as prisons serve the purpose of retribution and removing criminals from society as well as correcting and improving prisoner's behaviors to become good citizens of society. Research findings have established correlation

between disciplinary misconduct and recidivism after being released from prison (Cochran, Mears, Bales, & Stewart, 2014; Flanagan, 1983; French & Gendreau, 2006).   As prisons represent a whole other society where a large number of people who have violated the law live and interact together, it is essential to have rules, regulations and/or authorized orders to serve as guidelines to effectively maintain peace and order of prisoners. A principal law that prisons abide by as a tool to control prisoners is the "Correction Act of 2017 (B.E. 2560)". The Act explicitly consists of rules, regulations, authorized orders and procedures for prisoners to live in prisons, particularly, in Chapter 7 (Disciplines and Penalties). For example, Section 68 states that a prisoner who violates or disobeys prison officer's orders and prison rules or regulations, is deemed to be in breach of discipline. Moreover, Sections 69 and Section 70 imposes penalties on prisoners who violated disciplinary rules.

Given the limited research on disciplinary misconduct by prisoners in Thailand, there is still insufficient understanding and application in this field to effectively and extensively address the problem (Kaewpriwan, 2007) when compared to other countries that have studied this discipline for several decades (Hanks, 1940; Pompoco, Wooldredge, Lugo, Sullivan, & Latessa, 2017). The study aims to empirically analyze factors affecting disciplinary infractions within prisons to deepen understanding and to ultimately apply useful findings to recommend appropriate guidelines in addressing problems related to disciplinary infractions among prisoners.

LITERATURE REVIEW

Prison misconduct is not a general crime which is against criminal law, but disciplinary infraction is an action that deviates from the majority of people in prison and is against prison rules that prisoners are expected to obey. However, some disciplinary infractions are crimes if the actions are illegal such as possessing or taking drugs. While discussions regarding disciplinary offenses often fall under criminological perspectives and concepts as well as other criminal and deviant behaviors within the general society, criminological concepts in this study are discussed through the viewpoint of social learning theory, differential

association theory, self-control theory, and rational choice theory. The four criminological theories were selected to establish a research framework due to the review of previous studies.

Social learning theory and differential association theory are a group of concepts explaining how misconduct is acquired through social learning processes. It explains that learning processes which lead to misconduct are caused by associating with people who have committed crimes and perceive the techniques as well as motives to follow their criminal path. This often refers to friends who have been together (Sutherland, 1939), whereby criminal behavior is learned during the interaction with other persons in a process of communication. Learning depends on association levels in terms of frequency, duration, priority and intensity till the time that it was developed to be more comprehensive and suitable for social change by combining the concept of reinforcement and concept of imitation (Akers, 1997). Imitation on the other hand, is shaped through behavioral observation from others and following it. The modelled behaviors can be based on the person in close contact with the imitators or based on the media with which imitators never associate with in person. Imitation depends on the models' behaviors and effects of such behaviors, of which induces imitators to either copy or not. Extending from Sutherland's theory, association with the same characteristics is a reinforcement that makes one feel important. Accordingly, disciplinary misconduct of prisoners can occur due to associating with prisoners who have committed disciplinary infractions and thus the imitation of those behaviors.

Self-control theory or general theory of crime rationales can be applied to explain prison misconduct based on the concept that self-control is distinctive in each person. It depends on socialization such as how one was raised and cultivated, support by parents and emphasis on education and training by schools or other social institutions. It is hypothesized that persons with high degrees of self-control will have less tendency to commit a crime throughout their lives, while those with low degrees of self-control will have a higher tendency to commit a crime. Crimes happen when there are facilitating factors or opportunities (Gottfredson & Herschi, 1990). Persons with low self-control is generally characterized by impulsivity, simple tasks, risk- taking, physical activities, self-centeredness and bad temper. Therefore, in this context, prisoners with low

self-control will commit more frequent disciplinary infractions than those with high self-control.

Rational choice theory relates to the process of thinking and decision making, where rationality in the decision to commit an offense or not is based on evaluating the benefits and costs of action (Cornish & Clarke, 1986). This concept is derived from the Classical School of Criminology, based on the credence that human requirement is the pursuit of happiness (Hedonism), whereby humans naturally seek satisfaction (Pleasure), while avoiding what causes them pain. Hence, the decision to commit an act requires weighing the outcomes of whether such an act will result in more or less benefits (happiness) or costs (pain). If the outcome causes more benefits than costs, then one will choose to act, whereas if the outcome involves more costs, one will choose not to act. Consequently, crime prevention can be carried out by causing fear of punishment which will impose a higher cost in the process of weighing the outcome of the act. Within this theoretical framework, the decision to commit disciplinary infractions will be based on weighing the outcome of misconduct in terms of benefits and costs.

A review of relevant research analyzing factors affecting prisoners' disciplinary infractions found several significant factors that influences the level disciplinary infractions which are summarized as follows:

1) Personal factors: a number of researches examined the impact of multiple personal factors on disciplinary infractions including age, marital status, convict history, relatives' visits, sentence and classification of prisoners. The variable that is frequently found to have an effect on disciplinary misconduct is age, whereby young prisoners were found to have committed more frequent disciplinary offenses than older prisoners (Hanks, 1940; Flanagan, 1983; Goetting & Howsen, 1986; Kuanliang & Sorensen, 2008; Lahm, 2009; Pompoco et al., 2017; Rocheleau, 2014). For marital status, research findings found that unmarried prisoners committed disciplinary offense more frequently than married ones (Flanagan, 1983; Goetting & Howsen, 1986). With regards to convict's history prior to recent imprisonment, it was found that prisoners who have been sentenced in prison or have committed offenses prior to imprisonment committed more frequent disciplinary offenses than others (Cyayton & Carr, 1984; Goetting & Howsen, 1986; Rocheleau, 2014). The sentence or a term of imprisonment imposed by a court was also examined in this research since previous studies found that

prisoners who were sentenced to short term imprisonment tend to commit more frequent disciplinary offenses than long term prisoners (Goetting & Howsen, 1986). On the other hand, there were studies that also found no effect of sentencing on disciplinary misconduct (Hanks, 1940; Rocheleau, 2014). Furthermore, there were research findings that established correlation between relatives' visits and disciplinary misconduct (Jen & MacKenzie, 2006), as well as research that found no such correlation (Flanagan, 1983; Goetting & Howsen, 1986). In a recent study, it was found that after seeing relatives, prisoners increasingly tend to commit disciplinary offenses (Immarigeon, 2013). Another personal factor, classification of prisoners, appears to be a rather distinctive factor for Thailand as penitentiaries in the country has a different system of management and control of prisoners. In a previous correlation study, prisoner classification was found to be a statistically significant factor explaining frequency of disciplinary offenses whereby prisoners under good classification committed less disciplinary offenses than those under bad classification (Lerdsena & Khruakham, 2019). Therefore, this variable was taken into consideration in the analysis.

2) Associating and learning is the variable within the theoretical framework of differential association and learning theories. Relevant research found that friendship or association had an effect on disciplinary misconduct in prison. Associating with friends who have committed disciplinary offenses plays a role in persuasion of or support to other prisoners to commit (Reid, 2017). The result of an initial examination found a statistically significant correlation between association and disciplinary misconduct.

3) Rational decision making is a variable which was not found in any research in other countries, yet rational choice before any infractions in criminal activity is indeed an important variable. This is supported by the results from an initial evaluation which found high statistically significant correlation between rational decision making and disciplinary misconduct (Lerdsena & Khruakham, 2019). Therefore, this variable will be taken to the next level of analysis.

4) Low self-control is a variable related to mental and personal character of prisoners. There are different measurements which are typically self-assessment questions. Most research found that prisoners who suffer from mental and personal problems expressed through low self-control character, tend to commit disciplinary offenses more frequently than other groups. (Edens, Poythress, & Lilienfeld, 1999;

Fox, 1958; Goetting & Howsen, 1986; Hanks, 1940; Kuanliang & Sorensen, 2008; Rocheleau, 2014).

Prisoners' Disciplinary Misconducts in the Thai Context

Thailand has recently faced the prison overcrowding problem, approximately 328,998 prisoners held in prisons around the country (Table 1). This situation certainly has a negative impact on administering the prison and cause a lack of effective control of prisoners.

Table 1. Statistic of Prisoners from All Prions in Thailand on February 1, 2019

Types	Male	Female	Total	Percentage (%)
1. Convicted prisoners	269,904	40,911	310,815	82.080
2. Inmates during	56,063	8,319	64,382	17.002
2.1 Appellate procedure	27,958	4,194	32,152	8.491
2.2 Assize	8,749	1,586	10,335	2.729
2.3 Investigation	19,356	2,539	21,895	5.782
3. Juveniles in custody	70	1	71	0.019
4. Detainees	19	0	19	0.005
5. Restrictions	2,942	444	3,386	0.894
Total	328,998	49,675	378,673	100.00

Source: Correction Department, 2019

Table 2 presents the disciplinary infractions by prisoners in Nakhon Pathom Central Prison, which illustrates that despite the presence of rules and regulations, infractions still occur. In the long run, such infractions will increasingly occur, and prisoners will get indoctrinated with bad behaviors. Consequently, as prisoners return to society, there is a possibility that they will misbehave as they have become accustomed to such behaviors in prison. This goes against prison provisions which focus on controlling, correcting and developing prisoners' behaviors to enable them to return to society as decent and worthy individuals. Whether the problem of misbehavior in prisons is entirely resolved or not, these habitual misbehaviors are a factor that influences recidivism rates.

