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RELATIONSHIPS BETWEEN LAW ENFORCEMENT OFFICER-INVOLVED VEHICLE COLLISIONS AND OTHER POLICE BEHAVIORS

by

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Submitted in Partial Fulfillment of the Requirements

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DEDICATION

This work is dedicated to my family, who has supported me in this and all other endeavors. My mom and dad, Bonnie and John, raised me to think about others and work hard. Ben has always been an encouraging and patient brother. Kloo is my partner in life and I am fortunate to have her beside me. I appreciate their love more than words can express.

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ABSTRACT

Specialization and versatility regarding officer negative outcomes have different implications for agency policies and practices. Versatility suggests interventions that address several problematic behaviors, while specialization may necessitate more targeted interventions. If officers who engage in one form of negative behavior are also more likely to be involved in other undesired outcomes than co-monitoring behaviors via early intervention systems or other mechanisms may be an effective means of identifying problematic officers. The threat posed by officer-involved motor vehicle collisions to the safety of police and the public has received increased attention from practitioners and researchers in the past decade or so. However, we do not know if officers in negative outcomes while on duty are also more likely to be in vehicle collisions. This study examines these links with a survey of patrol officers and their supervisors in a large police department. The findings demonstrate significant effects of citizen complaints for reasons other than excessive force but none of the other negative officer outcomes on collision involvement. In addition, off-duty collisions and secondary employment consistently increase the likelihood of on-duty crashes. The policy implications of these findings for reducing officer collisions are discussed at length.

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CHAPTER 1

INTRODUCTION

The amount of specialization in offending is a question with great significance for

the development of theories of crime and deviance[1]. Empirical evidence of specialization

suggests theoretical explanations should be able to account for observed differences in

offending behaviors. Developmental theories, such as Moffitt's (1993) taxonomy that

assumes two groups of offenders, are appropriate for this task. On the other hand, if

individuals engage in varied manifestations of crime and deviance, an all-encompassing

framework such as self-control theory as explicated in Gottfredson and Hirschi's (1990)

seminal text, *A General Theory of Crime*, may be better suited to explain their offending

behaviors. Decades of research on the generality of crime and deviance has established

that individuals tend not to specialize (Brame, Mulvey, Piquero, & Schubert, 2014;

Kempf-Leonard, 1987; Paternoster, Brame, Piquero, Mazerolle, & Dean, 1998; Piquero,

Paternoster, Brame, Mazerolle, & Dean, 1999; Sampson & Laub, 1993). However,

researchers have also demonstrated that versatility is not absolute and important

differences exist. For instance, Osgood & Schreck (2007) discovered a greater amount of

specialization among violent offenders than nonviolent offenders, and Lynam, Piquero,

and Moffitt (2004) found more violent specialization in self-report data than official

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[1] Paternoster, Brame, Piquero, Mazerolle, and Dean (1998) defined specialization as "the extent to which an offender tends to repeat the same specific offense or offense type on successive criminal events" (p. 133).

records[2]. Overall, the criminological literature contains mixed evidence in support of both general and developmental theories of crime and deviance.

Theoretical explanations of crime and deviance committed by police officers specifically are not nearly as well developed. Sherman (1980) sought to develop "a substantive theory of police behavior" (p. 94), and summarized quantitative research on four police officer behaviors including violence, which he broadly defined as, "justified and unjustified use of any physical force (including deadly force) against citizens" (p. 69). Black (1976, 1980) also took an encompassing approach when he explained the conditions under which officers apply the law, while others have taken a narrower slant and addressed particular behaviors such as racially-biased decision making (Smith & Alpert, 2007). Still, a theory of negative police officer outcomes does not exist.

One key piece of information that is missing and hindering theories of negative police officer behaviors concerns the question of specialization or generalization. We simply do not know if officers involved in one type of concerning behavior are also more likely to be in other negative outcomes while on duty. This information would be useful in determining whether a theory of police deviance should be general in scope or specific to a particular negative outcome. Specialization and versatility regarding police officer negative outcomes have different implications with respect to law enforcement agency policies and practices and therefore hold considerable significance for police practitioners and policymakers. Versatility suggests that agencies may be able to design interventions that address a wide range of problematic behaviors, while specialization may necessitate more targeted interventions. If police officers who engage in one form of negative

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[2] In comparison, Piquero (2000) found less evidence for specialization among violent offenders based on his analyses of official records.

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behavior are also more likely to be involved in other undesired outcomes than co-monitoring a wide range of behaviors via early intervention systems (EIS) or other mechanisms may be an effective means of identifying problematic officers.