Table 2. Types of Disciplinary Offenses in Nakhon Pathom Central Prison

Types of Disciplinary Offenses	Amount of disciplinary offenders in prison			Total
	2015	2016	2017	
Altercation/ Assault	34	42	56	132
Possession of prohibited items	14	11	41	66
Gambling	45	65	32	142
Use drugs and intoxicant	10	1	8	19
others	23	28	24	75
Total	**126**	**147**	**161**	**434**

Source: Nakhon Pathom Central Prison, 2018b

Research Hypotheses

Based on the review of relevant theories and researches, the following hypotheses were formulated for the present study:

1) Personal factors, including age, marital status, convict history, relatives' visits, sentence, and classification of prisoners have a significant impact on disciplinary misconduct in prison.

2) Association and learning have a positive significant impact on disciplinary misconduct in prison.

3) Rational decision making has a positive significant impact on disciplinary misconduct in prison.

4) Low self-control has a positive significant impact on disciplinary misconduct in prison.

METHODS

Research Site

Nakhon Pathom Central Prison is the central administration department belonging to department of Corrections under the Ministry of Justice, responsible for custody of both male and female convicted prisoners who are sentenced for life imprisonment, penal operating, education and learning, correctional behavior and vocational training, as well as managing welfare and prisoners' health care. The prison is separated into 9 wings of controlling zones. Wings 1, 2 and 4 houses convicted male prisoners. Wing 3 houses male prisoners convicted of heavy penalty. Wing 5 houses male inmates during process of judgement. Wing 6 is the cooking area. Wing 7 is for female prisoners. Wing 8 is the medical center and Wing 9 is for persons under investigation, detainees, restrictions and assistant prisoners. According to the Department of Correction operational plan in 2016-2019, the central prison, which is the chief of boundary 7, is responsible for consultation and handling of prisons in Kanjanaburi, Samut Sakhon, Samut Songkarm, Prachuap Khirikhan, Suphanburi, Petchaburi, and Ratchaburi, consisting of 127 male officers and 27 female officers. The Nakon Pathom Central Prison alone has approximately 5,500 prisoners (Nakhon Pathom Central Prison, 2018).

Table 3. Statistic of Prisoners in Nakhon Pathom Central Prison (1 January 2018)

Types	Male	Female	Total	Percentage
1. Convicted prisoner	3,929	498	4,427	78.72
2. Inmates during trial	1,031	128	1,159	20.61
3. Juveniles in custody	2	2	4	0.07
4. Detainees	12	3	15	0.27
5. Restrictions	18	1	19	0.34
Total	4,992	632	5,624	100.00

Source: Nakhon Pathom Central Prison, 2018a

The Samples

The sample group consists of 209 male prisoners from a total of 434 who have committed disciplinary misconduct in the central prison of Nakhon Prathom. The samples were derived through the Taro Yamane formula (1973) with 95% confidence level. The samples were selected through nonprobability sampling and quota sampling by dividing quotas according to the proportion of prisoners who committed disciplinary infractions in each territory.

Research Instrument

To collect data from the sampled prisoners, questionnaires were designed from reviews of relevant theories and researches and were separated into six parts including questions measuring the independent variables such as personal characters, association and learning, rational choice and low self-control under parts 1 to 4. Questions measuring the dependent variable, disciplinary misconduct, are under part 5 while question seeking suggestions are contained under part 6. The responses to questions pertaining to the independent and dependent variables, except for personal characters, utilized a five-point rating scale (Likert scale). Respondents could choose to answer based upon their opinions where a rating of "1" refers to "least agree" and a rating of "5" refers to "most agree". Validity and reliability tests of the questionnaire was conducted before data collection. The questionnaires were submitted to three academic experts for evaluating validity of content by calculating out index of item-objective congruence (IOC) and adjusted according to experts' suggestions. A trial run of the revised questionnaires was carried out among a group of 30 prisoners who committed disciplinary offenses but were not part of the selected samples. The result of reliability test by employing the Cronbach's alpha showed a coefficient of more than 0.70, indicating that the questionnaire was significantly reliable.

Independent Variables

Independent variables for this study consisted of 4 parts which were personal characters, association and learning, rational decision making, and low self-control. These variables were selected based on reviews of related literature.

Personal characters variables were arrived at through reviews of relevant

researches which studied the impact of personal characters on disciplinary misconduct. The characters included age (Hanks, 1940; Flanagan, 1983; Goetting & Howsen, 1986; Kuanliang & Sorensen, 2008; Lahm, 2009; Pompoco et al., 2017; Rocheleau, 2014), convict history (Cyayton & Carr, 1984; Goetting & Howsen, 1986; Rocheleau, 2014), relatives' visits (Flanagan, 1983; Goetting & Howsen, 1986; Immarigeon, 2013; Jen & MacKenzie, 2006), marital status (Flanagan, 1983; Goetting & Howsen, 1986), sentence (Goetting & Howsen, 1986; Hanks, 1940; Rocheleau, 2014), and classification of prisoners (Lerdsena & Khruakham, 2019). Analytically, all the examined variables, except age, were converted into dummy variables, except for convict history (Mean = 1.94, S.D. = 0.99) and relatives' visits (Mean =1.09, S.D. = 1.21). The converted variables were age (0 = 21-30 years old, 1 = over 31 years old), marital status (0 = single, divorced, separated and other, 1= married), sentence (0 = 0-5 years, 1 = over 5 years) and classification of prisoners (0 = moderate class, bad and very bad class, 1 = good, very good and excellent class).

Association and learning (Reid, 2017) (Mean = 2.60, S.D.= 0.91) is based on the theoretical frameworks of social learning theory and differential association theory. It was created from responses to 8 questions using the 5-point Likert's scale ratings on committing disciplinary offenses by learning from other prisoners, committing disciplinary offenses by being persuaded, consulting with close friends, disciplinary infraction techniques taken from friend, groups of friends having effects on decision making to commit disciplinary offenses, and viewing disciplinary infraction as normal.

The rational decision making variable (Lerdsena & Khruakham, 2019) (Mean = 2.30, S.D. = 0.93) drew upon the theoretical framework of rational choice theory. It was based on responses to 7 questions using the 5-point Likert's scale rating on satisfaction on committing disciplinary offenses, feeling pleasure after infraction, not to commit disciplinary offenses whether knowing the possibility of being caught, searching for opportunities to commit disciplinary offenses, outcome of disciplinary misconduct is worthy, deciding to commit disciplinary offenses if there were no officers or no security cameras, and getting rewarded from committing disciplinary offenses.

The low self-control variable (Edens, Poythress, & Lilienfeld, 1999; Fox, 1958; Goetting & Howsen, 1986; Hanks, 1940; Kuanliang & Sorensen, 2008;

Rocheleau, 2014) (Mean = 2.64, S.D. = 0.95) is based on the theoretical framework of self-control theory. It was based on responses to 6 questions using the 5-point Likert's scale ratings regarding being snappish, irritable and indulgent, solving problem with other prisoners with violation, viewing disciplinary infraction as challenging, committing disciplinary infraction due to lack of restraint and recklessness, unable to suppress emotions while getting provoked, and no regret for committing disciplinary offenses. These questions reflect the characteristics of low self-control.

Dependent Variable

The dependent variable which is the level of disciplinary infractions (Range = 7-35, Mean = 12.22, S.D. = 6.86), was derived from responses to 7 questions utilizing the 5-point Likert's rating scale on disciplinary misconduct which consists of altercation or assault, possession of prohibited items such as drugs, weapons, etc. gambling, tattooing, use of drug or intoxication, escape or escape attempt and insubordination. The respondents were asked to rate their disciplinary misconduct level for each category of infraction ranging from 1 to 5, where 1 means never or very few and 5 means very often.

Table 4. Descriptive Statistics of Dependent and Independent Variables

Variables	Minimum	Maximum	Mean	Std. Deviation
Age (AGE)	0	1	.56	.498
Marital status (MSTATUS)	0	1	.17	.374
Classification of prisoners (CLASS)	0	1	.40	.491
Sentence (SENTENCE)	0	1	.55	.499
Relatives' visits (VISIT)	0	1	.71	.453
Convict history (PREHIST)	1	5	1.94	1.017
Association and learning (LEARN)	1.00	4.38	2.6005	.91228
Rational choice (REASON)	1.00	4.57	2.3014	.93428
Low Self-control (SELFCON)	1.00	4.83	2.6380	.94647
Prisoner's misconduct (MISCON)	7.00	35.00	12.2249	6.86001

Data Analysis

The research employed the Multiple Regression Analysis in examining data deemed as a suitable statistical technique for examining the effect of several independent variables which were metric variables on one dependent metric variable. This statistical technique enables the researcher to examine the overall effects of independent variables on the dependent variable and the effects of each independent variable on the dependent variable together with the effects of other independent variables taken into the model. In order to employ the multiple regression analysis, some statistical assumptions must be met. To fulfil the assumptions, the following tests were undertaken, the linearity test, normality test, homoscedasticity test, and multicollinearity test (Mertler & Vannatta, 2010). After the required tests were conducted, seven cases were deleted. Consequently, this research employed a total sample of 202 cases.