Police practitioners and policymakers are constantly balancing many demands including protecting public and officer wellbeing as well as the image of police in society. Today, threats to public safety and support of the police span historical concerns such as deadly and excessive force and contemporary additions to the list of negative officer outcomes such as officer-involved motor vehicle collisions. As leaders search for methods of reducing newly recognized hazards and those that will continue emerging in the future, evidence of empirical associations with more traditional concerns may offer policy guidance by drawing on ideas from more established areas of research. For instance, researchers have found that agencies with more restrictive policies have fewer deaths from vehicle pursuits (Alpert, 1997; Crew, Kessler, & Fridell, 1994) and deadly force incidents (Fyfe, 1979; Meyer, 1980; Sherman, 1983; Uelmen, 1973). It may be that more restrictive policies are also an effective way of reducing other negative officer outcomes as well.

Motor Vehicle Collisions and Other Negative Officer Outcomes

Police researchers and the American public have always paid close attention to officer behaviors with the potential to threaten the lives and prosperity of fellow officers and citizens. Research on negative police outcomes has centered on force broadly speaking, more specifically deadly force, excessive force, and force that causes injuries. Historical changes in the police institution and citizenry have shifted the scope of scrutinized police behaviors. Technology has played a key role in the weapons available

to police that must be monitored. Among all of the potentially concerning police outcomes that have been the subject of empirical investigation, it appears that motor vehicle collisions have been overlooked in terms of the threat posed to the safety of officers and the public. In recent years, police practitioners and researchers have recognized that motor vehicle collisions are among the most harmful police behaviors. In this way, motor vehicle collisions are similar to deadly and excessive force, vehicle pursuits, and other negative officer outcomes that threaten citizen and officer safety and undermine the legitimacy of police.

There are numerous pieces of evidence to support the hypothesis that officers in motor vehicle collisions may also be disproportionately represented among other negative outcomes including deadly force, citizen complaints, and vehicle pursuits. To begin, this study was inspired by conversations with police leaders and policy makers who speculated about the associations between officer-involved vehicle collisions and other negative outcomes during 2012 and 2013 meetings of the California Commission on Peace Officer Standards and Training (CalPOST) Situation-Appropriate, Focused, and Educated (SAFE) Driving Campaign. The knowledge of experienced police officials should not be discounted (Sparrow, 2011). This issue was also raised at the June, 2013 Maryland State Summit on Reducing Deaths, Disabilities, and Injuries to Maryland Law Enforcement Officers Engaged in Traffic-Related Activities, which included police executives and other delegates from the state and beyond who gathered to produce a report to the Maryland Highway Safety Office. The agenda of discussion questions included the following: "Does officer, deputy, and trooper behavior behind the wheel parallel behavior in other aspects of the job?", "Can success be achieved by focusing on

driving safety alone?", and "Should abuse of the police vehicle be treated in the same way as abuse of force?"

Police agencies have co-monitored numerous negative officer outcomes for many years in hopes of identifying and addressing potentially problematic employees. Early intervention systems, a common mechanism used by agencies to identify problematic officers, operate by monitoring numerous different behaviors at the same time including use of force, deadly force, and citizen complaints (Alpert & Walker, 2000; Walker, Alpert, & Kenney, 2001). Although it is relatively less common, some agencies also include vehicle collisions in their EIS. Of course, agencies have received and investigated citizen complaints regarding a variety of different behaviors for many years as well (Rojek, Decker, & Wagner, 2015). The Prince George's County (MD) Police Department (PGPD), where this study was conducted, records citizen complaints as an open-ended narrative (Prince George's County, 1991), and ultimately categorizes them into nine categories (Prince George's County Citizen Complaint Oversight Panel, 2014). Many of these categories are quite broad. For instance, "conduct related" complaints refer to "excessive, unwarranted or unjustified behavior that reflects poorly on the officer the department or on the county government, regardless of duty status. This category includes allegations of misconduct, unbecoming conduct, and unreported misconduct" (Prince George's County Citizen Complaint Oversight Panel, 2014, p. A1). The approach of monitoring comorbidities, or the co-occurrence of negative outcomes, is popular in hospitals and the fields of medicine and public health. Finally, agencies have attempted to curtail on-duty vehicle collisions with improved officer training, more restrictive policies,

and closer supervision and monitoring, all of which are tactics that have been used in the past to address other negative outcomes including deadly force and vehicle pursuits.

Research on negative officer outcomes is often limited to one outcome such as deadly force, citizen complaints, pursuits, and more recently motor vehicle collisions. However, researchers of negative officer outcomes have tended to focus on the same characteristics of officers, agencies, and situations—suggesting particular variables may have predictive value across a variety of behaviors. For instance, researchers have repeatedly pointed to demographic characteristics such as officer age and gender and aspects of agency culture including supervision and enforcement of policies. Sherman (1980) summarized quantitative research on detection activities, arrest decisions, service behaviors, and violence, and his review of explanatory variables at the individual-, situational-, organizational-, community-, and legal-level demonstrated overlap across multiple officer behaviors many of which had been used to explain more than type of officer behavior. One of the only studies to simultaneously consider officer involvement in multiple negative outcomes was conducted in the NYPD by Fyfe and Kane (2006), who reviewed files of terminated officers. Several studies based on that research have found that officers involved in career-ending forms of misconduct were also more likely than their peers to be involved in a range of other problematic on-duty behaviors (Kane & White, 2013).