RESULTS

The primary results of a bivariate correlation analysis between the examined variables revealed that the level of disciplinary misconduct which was the dependent variable in this research was significantly correlated with the variables of classification of prisoners (CLASS), association and learning (LEARN), rational choice (REASON), and low self-control (SELFCON) at the statistically significant level of 0.01. This indicates that when other factors are not controlled for, there were 4 factors that had a significant effect on disciplinary misconduct. The correlation of each factor is shown below.

Table 5. Analysis Result of Correlation between Examined Factors and Disciplinary Misconduct.

	X1	X2	X3	X4	X5	X6	X7	X8	X9
MSTATUS (X2)	.182(**)								
CLASS (X3)	-.034	-.059							
SENTENCE (X4)	.077	.061	.051						
VISIT (X5)	-.141(*)	.135	-.010	.037					
PREHIST (X6)	.289(**)	-.018	-.348(**)	.082	-.235(**)				
LEARN (X7)	.131	.084	-.227(**)	.080	-.225(**)	.167(*)			
REASON (X8)	.063	.014	-.353(**)	-.022	-.208(**)	.165(*)	.755(**)		
SELFCON (X9)	.028	-.008	-.278(**)	-.004	-.100	.162(*)	.700(**)	.705(**)	
MISCON (Y)	.091	.011	-.303(**)	-.075	-.109	.081	.574(**)	.646(**)	.614(**)

* $p \leq 0.05$ ** $p \leq 0.01$

Classification of prisoners and disciplinary misconduct are negatively related ($r = -0.303$, $p \leq 0.01$) indicating that prisoners in the moderate class, bad class and very bad class tended to commit disciplinary offenses more than those in the excellent class, very good class and good class. Furthermore, association and learning and disciplinary misconduct show a positive relationship ($r = 0.574$, $p \leq 0.01$), meaning that prisoners who have a bad attitude and learn from prison friends who commit disciplinary offenses will follow their friends. For the rational decision making, there was a positive correlation to disciplinary misconduct ($r = 0.646$, $p \leq 0.01$), signifying that prisoners consider whether outcomes and opportunities of committing disciplinary offenses have a high tendency of success for which they are more likely to commit disciplinary offenses. Low self-control also had a positive correlation with disciplinary misconduct ($r = 0.614$, $p \leq 0.01$), implying that prisoners who have low self-control are likely to commit disciplinary offenses.

The results of a multiple regression analysis taking all the independent variables into the analytical model revealed that the model created from a combination of all independent variables is able to explain 49% of the variance in the dependent variable ($R2 = 0.491$, R2 adj $= 0.467$, $F(9,193) = 20.683$, $p <$

0.001) as shown in table 6. Also, it was found that rational decision making (B = 2.334, p < 0.001) and low self-control (B = 1.934, p < 0.001) had a significant effect on the level of disciplinary infraction while controlling for the effects of the other independent variables. This indicates that when the effects of other variables are being controlled for, prisoners who see the value of benefits and opportunities of disciplinary infractions will tend to commit disciplinary infractions. Similarly, prisoners with a high level of low self-control will be more likely to commit disciplinary infractions. The other seven variables including convict history, relatives' visits, marital status, sentence, classification of prisoners and factor of association and learning, had no statistical significant effect on the level of disciplinary misconduct.

Table 6. The Results of Multiple Regression Examining the Effect of the Factors on Level of Disciplinary Misconduct.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.955	1.699		.562	.575
Age (AGE)	1.023	.708	.080	1.445	.150
Marital status (MSTATUS)	-.354	.923	-.021	-.384	.701
Classification of prisoners (CLASS)	-1.400	.768	-.108	-1.823	.070
Sentence (SENTENCE)	-.866	.667	-.068	-1.297	.196
Relatives' visit (VISIT)	.113	.782	.008	.145	.885
Convict history (PREHIST)	-.580	.373	-.093	-1.555	.122
Association and learning (LEARN)	.812	.614	.116	1.322	.188
Rational decision making (REASON)	2.334	.620	.332	3.767	.000
Low self-control (SELFCON)	1.934	.541	.282	3.574	.000

DISCUSSION

From the primary results of the bivariate correlation analysis, it was found that there were four factors that significantly affected the level of disciplinary infractions at the statistical significance level of 0.05, consisting of classification of prisoners, association and learning, rational decision making, and low self-control. However, results of the multiple regression analysis found only two variables, rational decision making and low self-control to be significant (see Edens et al., 1999; Fox, 1958; Goetting, & Howsen, 1986; Hanks, 1940; Kuanliang, & Sorensen, 2008; Rocheleau, 2014). This result supports the concept of rational choice theory (Cornish & Clarke, 1986) and self-control theory (Gottfredson & Herschi, 1990). This indicates that prisoners, who think rationally and have low self-control characteristics including impulsivity, simple tasks, risk-taking, physical activities, self-centeredness and bad temper, are more likely to violate the disciplinary rules in the prison. Theoretically, prisoners with low self-control frequently perceived costs from getting caught and penalties with less importance compared to the norm, including perceiving greater benefits from committing disciplinary offenses. As such, they are less capable in restraining their desires or endure for benefits from disciplinary infraction and therefore decide to commit disciplinary offenses to fulfil their urge.

Although the effect of association and learning was found to be significant in the bivariate analysis, it was found to have no significant effect on the level of misconduct in the multiple regression analysis. A possible explanation is that the prison is a closed area where all prisoners are familiar with each other, causing an indifferent learning process for the prisoners within the prison. Consequently, the decision to commit disciplinary infractions mostly depends upon individual attitudes and preferences which is related to the concepts of rational choice theory and self-control theory.

Classification of prisoners is another interesting factor despite showing no statistical significant effect at the 0.05 level. However, when considering its significant correlation level of 0.07 in the multiple regression model and its significant correlation with the level of misconduct in the bivariate analysis ($r = -0.303$, $p < 0.01$), it is interesting to discuss the relationship between classification

of prisoners and disciplinary misconduct. Arguably, prisoners in the bad classification (bad, very bad and moderate) tended to commit more disciplinary offenses than those in the good classification (good, very good and excellent). This relationship can be explained through the self-control theory and labeling theory that bad-class prisoners generally have less self-control but higher convict history (r = -0.348, p < 0.01) than those in the good-class (r = -0.278, p < 0.01). Prisoners in the bad class are always stigmatized by officers and labeled as bad and unreliable persons. Consequently, they are treated unequally or oppressed by prison officers, likely causing a negative attitude towards prison officers or other prisoners and they would, in turn, react with misbehavior, such as altercation, disobey with order, and demonstrate other aggressive behaviors as a result of the labeling (Becker, 1963; Khruakham, 2015).

Other personal factors, such as age, marital status, convict history, sentencing and relatives' visits, were all found to have no statistically significant effect on the level of disciplinary infractions. However, this is not surprising as few other researches also showed no significant impact. Overall, personal factors have less effect on disciplinary misconduct of prisoners. As such, rational decision making and self-control should be factors considered by prisons when formulating solutions to the problem of disciplinary misconduct.

RECOMMENDATIONS

Practical Recommendations

Although the results showed that the factors of rational decision making and self-control had a significant impact on disciplinary misconduct, only suggestions to reduce problems of disciplinary infractions by prisoners based upon rational choice theory were discussed. This is due to that self-control theory suggests that self-control is constant on time, resulting in difficulty to change the behaviors of prisoners who have low self-control. It is recommended to improve measures of checking and employ harsher penalties on prisoners who commit disciplinary offenses to reduce opportunities and increase penalty as well as increase costs caused from disciplinary misconduct into cognitive and decision making process. This recommendation is consistent with the principle of rational choice theory,

suggesting that to effectively prevent disciplinary misconduct is to lessen benefits or to increase costs as well as to lower the worthiness or to amplify risks of getting penalized for committing disciplinary offenses. Therefore, creating a better prisoner inspection system and imposing harsher penalties is feasible for reducing problems of disciplinary misconduct. This can be carried out by increasing security cameras and installing body scan machines to check prisoners before access into prison or dormitory. These tools are helpful in detecting and preventing some disciplinary misconduct, such as possession of prohibited items, altercation/assault, prison escaping, sexual issues, tattooing, and use of drugs or intoxicant.

Policy Recommendations

Reducing the number of prisoners is a sound policy recommendation that would help alleviate the problem of disciplinary offenses in prisons. The reason being that overcrowded prisons will most certainly be faced with various setbacks such as very consuming budgets, disproportionate number of correction officers to prisoners, difficulties in rehabilitating and controlling prisoners (Cyayton & Carr, 1984; Fox, 1958; Jen & MacKenzie, 2006; Reid, 2017). Comparatively, a good example in managing the prison overcrowding problem could be found in the Malaysian Kajang Prison, where a policy was established to reduce the number of prisoners by two-thirds within two years. Subsequently, some new guidelines were created and implemented to reduce the number of prisoners such as those deemed to be harmless to the overall society, and a pre-release with probation for prisoners who had a remaining penalty of less than one year of imprisonment (Pootrakul, Terdudontham, Khruakham, & Poonyarit, 2019). This strategy has been widely promoted by the United Nation (UNODC, 2006; 2007; 2011).

Additionally, various strategies could be carried out to reduce the number of prisoners at different stages of the criminal justice procedures. For example, during the pre-prosecution stage, the number of offenders brought into the criminal justice system could be reduced by decriminalizing some soft drug-related offenses, using more pretrial diversion measures, encouraging the use of restorative justice and community justice, and constructing social support and involvement for released prisoners not to recidivate. During the prosecution and on-going trial stage, the number of offenders being brought into the prison can be reduced by

improving the bail release system such as by making funding increasingly available to offenders under poverty, employing plea-bargaining, and supporting the use of non-custodial measures as identified in the Tokyo Rules. At the sentencing disposition stage, it is suggested that the court use non-custodial sanctions for the offenders committing less serious or less harmful offenses and use more intermediate punishments such as monetary penalties, community service order, restitution to the victim or probation and judicial supervision. As for the post-sentencing stage, it is recommended that institutionalization be avoided and to assist offenders for early reintegration into society by employing post-sentencing alternatives such as half-way houses, work or education release, various forms of parole, remission, or pardon.
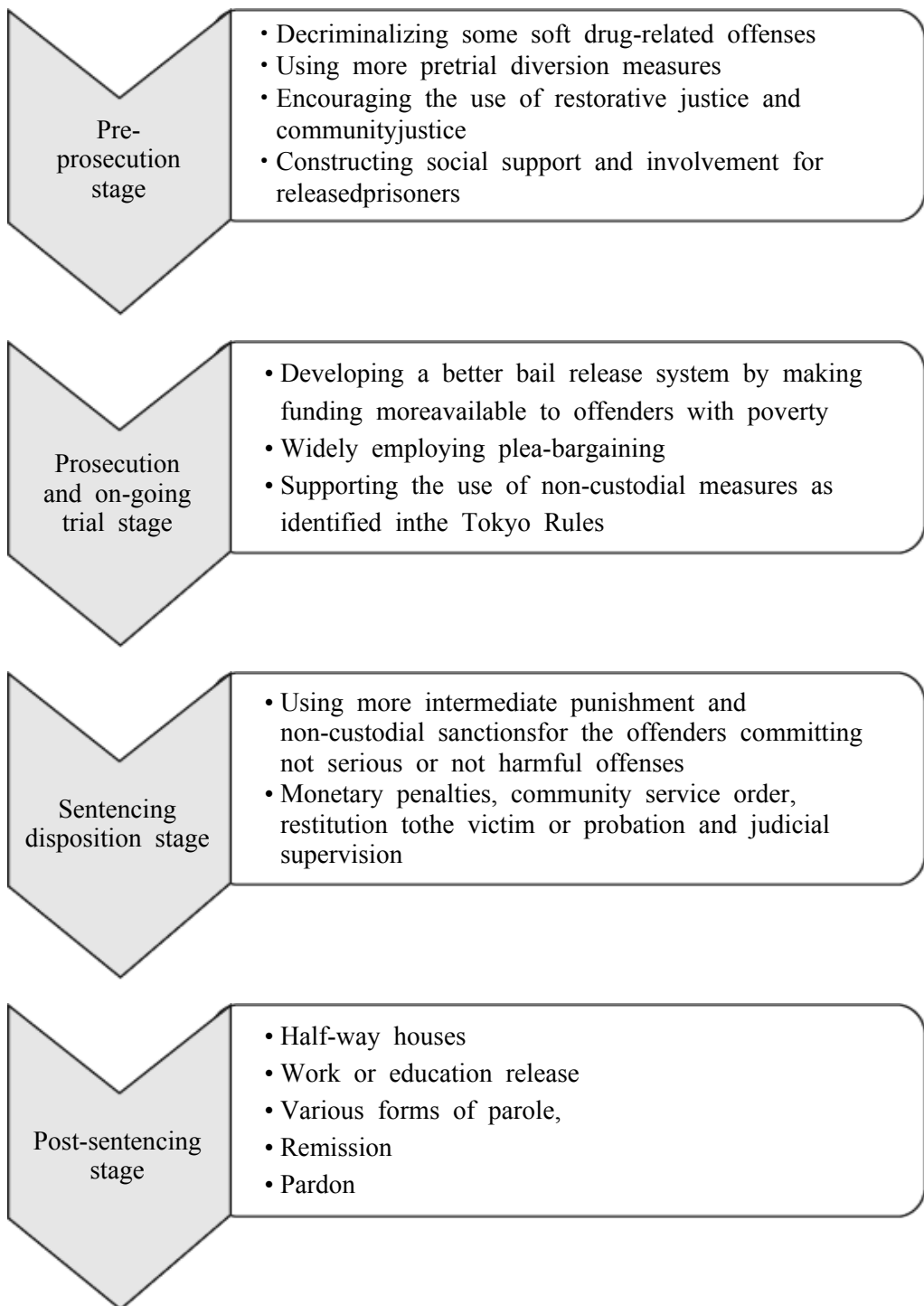
| Pre-prosecution stage | · Decriminalizing some soft drug-related offenses
· Using more pretrial diversion measures
· Encouraging the use of restorative justice and communityjustice
· Constructing social support and involvement for releasedprisoners |

| Prosecution and on-going trial stage | · Developing a better bail release system by making funding moreavailable to offenders with poverty
· Widely employing plea-bargaining
· Supporting the use of non-custodial measures as identified inthe Tokyo Rules |

| Sentencing disposition stage | · Using more intermediate punishment and non-custodial sanctionsfor the offenders committing not serious or not harmful offenses
· Monetary penalties, community service order, restitution tothe victim or probation and judicial supervision |

| Post-sentencing stage | · Half-way houses
· Work or education release
· Various forms of parole,
· Remission
· Pardon |

Figure 1. Summary of Policy Recommendations for Reducing the Number of Prisoners

Limitations and Recommendations for Future Research

There were various limitations in this research, such as the studied samples from a single prison may not be statistically representative of all prisoners in the country. This would affect the general applicability of the research results to prisoners in other prisons throughout the country. Another limitation was the conversion of personal characteristic variables into dummy variables which could result in the loss of information for the analysis. Also, the measurement of dependent variable was imprecise. This might affect the findings of the study; therefore, a higher level of measurement of personal factors and the dependent variable with more accurate measurement should be included for future research. Moreover, preceding research also found that the influence of these macro variables were greater than individual factors, but none of the macro variables or prison characteristics, such as structure of prison, number of prisoners, prisoner's programs/activities etc., were examined in this study (Jen & MacKenzie, 2006). Therefore, future research should aim to include data from various prisons in order to examine the effects of prison characteristics as macro variables. This would academically substantiate some potentially effective guidelines to prevent disciplinary infractions in prisons.

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Exploring Factors of Support for Red Light Cameras and Perceived Officer Quality

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Abstract

The purpose of this study is to explore the role of individual, geographic, and police service variables in predicting 1) residents' support of red light cameras and 2) residents' perceptions of officer quality through ordinary least squares analyses (OLS). Further, with confirmatory factor analysis (CFA) utilizing structural equation modeling,

the study retests previously identified significant relationships to consider a hypothesized link between the two latent variables (residents' support for the camera and their perceptions of officer quality). The study uses data from a 2008 survey of Houston residents. The results suggest, first, that police service variables are more predictive of both residents' perceptions than are individual and geographic variables (OLS results). Second, a significant link exists between the two perceptions (CFA results). Thus, the results indicate that if residents offer greater support of red light camera enforcement, their perceived quality of life becomes secure, leading to a better evaluation of the police. Red light camera enforcement has not been frequently observed in the context of quality of life. The findings add empirical evidence to the body of literature regarding traffic camera enforcement and residents' perceptions of police.

Keywords

INTRODUCTION

Quality of life remains an ongoing agenda in the policing scholarship. The focus on quality of life problems has emerged from broken windows order maintenance strategies that regulate minor incidents, assuming a spiraling escalation from minor social disorders to more serious crime incidents (Wilson & Kelly, 1982). Further, the community policing philosophy transformed the role of police to one involving more social regulation and soft power, from the previous authoritative role they held (Goldstein, 1990). Therefore, the role of police today in ensuring residents' safe life experiences extends to a caregiving role. Many police departments focus on regulating both major crimes and minor problems in communities. For instance, the police are supposed to check residents' home security and be present in meetings with community members (Dansie & Fargo, 2009). Kelly and Moore (1988) expressed their regret that police had downplayed their order maintenance role, and researchers did not realize until the early 1980s that residents care more about disorders than crime.