Research at the officer-level, such as that by Fyfe and Kane (2006), is based on the repeated finding that negative outcomes are clustered within a small group of officers, which have been termed "bad apples." Although the reasons for this is debated, it has been repeatedly proven that a small proportion of officers cause a majority of negative

outcomes in their agencies such as excessive force (Brandl, Stroshine, & Frank 2001; Christopher Commission, 1991; Kolts Commission, 1992; Lersch, 1998b, 2002). The Christopher Commission (1991) found that only 44 officers out of 8,450 officers employed by the LAPD during their study had received 6 or more citizen complaints for excessive force. Two-thirds of LAPD officers had received no force complaints over the 4 year study period (Christopher Commission, 1991). The clustering of problematic behaviors among offenders has also been established (e.g., Braga, 2012; Chaiken & Chaiken, 1984; Greenwood & Abrahamse, 1982; Peterson & Braiker, 1981; Williams & Lucianovic, 1979; Wolfgang, Figlio, & Sellin, 1972). However, we do not know if the small groups of officers causing negative outcomes in their agencies are specialists or generalists. Walker et al. (2001) conducted a national study of early intervention systems in the U.S. including case studies and reported, "It has become a truism among police chiefs that 10 percent of their officers cause 90 percent of the problems" (p. 1). Motor vehicle collisions also appear to be clustered within a small group of officers who cause a disproportionate amount of the total crashes in their respective agencies. In their study of 844 officers in serious collisions, Rix, Walker, and Brown (1997) found that 233 (28 percent) had previously been in one other crash and 115 (14 percent) had been in three or more vehicle collisions.

Goals and Overview of this Study

Today, officer-involved crashes continue to be a substantial yet under-examined risk to both citizens and officers in the United States. The longstanding oversight among the practitioner and researcher communities and recent recognition of the disastrous impact of vehicle collisions involving their officers have placed police managers and

supervisors in a position of scrambling for ideas to reduce these events. Among pressing questions to police executives is the relationship between officer involvement in motor vehicle collisions and undesired officer behaviors such as use of force, vehicle pursuits, excessive force incidents, and other behaviors that have resulted in citizen complaints.

At its core, this study considers whether officers who cause harm with their behind the wheel driving behaviors also disproportionately misuse other tools, weapons, and powers granted to police but expected to be used judiciously. More specifically, this study empirically examines whether officer involvement in vehicle pursuits, deadly force incidents, and citizen complaints about a variety of officer behaviors increases the likelihood of vehicle collisions. This study uses multivariate analyses to control for potentially confounding variables and is broader than the question of specialization in officer negative outcomes but it should shed light on this issue. As a group, the concerning and potentially costly behaviors examined in this study are referred to as negative outcomes, events, and behaviors throughout the following pages. Other terms used by prior researchers could also encapsulate negative officer outcomes. For instance, Barker and Carter (1994) defined police abuse of authority as "any action by a police officer without regard to motive, intent, or malice that tends to injure, insult, trespass upon human dignity, manifest feelings of inferiority, and/or violate an inherent legal right of a member of the police constituency in the course of performing 'police work'" (p. 7). Certainly deadly and excessive force, vehicle crashes, and other negative outcomes have tendencies to injure the public. Other researchers have used terms including officer or employee misconduct, deviance, and crime (Kane & White, 2013; Kappeler, Sluder, & Alpert, 1998). Negative officer outcomes functions as a unifying term because there is

general consensus among practitioners, researchers, the public, and other stakeholder groups that deadly force, excessive force and other behaviors that result in citizen complaints, and vehicle pursuits and crashes are socially undesirable and potentially harmful events that should be limited whenever possible.

The perception that motor vehicle collisions are accidents presents a mental roadblock to the idea that they represent negative behaviors and decision-making in the same way as excessive force. Although motor vehicle collisions are often referred to as accidents—a term which implies a random and unpredictable nature, it is clear that some portion of these negative officer outcomes is preventable. For instance, 45.1 percent of PGPD officers reported one or more collisions in this study, while 29.6 percent of officers reported at least one at-fault collision. A NHTSA study of fatal officer-involved collisions in the U.S. from 1982 to 2008 found 931 driver-related factors including speeding among the 726 vehicles involved (Noh, 2011). CalPOST reported that one driving behavior, operating motor vehicles at unsafe speeds, caused more than 1/3 of the over 7,100 injury and fatality collisions from 1997 to 2007 in the state (Gustafson, 2009).

This study serves several purposes to the academic and practitioner communities interested in police vehicle collisions. This research may open or close the door to learning about officer-involved vehicle collisions from more established bodies of research on other negative outcomes including deadly force, citizen complaints, and vehicle pursuits. These outcomes have been the cause of considerable concern among the public and have been monitored by police departments and risk managers in the United States to detect problematic officers. It is unclear if these undesired behaviors can also be useful in identifying officers with problematic driving outcomes. Overall, this research

assesses whether officers in negative on-the-job outcomes are disproportionately likely to expose their employer to liability and other costs resulting from on-duty vehicle collisions.