Studies measured quality of life issues from disorders in neighborhood environments, such as abandoned cars/buildings, drug sales, vandalism, graffiti, vagrancy, public drunkenness, or loitering, which are not serious crimes (e.g., Dansie & Fargo, 2009; Reisig & Parks, 2000; Scheider, Rowell, & Bezdikian, 2003). Findings from England suggest that residents' confidence level in policing is rooted in neighborhood disorders, not residents' fear of crime. Thus, public perceptions of the police depended more on non-criminal disorders in the neighborhoods (Jackson & Bradford, 2009; Jackson, Bradford, Hohl, & Farrall, 2009), consonant with studies that found that minor disorders that affect the quality of life correlated with residents' opinions about the police (Innes, 2007; Innes, 2004; Scheider et al., 2003). A few, albeit interesting, studies point out that traffic problems are a core aspect of quality of life. One Canadian study reported that residents feared reductions in quality of life more than violent crime (Ruddell & Ortiz, 2015). Approximately half of the residents from this study identified traffic safety issues, particularly speeding and aggressive driving, as top priorities in need of police intervention. A similar finding has been reported in the U.S., where traffic enforcement aiming at speed control and aggressive driving

were identified as serious problems that concern residents the most (Boise PD, 2007; Coleman, 2005).

Non-criminal aspects that do not necessarily pertain to concerns about serious crime itself, but that pertain to concerns about disorders in neighborhoods have a stronger influence on residents' perceived quality of life. Thus, it is obvious that the police should be observant and address the quality of life related-problems to lessen residents' worries. Although limited scholarship directly addressed traffic disorders in the context of quality of life, to us, it is sufficient to make a hypothesized link that maintaining orders by traffic cameras is likely to increase the quality of life of residents and potentially lead to improved public satisfaction with the police. We have not encountered a wealth of evidence suggesting any relationship between residents' view of red light cameras and their opinion of police. If residents approve automated red light cameras to achieve greater security in their quality of life matters, is there a possibility that residents' perceptions of police become better? To answer these questions, we reviewed the key literature regarding residents' perceptions of police and traffic enforcement via red light cameras. We also searched for a link between residents' support of red light cameras and their perceptions of the police.

A Link Between Residents' Perceptions of Police and Red Light Cameras

For the past four decades, a rich body of literature has enhanced our understanding of residents' perceptions of the police (for reviews, see Avdija, 2010; Lai & Zhao, 2010; Luo, Ren, & Zhao, 2017; Orr & West, 2007; Sampson, 2006; Schafer, Huebner, & Bynum, 2003; Skogan, 2005; Weitzer & Tuch, 2005; Zhao, Lai, Ren, & Lawton, 2011). Since the beginning of community problem-solving era, a broader reform aimed at improving the entire neighborhood has been implemented. Thus, any problems that have affected the quality of life are potentially under scrutiny through a policing research lens. Theoretical concerns aside, an empirical question remains regarding whether greater traffic safety is attainable with red light camera enforcement.

Traffic safety is a concern of residents in almost all communities (e.g., Boise PD, 2007; Coleman, 2005; Kamyab, McDonald, Stribiak, Storm, & Anderson-Wilk, 2000; Scheider et al., 2003). Residents in Idaho identified traffic issues as the second most important service priority, after solving major crimes

(Coleman, 2005). One police department survey revealed a negative relationship between the public's view of traffic problems and their satisfaction with the police (Boise PD, 2007). In another study in Iowa, both residents and the police supported the use of red light cameras to reduce accidents to enhance the quality of life (Kamyab et al., 2000). In a survey of 12 cities in the United States, residents' ratings of the quality of life positively associated with their opinions of the police (Scheider et al., 2003). In Canada and England, traffic safety (Ruddell & Ortiz, 2015) and social disorders (Jackson & Bradford, 2008; Jackson et al., 2011) were the primary concerns of residents in respect of problems that affect the quality of life. Skogan (2019) empathized that police are a "public safety" function and wrote "during 2017, 17,284 Americans were murdered but more than 40,000 were killed in traffic accidents. Many lives are at risk daily on the traffic front, where the fundamental causes of concern are offenses involving speed and alcohol" (p. 163). As such, it is not surprising that residents' assessments of traffic problems (i.e., disorders on roads that can affect the quality of life) have a link to their opinions about police, because residents believe that police are responsible for taking care of such problems. To the best of our knowledge, there is little information on this relationship in the literature.

Residents' Perceptions of Police

There is a growing body of research on levels of residents' engagement in their communities (Gibson, Zhao, & Lovrich, 2002; Gibson, Zhao, Lovrich, & Gaffney, 2002; Sampson, 2006; Sampson, Raudenbush, & Earls, 1997; Schafter et al., 2003). Collective efficacy concerns the public's willingness to intervene when there is a need. It is assumed that in neighborhoods with high collective efficacy, the residents are more willing to collaborate with the police. Other related issues included informal control (e.g., controlling youths' behaviors, etc.), social cohesion (e.g., knowing one's neighbors' names, talking with neighbors, etc.), and integration (e.g., trusting neighbors, returning favors, etc.) (Gibson, Zhao, Lovrich, 2002; Gibson, Zhao, Lovrich, et al., 2002; Sampson et al., 1997). The results consistently suggest that residents who perceive fewer problems in their neighborhoods tend to have positive sentiments about the police. A weak support system in a neighborhood, however, often leads to poor evaluations of the police. The residents' sense of safety is another crucial predictor of the overall

satisfaction with police. Residents who believed they were safe in their neighborhoods during the day or at night were more likely to have positive ratings of the police (Reisig & Parks, 2000; Payne & Gainey, 2007; Weitzer & Tuch, 2005).

The variety and frequency of interactions between residents and police have been one of the most significant predictors of residents' satisfaction with the police (Adams, Rohe, & Arcury., 2002; Cao, Frank, & Cullen, 1996; Eck & Rosenbaum, 1994; Ren, Cao, Lovrich, & Gaffney, 2005; Skogan, 2005; Skogan, 2009). Walker and Archbold (2013) noted the importance of the internal review process to enhance police accountability. The authors write, "[T]he new police accountability involves more than the creation of new bureaucratic procedures, although they are important, but also the development of a new organizational culture willing to ask hard questions about its own operations" (p. 203). There is little doubt that a police department's ability to investigate its own employees would relate to a positive rating of it. Features measuring officers' attentive attitudes, prompt response time, and the provision of adequate staffing were likely to be significant predictors of residents' positive views of the police (Skogan, 2005; Weitzer & Tuch, 2005). Residents supported the police's more aggressive approach to traffic enforcement and crime fighting (Chermak, McGarrell, & Weiss, 2001; Weiss & Freels, 1996; Wilson & Boland, 1978), whereas police at traffic stops invited negative perceptions of the police (Madon, 2018; Reisig & Correia, 1997).

Another area that has attracted researchers' collective attention is demographic factors that predict residents' perceptions of police. In this regard, race or ethnicity has been the most researched demographic predictor. It has been well established that Whites rated police more positively than African Americans or Hispanics (Avdija, 2010; Cao, 2011; Lai & Zhao, 2010; Weitzer & Tuch, 2005; Weitzer, Tuch, & Skogan, 2008). Women were likely to be more supportive than men (Avdija, 2010; O'Connor, 2008; Weitzer & Tuch, 2005), and relatively older residents tended to hold more positive attitudes than their younger counterparts (Schafer et al., 2003; Weitzer & Tuch, 2005; Wu, 2014). Individuals with relatively higher educational attainment rated the police more positively than their counterparts (Weitzer & Tuch, 2005; Weitzer et al, 2008). Both direct and indirect victimization experiences were found to have negative effects on residents'

attitudes toward the police (O'Connor, 2008; Payne & Gainey, 2007; Ren et al., 2005; Zhao, Lawton, & Longmire, 2010). While a positive relationship with the media associated with positive public opinions of the police (Brown & Benedict, 2002; Jefferis, Kaminski, Holmes, & Hanley, 1997; Otto, 2000; Parrish, 1993; Weitzer & Tuch, 2005), unfavorable media coverage generally increased residents' skeptical opinions of the police (Lai & Zhao, 2010; Ren et al., 2005; Weitzer & Tuch, 2005).

Residents' Perceptions of Red Light Cameras

A study that evaluated red light cameras in U.S. cities reported that camera availability has led to a decline in traffic accidents (Hu, McCartt, & Teoh, 2011). The cameras were found to have improved public safety by reducing accident rates in two Virginia studies (Garber et al., 2005; Ruby & Hobeika, 2003). One systematic review has concluded that red light camera enforcement was effective in reducing traffic accidents and personal injury (Retting, Ferguson, & Hakkert, 2003). Studies in European countries reported equivalent findings, particularly with the use of automated speed and red light cameras (Blais & Dupont, 2005; Tavares, Mendes, & Costa, 2008).

To date, little research has incorporated residents' perceptions about red light cameras installed in the city streets in the context of policing study. An important goal of policing is to improve residents' quality of life by removing problems that can negatively affect the quality of life in neighborhoods. Road disorders, such as traffic infractions, speeding, and aggressive driving, are important aspects that can negatively affect the quality of life. The above studies reported that residents worried about disorders more than crime rates (Jackson et al., 2011; Scheider et al., 2003). Effective traffic policing has reduced accidents and fatalities (Bates, Soole, & Watson, 2012; Makowsky & Stratmann, 2011; Tay, 2009), which presumably increases residents' satisfaction with the police. Reducing accident rates was viewed as an important public safety agenda that police are responsible for (Skogan, 2019). Yet, few studies viewed the camera enforcement as a form of reducing disorders, thereby increasing quality of life.

Unlike findings about residents' perceptions of police based on actual interactions, traffic cameras may not require consideration of race/ethnicity and victimization experience because the automated nature of camera enforcement does

not rely on personal decision-making. One recent study noted that camera enforcement might not only ease the racial profiling issue, but also address concerns for socioeconomically marginalized residents (Eger, Fortner, & Slade, 2015). Relevant studies reported that the support of red light cameras was positively associated with age and that female residents were more likely than males to perceive the camera positively (Egbendewe-Mondzozo, Higgins, & Shaw, 2010; McCartt & Eichelberger, 2011; Porter & Berry, 2001). A few studies included residents' education in the analysis. Educational attainment negatively associated with support of traffic cameras (Higgins, Shaw, & Egbendewe-Mondzozo, 2011), and relatively educated people seemed to be cynical about traffic safety (Failde-Garrido et al., 2016). Researchers have also pointed out the media effect in determining residents' attitudes toward the police (e.g., Brown & Benedict, 2002; Lai & Zhao, 2010; Nix & Wolfe, 2016). We now live in the social media era; thus, many people actively post happenings in their life, whether those events are positive or negative. In this current social climate, the media's portrayal of the police as a predictor of residents' perception of red light cameras can be informative.

Research Purposes and Hypotheses

The first purpose of the study is to identify significant predictors of residents' support for red light cameras and their perceptions of officer quality. Demographic/individual predictors: (1) White, relatively older, female, relatively educated residents, residents who perceive media portrayal of the police to be fair, and residents who have not experienced crimes (either directly or indirectly) are more likely to have positive perceptions of officer quality. Geographic predictor: (2) There will be a difference in the five geographic locations (see details in Method) in residents' perceptions of officer quality. Neighborhood integration predictors: (3) Residents who perceive relatively higher neighborhood strength (commonly referred as collective efficacy) and neighborhood safety are more likely to have positive perceptions of officer quality. Service predictors: (4) Residents who have interacted with the police, who consider the police's ability to investigate its own employees, who think police has adequate staffing, and who are satisfied with traffic and drug/narcotic enforcement are more likely to have positive perceptions of officer quality.

We addressed residents' perceptions of red light cameras corresponding to the previous hypotheses for officer quality. Demographic/individual predictors: (5) Nonwhite, relatively older, female, relatively uneducated residents, and residents who perceive media portrayal of the police as fair are more likely to support red light cameras. Geographic predictors: (6) There will be a difference between the central downtown and noncentral areas in residents' perceptions of red light cameras (see details in Method). Service predictors: (7) Residents who have interacted with the police, who consider the police's ability to investigate its own employees, who think the police employed adequate staffing, and who are satisfied with traffic and drug/narcotic enforcement are more likely to support red light cameras.

The second purpose of this study is to explore a hypothesized linkage between these two perceptions. There is little research available regarding a link between residents' perceptions of the police (officer quality) and red light cameras as an important policing practice to reduce traffic accidents and improve residents' quality of life. To the best of our knowledge, a link between the two perceptions has not been studied, but there is empirical evidence (e.g., Kamyab et al., 2000; Ruddell & Ortiz, 2015; Skogan, 2019) that traffic safety can be a key means to enhance residents' quality of life. Thus, we posit that (8) there will be a positive association between residents' support of red light cameras and their perceptions of the police.

METHOD

Participants

A telephone survey of Houston residents was undertaken between May 1 and June 3, 2008 by the College of Criminal Justice at Sam Houston State University, located Huntsville, Texas. The Precision Research, Inc. data collection facility, located in Glendale, Arizona, conducted all telephone interviews using random digit dialing (RDD) via computer-assisted telephone interviewing (CATI) technology. The study used 834 cases that resided within the city limit. The residents were asked about their interactions with the police, neighborhood nature, satisfaction, and anticipation level of professionalism of the Houston Police Department (HPD).

Measures

Dependent variables

The two dependent variables were created from six ordinal variables (1=strongly disagree to 4=strongly agree): (1) the HPD officers are honest; (2) the HPD officers are hardworking; (3) the HPD officers are well trained; (4) the HPD officers are able to answer residents' questions; (5) I support the current use of red light cameras in the city; and (6) I approve the use of red light cameras at more intersections. By factoring these ordinal variables into two dependent variables, we attempt to create more scaled variables for later applications of OLS and CFA. The two new factors were associated with Houstonians' views on their police's characters and the usages of red light cameras (see Table 1). Eigenvalues of both factors were greater than 1. The two factors accounted for 74.19% of total variability.

Officer quality. The first component was created by the first four items, (3) well trained, (1) honest, (4) answer residents' questions, and (2) hardworking, accounted for 49.47% of the variance. The Cronbach's alpha for this scale was .82, indicating these four items have a high level of congruence to be one single item. The first factor was titled "officer quality."

Support the camera. The second component was created by the two items, (6) cameras at more intersections and (5) support the current use of cameras, accounted for 24.72%. The Cronbach's alpha for this scale was .91. The second factor was titled "support the camera."

Table 1. Exploratory Factor Analysis for the Dependent Variables

	Factor 1	Factor 2
Residents' evaluations on:	"Officer Quality"	"Support the Camera"
HPD officers are well trained	.817	.084
HPD officers are honest	.810	.181
HPD officers answer residents' questions	.793	.046
HPD officers are hard working	.769	.177
Eigenvalue = 2.97, % of variance = 49.47%, Cronbach's alpha = .82		
Approve more cameras at intersections	.124	.951
Support red light cameras in the city	.154	.944
Eigenvalue = 1.48, % of variance = 24.72%, Cronbach's alpha = .91		
Cumulative % of variance = 74.19%		

Note: Factor analysis with varimax rotation

Independent variables

Individual predictors. (i.e., demographic, victimization experience, and media). Ethnicity/race, gender, age, and education are demographic variables. Direct or vicarious victimization experience for the past 12 months was asked as a dichotomous variable. Residents' perceptions on the fairness of media portrayal of the HPD is an ordinal variable.

Geographic predictors. The study adopted both the HPD's patrol beat standard and the two main state highways dividing the Houston area into east and west (I-45) and south and north (I-10) to decide on the five areas. Thus, the study

organized Houston into the five areas, downtown central, northwest, northeast, southwest, and southeast to assess perceptions of officer quality. To evaluate residents' perceptions of red light cameras, the study compared the downtown central to the outside areas (northwest, northeast, southwest, and southeast) as dichotomous because red light cameras were installed in the outside more than central area.

Neighborhood integration predictors. The variable of neighborhood strength consisted of six ordinal variables, asking degrees of collective efficacy or social integration (e.g., Sampson et al.,1997; Zhao et al., 2010). The higher scores of this variable mean a higher neighborhood strength (Cronbach's Alpha=.72). Safety is a combination of two ordinal variables, asked if residents feel safe when residents were outside during day and night. The higher scores indicate higher perceived safety (Cronbach's Alpha=.63).

Police service predictors. Interactions with the police is a combination of three dichotomous variables, asking whether residents perceived the HPD officers' response as prompt and their level of involvement with residents and business owners. The higher scores of this variable indicate higher levels of interactions (Cronbach's Alpha=.64). Investigation is an ordinal variable asking the police's ability to investigate their own employees. Staffing is an ordinal variable about adequacy of police service. Satisfaction with traffic and narcotics/drug enforcement is a combination of two ordinal variables (Cronbach's Alpha=.61), questioning the police practices about traffic and narcotic/drug enforcements.

Research Design and Analytic Strategy

We need two approaches to solve the two central aims. First, the study identified significant predictors for Houston residents' perceptions of officer quality and their support of red light cameras using ordinary least squares analyses (OLS). Second, the study sought to clarify whether residents' support of red light cameras had an association with their perceptions of the police, while retesting all the previously identified significant predictors (from OLS models) simultaneously, using confirmatory factor analysis (CFA) completed by Mplus.