This study unfolds over the course of six chapters. Chapter Two reviews the current state of knowledge regarding the impact and causes of officer-involved motor vehicle collisions. Chapter Three justifies the importance of conducting research on negative officer outcomes that threaten public including officer safety as well as trust between the police and those they serve. Chapter Three also reviews the extant literature on other negative officer outcomes, a body of literature that suggests commonalities between involvement in these events and vehicle collisions. Chapter Four details the methodological procedures utilized in this study. The site for this research, the Prince George's County (Maryland) Police Department, is described. Measurement of the independent and dependent variables is noted and the missing data and analytical strategies are detailed. Chapter Five provides the results of four regression models that examine the impact of deadly force, complaints for excessive force and other reasons, and vehicle pursuits on vehicle collisions among patrol officers in the PGPD. Finally, Chapter Six summarizes the significant findings and discusses he policy implications in terms of reducing officer-involved collisions in the PGPD and other law enforcement agencies.

CHAPTER 2

POLICE OFFICER-INVOLVED MOTOR VEHICLE COLLISIONS

It is necessary to justify undertaking this research before turning to the reasons that police officer-involved vehicle collisions may be related to other negative outcomes. Although little empirical research has been devoted to understanding the causes and correlates of officer-involved vehicle collisions, the available research makes one thing clear: officer-involved vehicle collisions are threats to public and officer safety. Chapter Two begins with details of the human and financial costs of officer-involved vehicle collisions in the United States. Next, Chapter Two reviews the extant literature that has attempted to explain police crashes. Despite limited information about police crashes relative to other negative officer outcomes, it later becomes clear that many of the same causes have been implicated in numerous behaviors.

The Relevance of Officer-Involved Vehicle Collisions

Police behaviors with the potential to harm the public and fellow officers have always been of paramount concern. The importance of harmful police officer behaviors is a consequence of the vital and unique role of public police—reducing the overall amount of disorder and acts that threaten the prosperity and safety of citizens. To accomplish their goal, police officers are granted authority to use exceptional powers and tools. In the United States, police are allowed in certain circumstances to use deadly force, detain and arrest citizens, and disregard laws regarding motor vehicle operations on public roadways. In turn, officers are trusted to engage in potentially harmful behaviors only to

the extent required in accomplishing their mandate—any excesses introduce harm that undermines the fundamental purpose of police. This agreement creates the foundation of the police-public social contract, which is spelled out in state and federal legal codes, agency policies, and court decisions. Perceived and actual violations of this trust have led to some of the most significant acts of civil unrest in United States' history.

As societal expectations of police have shifted, the officer behaviors that have been scrutinized by the public, government, researchers, and other interested parties have evolved as well. Concerns regarding officer behaviors focused on serious, deliberate officer misdeeds such as brutality and corruption a century ago but have expanded and incorporated events that are more commonly encountered in the daily activities of officers. Increased attention has also been paid to behaviors that threaten officer safety in the field, which have also shifted as technological advances have introduced new tools and weapons for police officers and suspects. Many tools used by officers present benefits in terms of officer and citizen safety but also hold the potential for misuse. Notable examples have included firearms, oleoresin capsicum (OC) spray, and conducted energy devices (CEDs) (i.e., Taser).

Perhaps the most significant technological advancement in policing over the past century has been the motorized vehicle. However, the potential negative results of police motor vehicle operations have not been accorded nearly as much attention as other potentially harmful officer behaviors such as use of force in general. The proliferation of motor vehicles in the general public during the early 20th century created a public safety concern that quickly became a focus of the police (Richardson, 1974). The danger associated with motor vehicle collisions was recognized and the police responded with

reorganized agencies that dedicated a large portion of manpower and other resources to traffic safety (Richardson, 1974). Motorized patrol became a ubiquitous part of policing and a visible representation of police. The importance of patrol has increased as American's have continued to embrace automobile ownership as a vital part of daily life and commerce. Over the years, police vehicles have provided sanctuaries from unfavorable weather, a place to store essential weapons and communications devices, and a means of transporting unruly suspects. Motor vehicles may reduce police response times, expected to be impacted by travelling speeds to calls (Pate, Ferrara, Bowers, & Lorence, 1976)[3]. However, the benefits of police motor vehicle operation must be weighed against the foremost goal of citizen and officer safety because motor vehicle collisions frequently cause great harm and suffering.

<div align="center">

The Costs of Officer-Involved Vehicle Collisions

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There is a lack of information available to conduct an 'apples to apples' comparison of the harm caused by motor vehicle collisions and other negative outcomes such as excessive force incidents. In fact, there is an overall deficit in research on motor vehicle collisions involving officers, a constant theme of this study. Estimates of the number of officers killed in vehicles and on the streets of the United States are available at the national level from two sources: the federal government and a non-profit.