RESULTS

Descriptions of Independent Variables

Table 2 describes univariate analyses of independent variables. Approximately a half of residents were Whites (n = 423), the other half consisted of African Americans (n = 203), Hispanics (n = 136), and Others/ Asians (n = 72). More residents resided in the SW (n = 288) than NW (n = 180), Central (n = 164), SE (n = 132), and NE (n = 70). Numbers of male (n = 422) and female (n = 412) residents were similar. Residents' age (asked as an ordinal variable) averaged around forty (median:4, range:1-5). Most residents (n = 633) did not have victimization for the past 12 months, and more residents perceived the media portrayal of the police as fair (ordinal) (median: 3, range:1-4). More residents scored neighborhood strength higher (interval) (median: 19, range: 6-24) and perceived they were safe at day and night (interval) (median:5, range:2-6). More residents thought the police interacted with residents (interval) (median:2, range: 0-3) and trusted the police would investigate their own employees (ordinal) (median: 3, range: 1-4). While residents disagreed with the police's adequate staffing (ordinal) (median:2, range: 1-4), more residents satisfied with traffic and narcotic/drug enforcement (interval) (median:6. Range: 2-8).

Table 2. Descriptions of Independent Variables

Categorical Variables	Values	N	Percentage
Ethnicity/race	White	423	50.7
	African American	203	24.3
	Hispanic	136	16.3
	Others	72	8.6
Houston areas	Central	164	19.7
	Northwest (Outside)	180	21.6
	Northeast (Outside)	70	8.4
	Southwest (Outside)	288	34.5
	Southeast (Outside)	132	15.8
Gender	Female	412	50.6

Categorical Variables	Values	N	Percentage
	Male	422	49.4
Direct or vicarious victimization	Yes	171	20.5
	No	633	79.5

Metric Variables		Median	M (S.D.)
Age	Ordinal (1 - 5)	4	3.60 (1.17)
Education	Ordinal (1 - 6)	4	3.96 (1.58)
The media	Ordinal (1 - 4)	3	2.60 (0.73)
Neighborhood strength	Interval (6 - 24)	19	18.83 (3.07)
Safety	Interval (2 - 6)	5	4.76 (1.04)
Interactions	Interval (0 - 3)	2	1.63 (1.08)
Investigation	Ordinal (1 - 4)	3	2.58 (0.94)
Staffing	Ordinal (1 - 4)	2	2.27 (0.84)
Traffic and Narcotic/Drug	Interval (2 - 8)	6	5.60 (1.20)

Note: White=1, Black=2, Hispanic=3, Others=4/ Central=1, Outside=0 (Northwest=2, Northeast=3, Southwest=4, Southeast=5): Dummy coding was applied when these variables were entered into the OLS model / Gender: Male=0, Female=1 / Direct or vicarious victimization: Yes=1, No=0 / Age: 1=24 and younger, 2=25-34, 3=35-49, 4=50-64, 5=65 and older / Education: 1=less than high school or GED, 2=high school or GED, 3=training school certification, 4=associate's degree or some college, 5=college graduate, 6=professional or graduate degree / Media: The HPD is portrayed fairly by the media, from 1=strongly disagree to 4=strongly agree / Neighborhood strength: a combination of six variables / Safety: a combination of two variables/ Interactions: a combination of three dichotomous variables / Investigation: an ordinal variable measuring HPD's ability to investigate employees, from 1=strongly disagree to 4=strongly agree / HPD's staffing: The HPD has adequate staffing to provide adequate services, from 1=strongly disagree to 4=strongly agree / Traffic and narcotic/drug enforcements: a combination of two variables.

Residents' Perceptions of Officer Quality

Table 3 provides Houston residents' perceptions of officer quality. The model was significant, $F_{(18, 409)}$ =16.32, $p < .001$ and accounted for about 42% of the variance of officer quality. Only three predictors, being female (b*= .084, $p < .05$), interactions (b*= .193, $p < .001$), and traffic and drug/narcotics enforcement (b*=.425, $p < .001$), significantly predicted officer quality. Residents who thought that the police interacted with them and satisfied with traffic and drug/narcotic policing evaluated officer quality higher, consistent with studies (Adams et al., 2002; Chermak et al., 2001). Female residents assessed officer quality highly, similar to the previous studies (e.g., Lai & Zhao, 2010; Ren et al., 2005). Other

ethnic groups (b*= -.077, p < .1), northwest region (b*= -.086, p < .1), and investigation (b*= -.080, p < .1) all demonstrated a trend toward statistical significance. Other ethnic groups' unfavorable attitudes toward the police has been reported (e.g., Avdija, 2010; Cao, 2011; Weitzer et al., 2008). The northwest residents' less favorable attitudes toward the police was a new finding.

Table 3. Residents' Perceptions of "Officer Quality"

Predictors	Officer Quality		
	b	s.e.	b*
Individual predictors			
White	excluded		
Black	-.151	.098	-.071
Hispanic	-.122	.111	-.051
Others	-.278	.147	-.077†
Age	.035	.035	.043
Gender	.161	.076	.084*
Education	.035	.025	.058
Victimization	-.082	.095	-.034
Media	.045	.052	.035
Geographic predictors			
Central	-.050	.104	-.022
Northwest	-.208	.107	-.086†
Northeast	-.122	.134	-.040
Southwest	excluded		
Southeast	-.144	.117	-.042
Neighborhood integration predictors			
Neighborhood strength	.012	.012	.042
Perceived safety	.047	.038	.051
HPD's service predictors			
Interactions	.173	.040	.193***
Investigation	.085	.050	.080†
Staffing	.002	.054	.001
Traffic and drug/narcotic	.340	.037	.425***
F		16.32***	
R-squared (Adjusted R-squared)		.418 (.392)	

Note: b is unstandardized coefficient, s.e. is standard error, and b* is standardized coefficient.
No multicollinearity among variables was found.
†p < .1   *p < .05   ** p < .01   *** p < .001

Residents' Perceptions of Support the Camera

The prediction model of residents' perceptions on support the camera is presented in Table 4. The model was significant, F (12, 415) =5.33, p < .001 and accounted for 13.4% of the variance in residents' supportive opinions of red light cameras. The five predictors significantly contributed, age (b*=.147, p < .01), gender (b*=.120, p < .05), the central area (b*= -.092, p < .05), investigation (b*=.185, p < .001), and staffing (b*=.130, p < .05). Residents who thought the police's ability to investigate their employees, staffing adequacy, comparatively older, female residents, and those who reside in the noncentral area supported the cameras more. Female and older residents' more supportive attitudes toward the camera use were reported (Egbendewe-Mondzozo et al., 2010; Higgins et al., 2011; Porter & Berry, 2001). Marginally significant results were found in Hispanic (b*=.101, p < .1) and the media's portrayal (b*= -.082, p < .1). Hispanic residents' more supportive attitude toward traffic cameras was not reported before. Regarding the media, the result that was contrary to the hypothesis. Residents who perceived the media portrayal of the HPD to be unfair tended to support the cameras more.

Table 4. Residents' Perceptions of "Support the Camera"

Predictors	Support Red Light Cameras		
	b	s.e.	b*
Individual predictors			
White	excluded		
Black	.009	.117	.004
Hispanic	.249	.135	.101†
Others	.035	.181	.009
Age	.112	.041	.147**
Gender	.237	.091	.120*
Education	.002	.031	.004
Media	-.108	.064	-.082†
Geographic predictors			
Central	-.222	.112	-.092*
HPD's service predictors			
Interactions	.010	.049	.101

	Support Red Light Cameras		
Predictors	b	s.e.	b*
Investigation	.204	.062	.185***
Staffing	.156	.067	.130**
Traffic and drug/narcotic	.012	.045	.015
F		5.33***	
R-squared (Adjusted R-squared)		.134 (.109)	

Note: b is unstandardized coefficient, s.e. is standard error, and b* is standardized coefficient.
    No multicollinearity among variables was found.
    †p < .1   *p < .05   **p < .01   ***p < .001

Hypothesis testing thus far has relied on OLS to predict Houstonians' perceptions on officer quality and support the camera. Although some hypotheses were understood based on previous studies, some were equivocal. Hence, we sought to reassess all significant relationships found in OLS. We used more robust weighted least squares procedure through CFA to better analyze the two latent variables. In particular, we sought to test whether there is a link between the two latent variables to address the hypothesis 8. In diagrams, circles represent factors (latent variables), and rectangles represent measured variables (indicators). Only significant predictors from the two OLS regression results (in Tables 3 and 4) were entered into the CFA model. Those predictors are Hispanic, Others, age, gender, the media, central, northwest, interactions, investigation, staffing, traffic and drug/narcotic enforcement (from p < .001 to p < .10).