Officer Fatalities

The primary source of national information about officers killed in the line of duty is the Federal Bureau of Investigation's (FBI's) Law Enforcement Officers Killed and Assaulted (LEOKA) program. Information regarding officers who have been killed

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[3] Contrary to their hypothesis, Pate et al. (1976) found no significant effects of officer travelling speeds on overall response times.

or assaulted is provided by city, county, state, university and college, tribal, and federal law enforcement agencies participating in the FBI's Uniform Crime Reporting (UCR) program. Additional information on officers, suspects, and circumstances is provided by FBI field offices and nonprofit groups including the National Law Enforcement Officers Memorial Fund (NLEOMF). Data received by the FBI are ultimately classified into officers feloniously killed and accidentally killed. Accidental deaths include officers killed in falls, aircraft accidents, accidental shootings, and struck by vehicles. More germane to this discussion are officers accidentally killed in automobile and motorcycle collisions. For the purposes of this research, automobile and motorcycle deaths are combined to measure officers killed operating motor vehicles.

Over the past 20 years, a total of 2,463 police officers died at work in the United States, including 1,127 officers killed feloniously and 1,336 accidental deaths (FBI, 1995-2014). Fortunately, the LEOKA data show a decline in the total number of police officers killed annually in the line of duty over this two decade period (see Figure 2.1[4]). This drop has occurred in spite of motor vehicle collisions, which do not display the downward trend seen in felonious deaths. From 1994 to 2013, 874 police officers were killed in motor vehicle collisions (758 in automobiles and 116 on motorcycles), while 1,127 died in assaults by suspects. On average, 43.7 officers were killed each year in motor vehicles from 1994 to 2013, compared with 56.4 officers killed per year feloniously during the same period. An average 35.2 percent of annual officer deaths in the U.S. during the last 20 years were due to vehicle collisions. The largest number of

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[4] Trends in Figures 2.1-2.5 are shown using linear lines of best fit.

officers killed in crashes over this period was 60 in 2003 and the lowest was 27 in 2013.

In comparison, officers killed feloniously ranged from 79 in 1994 to 27 in 2013.
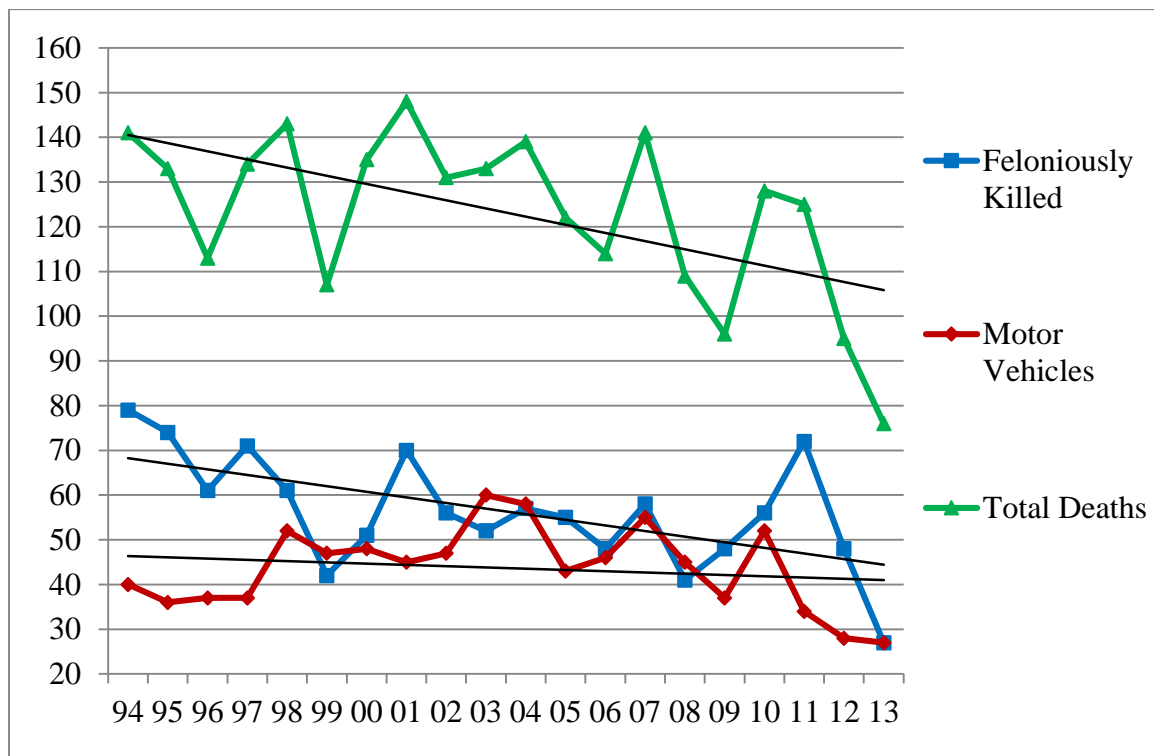
Figure 2.1. FBI (LEOKA) data on all causes of officer deaths: 1994-2013.

A more positive picture emerges over the past 10 years with respect to officer

fatalities as measured by the FBI (2005-2014) and shown in Figure 2.2. The trend of

decreasing fatal collisions becomes more evident and recent lows were observed in both

collision-related and felonious deaths. The downward trend in officer fatalities is more

easily observed in Figure 2.3, which excludes total officer deaths. The average number of

officers killed in crashes was 42.5 from 2004 to 2013, while the number of officers killed

by suspects was 51. The numbers of officers killed feloniously and in vehicle collisions

were equal in 2013 (27)—the safest year for police officers in the United States in

decades. Still, 37 percent of all officers killed on-duty from 2004 to 2013 were in

collisions (FBI, 2005-2014).
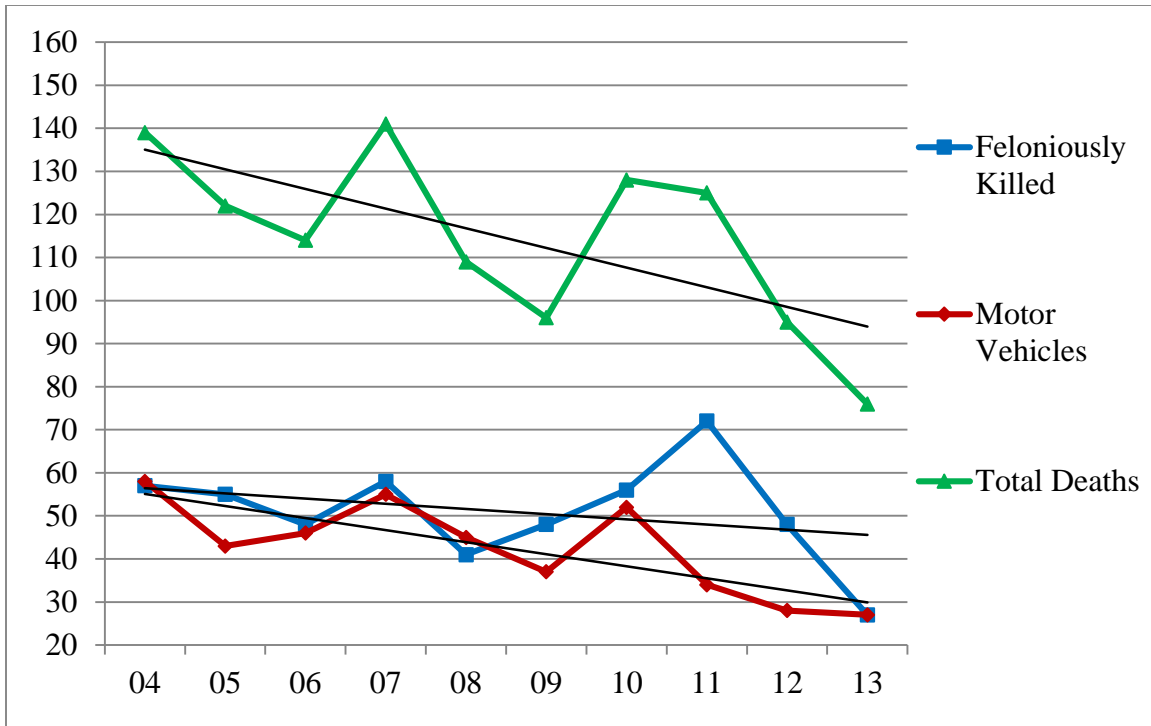
Figure 2.2. FBI (LEOKA) data on all causes of officer deaths: 2004-2013.
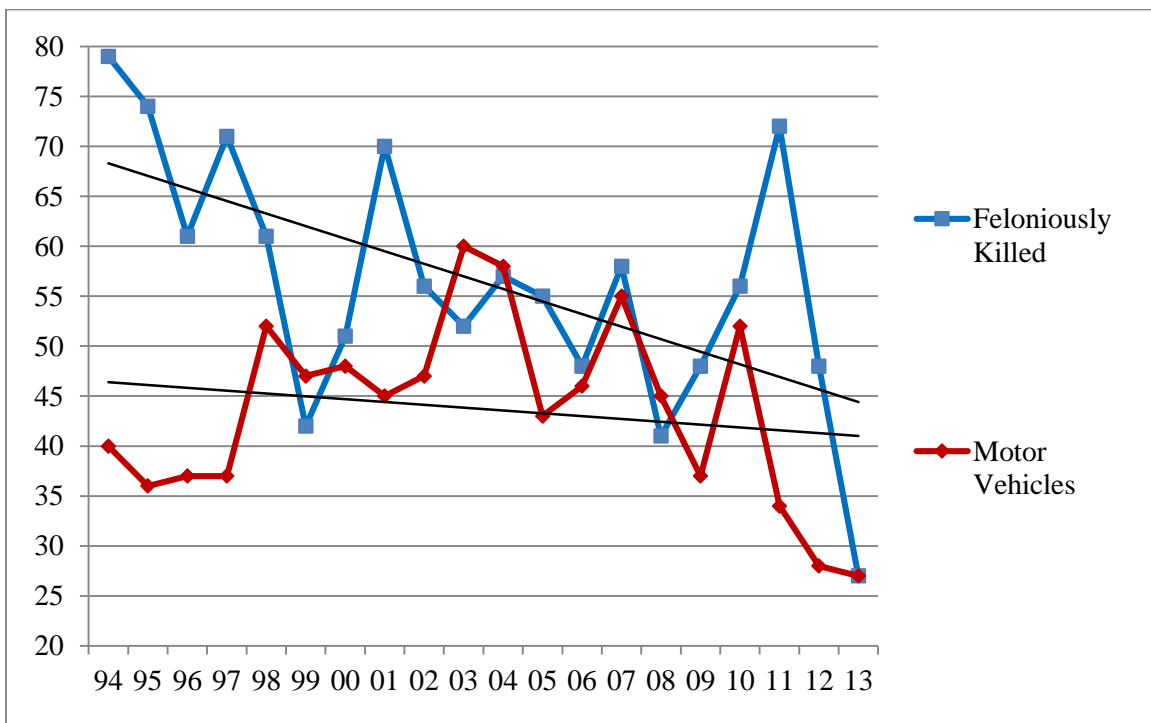
Figure 2.3. FBI (LEOKA) data on accidental causes of officer deaths: 2004-2013.