A Link between Residents' Perceptions of Support the Camera and Officer Quality

The predicted patterns of hypothesized model were tested (Figure 1). The absence of a line connecting variables implies no hypothesized direct effect. Only significant variables with their standardized coefficients (p < .05) were presented. The variables, as previously described, were used as indicators for officer quality and support the camera. The two latent factors were simultaneously regressed onto each of the significant predictors. The model resulted in excellent fit (assessed by CFI = .97, TLI = .96, RMSEA = .04). For the officer quality, residents' satisfaction with traffic and drug/narcotic enforcement (b*=.48), interactions

(b*=.24), investigation (b*=.15), and gender (b*=.11) showed positive associations with officer quality. Dissimilar to the OLS (see Table 3), Others ethnic category (b*= -.05, n.s.) and Northwest (b*=-.05, n.s.) were no more significant to predict residents' perceptions of officer quality. For the support the camera, investigation (b*=.25), staffing (b*=.12), age (b*=.15), gender (b*=.13), and Hispanic (b*=.10) showed positive associations, whereas the central area (b*= -.08, p < .1) negatively related to support the camera. Dissimilar to the OLS results (see Table 4), residents' thought on the fair media portrayal of the police (b*= -.00, n.s.) was not a significant predictor. The predictors account for 52 and 16 percent of the variances found in officer quality and support the camera, respectively. The hypothesis (8) seeking an association between the two latent concepts was supported (r = .19, p < .001). Therefore, residents who supported red light cameras were more likely to perceive officer quality higher.
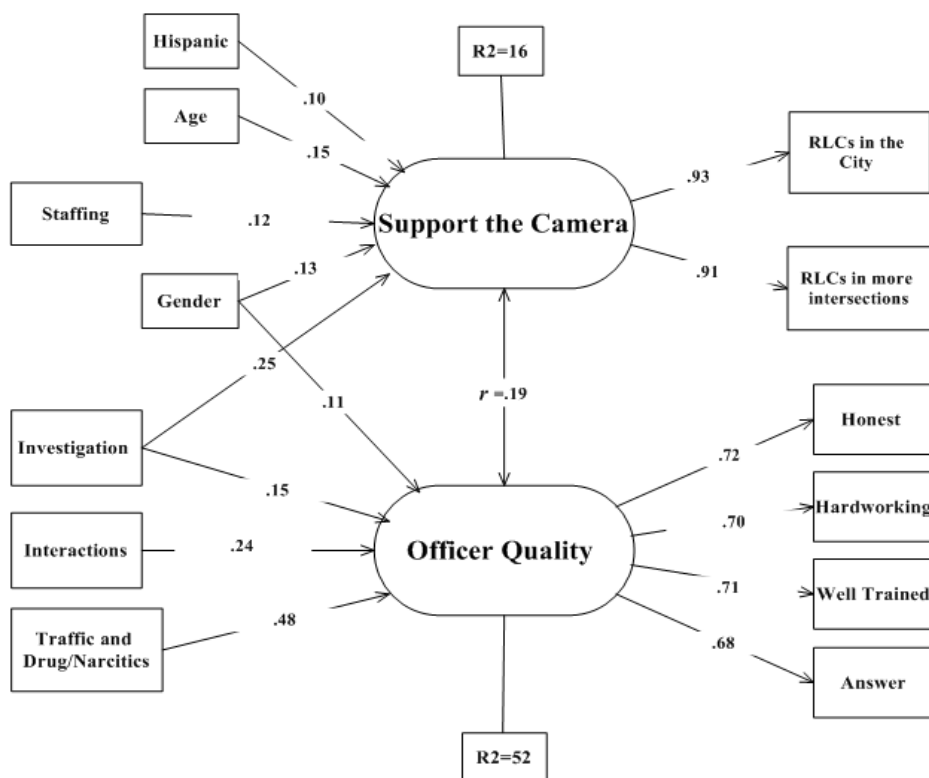

Figure 1. The Link between Residents' Perceptions of the Camera and Officer Quality
Note: Only significant variables with standardized coefficients were presented (p < .05).

DISCUSSION

The overarching purpose of this study was to determine whether individual, geographic, neighborhood integration, and police service factors predict Houston residents' perceptions of officer quality and their support of red light cameras (OLS), and to identify the link between these two perceptions by confirming the significant relations found in OLS (CFA). The four predictors measuring police services emerged as more predictive than individual, geographic, and neighborhood integration predictors. Thus, the police service was the most crucial factor predicting residents' positive perceptions of the police over conventionally emphasized predictors (i.e., race/ethnicity and neighborhood strength/collective efficacy). This result has made us recall that policing is a service function, which extends to practical and policy implications. Better police services will generate positive perceptions of the police even in communities with many minorities and neighborhoods where bonds among residents are weak. Officer quality is about residents' perceptions of the nature of individual officers (if they are honest, hardworking, etc.), whereas police service predictors relate more to the department's overall performance. Stronger associations between the two indicate that overall department policy affects how residents perceive officers' characters.

The present study poses the following theoretical implications. Disparity among ethnic or racial minorities is one of the most researched topics in policing research. Studies regarding residents' perceptions of the police have depended heavily on assumptions about differential enforcement as a function of race and/or ethnicity, whereas red light cameras rely on color-blind enforcement approaches. Very few researchers have studied this link. The available literature has not frequently studied the utility of red light cameras in terms of their role in policing, especially in quality of life research. Considerations of residents' quality of life have never been limited to a narrow scope. These have included not only physical disorders (i.e., vandalism, abandoned buildings, etc.), but also public health and residents' aspirations for improved safety (Skogan, 2015; 2019) for every aspect of community life that can potentially be obtained by securing safer roads.

The findings in the literature on the relationship between traffic tickets (not

based on automated camera enforcement) and residents' perceptions of police are not always consistent. Nevertheless, the most researched topic in the policing literature is the use of police discretion in traffic stops, which can be based on racially motivated factors. In light of the present results, police might do well to consider ways of alleviating residents' negative views by having a form of automated enforcement akin to cameras. Cameras do not differentiate color of skin, immigrant status, or other potentially biasing factors, and thus may provide services to residents that are fairer and more adequate—or at least produce perceptions of such. One recent study reported that red light cameras may play a mitigating role for deeply rooted racial profiling concerns in the U.S. (Eger et al., 2015).

The primary limitation of the study was that not all hypotheses were equally established to measure predictive relationships for the two dependent variables. Different strategies were applied to test the hypotheses regarding the two DVs (two constructs in the structural equation model) due to the study's exploratory nature in predicting residents' support of traffic cameras. That is, the victimization experience was not used as a predictor to test residents' support for the cameras because cameras are automated, and there is a weak basis for assuming that the attributions residents make toward discretionary decisions by police officers would be the same as attributions they make toward an automated camera triggered without human involvement. Similarly, the study also did not include neighborhood integration predictors (i.e., neighborhood strength and safety), since no existing literature has examined any relationship between neighborhood integration and residents' perceptions of traffic cameras. Because of these different strategies to utilize predictors, residents' support for cameras has lower predictive power compared to that of officer quality. A second limitation was that we tested predictors both significance levels at less than .05 (conventional) and .10 (.05 < p < .10) (marginal) because the search of residents' perceptions of red light cameras was exploratory in nature. A third limitation was that the city of Houston started relocating cameras from 2010, and camera locations of the study were based on the data obtained in 2008. Therefore, it does not reflect the current camera allocations and associated residents' support for the cameras may vary, thus limiting generalizability. Despite observed quality of life effects from red light cameras, the most commonly expressed sentiment was based on the belief that the

cameras were installed to generate city revenue rather than to promote road safety.

Another limitation is that it was challenging to address traffic cameras in the quality of life context because most published studies focus mainly on physical/social disorders (i.e., graffiti, loitering, etc.) rather than traffic disorders (i.e., speeding, etc.). Few studies (i.e., Coleman, 2005; Ruddell & Ortiz, 2015; Skogan, 2019) have addressed controlling aggressive driving/drivers in the context of the quality of life study. Because of this deficit, we were unable to review many studies reporting that traffic enforcement (i.e., red light cameras) enhances residents' quality of life and perceptions of police. Skogan (2015) has concluded that disorder has broader implications that affect residents' stress, health, and safety, and the current study offers evidence that residents' perceived traffic safety vis-à-vis cameras does relate to their perception of the police. Finally, the current study was undertaken within the context of a large body of studies reporting mixed results about the effectiveness of traffic cameras. Some researchers found a reduction in accidents where cameras were installed (e.g., Fox, 1996; Hu et al., 2011), whereas others did not (e.g., Walden & Bochner, 2011). The present study attempted to suggest some theoretical and practical links pertaining to the cameras in hopes of providing some insights to future policing and within the transportation literature.

Questions remain for future research. The city of Houston is the fourth largest city in the United States and is ethnically diverse. The results of our exploratory observation suggest one interesting note pertaining to ethnic and geographic features, insofar as the relations between the two perceptions differed in various parts of the city. Other and Hispanic groups and the northwest and central areas were predictive of the two latent concepts (review Tables, 3, 4 and Figure 1). This shows that residents' perceptions may vary across neighborhoods and ethnicities in one city. Revisiting the current results based on different ethnic groups and geographic areas with updated data can provide further insight into this topic. This will assist policy makers in resolving issues creating negative perceptions of technology-driven policing strategies, including the camera enforcement that future policing will increasingly adopt in this era. Although we will live in a time that is more interconnected and technology-oriented than ever, there is little doubt that one of the ultimate purposes of having a policing system

in society is to secure better safety to improve the quality of life, and this purpose will not change. Thus, resolving any problem as it relates to quality of life matters should be addressed by research that will improve residents' perceptions of police in the long run. However, few policing studies have addressed the use of red light cameras; thus, future research should seek to address this gap.

Acknowledgements

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