Another source of information regarding American officers killed in the line of duty is the National Law Enforcement Officers Memorial Fund (2015), which maintains a monument in Washington, D.C. and an online repository of information. In order to be added to the memorial, nomination forms must be signed by agency heads and submitted to a committee that reviews the cases for eligibility. Military police and correctional officers are eligible only if they were performing normal law enforcement duties or were recognized as law enforcement officers by their employers, respectively. Part time officers are considered on a case by case basis. Annual figures on the number of officers killed are available back to the 1791, but data on the causes of death are only available for the past 10 years (NLEOMF, 2015).

According to the NLEOMF (2015), a total of 1,501 officers died in the line of duty from 2004 to 2013. Of those, 504 officers were killed in motor vehicles, which included 434 automobile deaths and another 70 motorcycle crash fatalities. Thus, 50 officers have died each year on average from automobile collisions in the United States over the past decade, a higher figure than that found in the FBI's LEOKA data. In comparison, 548 officers were fatally shot, 14 were stabbed, 9 died from terrorist attacks, 8 were beaten, and 1 each were strangled and poisoned to death during the previous 10 year period, based on NLEOMF data. Approximately 33.6 percent of all officer deaths in the U.S. from 2004 to 2013 according to the NLEOMF (2015) were motor vehicle related. The number of officers killed in automobiles ranged from 32 in 2013 to 71 in 2007 (see Figure 2.4).
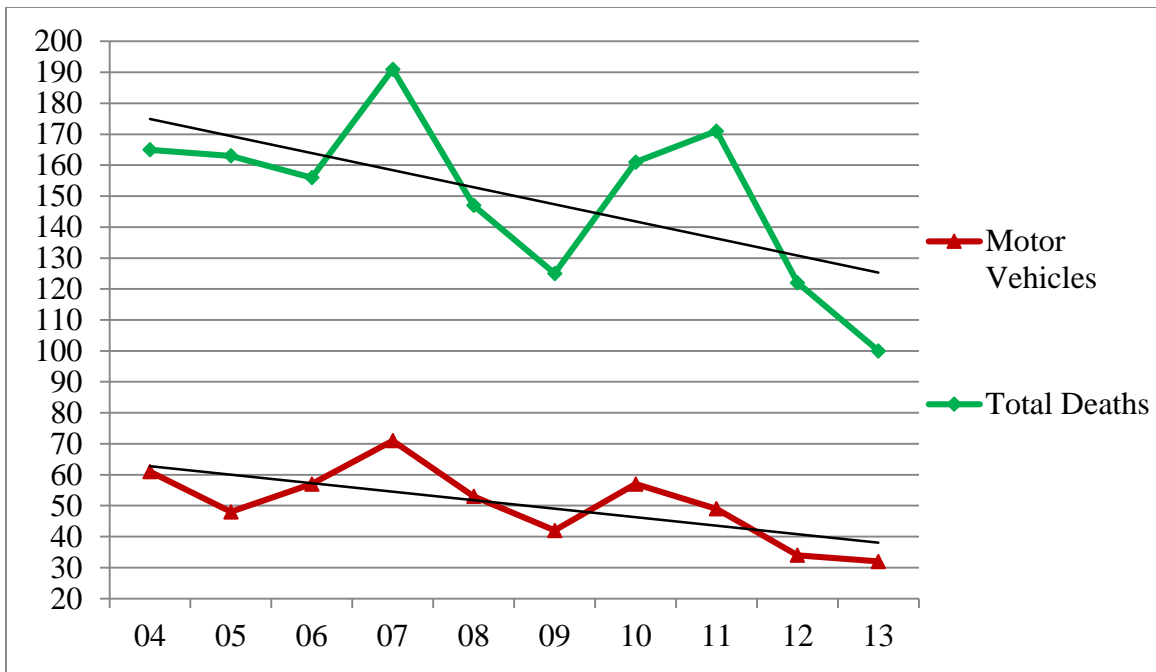
Figure 2.4. NLEOMF data on causes of officer deaths: 2004-2013.

Overall, the LEOKA and NLEOMF data provide slightly different estimates of the numbers of officers killed due to differences in reporting procedures and eligibility criteria. However, the overall picture of the prevalence of fatal officer involved collisions is alarming: approximately one-third of annual officer deaths in the United States have consistently been caused by motor vehicle collisions. Furthermore, officer motor vehicle deaths have been declining in recent years to a low in 2013, but have not been declining as quickly as deaths from other threats to officer safety.

Information on fatal officer-involved vehicle collisions is also available from the National Highway Traffic Safety Administration (NHTSA), which has agreements with state governments to provide information regarding fatal motor vehicle collisions that take place on their roadways annually. Crash information is maintained in NHTSA's Fatality Analysis Reporting System (FARS). A report based on these data is published

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annually by NHTSA and includes involvement of emergency vehicles, which are

categorized as ambulances, fire trucks, or police vehicles. Information regarding officer-

involved vehicle collisions is limited in these annual reports but counts are provided of

the number of officers and civilians killed (see Table 2.5). In 2011, Noh conducted a

detailed analysis of officer-involved vehicle collisions in the U.S. from 1980 to 2008

based on the FARS data. Noh (2011) found that FARS consistently provided a lower

estimate of officer deaths due to motor vehicles than the LEOKA data due to different

definitions of police vehicles, a FARS requirement that death take place within 30 days

of collisions, and variations in state data filing procedures. Still, Noh (2011) reported that

trends in vehicle deaths from 1980 to 2008 were similar in the FARS and LEOKA data.

Officer Injuries

Much less information is available regarding officer-involved vehicle collisions

that have not resulted in one or more fatalities. The FBI's LEOKA program only collects

data on officer injuries that result from assaults and so the number that have resulted from

vehicle crashes at the national level is unknown. Data from NHTSA's FARS are limited

to fatalities. However, recent evidence has suggested that nonfatal collisions, some of

which result in serious, debilitating injuries to police officers and the public, are

concerning in scope. Wolfe, Rojek, Alpert, Tiesman, and James (2015) reported that 39

officers were killed in California but another 7,684 officers were injured in vehicle

collisions from January, 2000 to December, 2009. This equates to nearly 200 officers

injured for every 1 officer killed in California behind the wheel between 2000 and 2009

(Wolfe et al., 2015). An earlier study of California peace officers reported that for each

officer killed in a vehicle crash there were approximately 100 collisions that resulted in

non-fatal officer injuries (Gustafson & Cappitelli, 2010). A smaller ratio of officer

injuries to deaths was found by Rix et al. (1997), who examined officer-involved

collisions that occurred in England and Wales from 1990 to 1993 and resulted in 511

injured officers and 16 officer deaths.

Details regarding the injuries sustained by United States' police officers due to

vehicle collisions are limited. Wolfe et al. (2015) examined records from the California

Department of Motor Vehicles and found a total of 35,840 collisions involving peace

officers had occurred in the state from 2000 to 2009. Wolfe et al. (2015) found that

collisions over that decade resulted in 7,684 injured officers. A total 9,181 officer injuries

were reported, including 6,380 complaints of pain, 2,395 other visible injuries, 367

serious injuries, and 39 fatalities (Wolfe et al., 2015). Between 19.0 and 23.2 percent of

annual collisions from 2000 to 2009 involving California law enforcement officers

resulted in one or more officer injuries or fatalities (Wolfe et al., 2015).

Even less is known about the minor collisions that are most common in police

departments, including those that result in little or no property damage. Part of the reason

for this oversight is that collisions without injuries are less harmful on the personal level.

Another reason is that law enforcement agencies and state departments of motor vehicles

may require injuries or a certain amount of damage before requiring officers to report

their collisions. However, overlooking minor vehicle collisions is a costly mistake for

agencies because of their magnitude. For instance, the Los Angeles Times reported that

LAPD officers alone were in over 1,250 collisions over a 3 year period (Rubin, 2012). Of

course, costly damage to police vehicles, civilian vehicles, and other forms of personal

property can occur without injuries to the individuals involved. Overall, research on

officer-involved vehicle collisions that has been limited to crashes resulting in fatalities or even injuries to officers has severely underestimated the scope of the problem.

Citizen Fatalities

Broadly speaking, motor vehicle collisions are a major public safety threat in the United States. The National Center for Injury Prevention and Control reported that 33,804 Americans were killed in motor vehicle traffic collisions in 2013 (Centers for Disease Control and Prevention, 2013). This figure is slightly higher than the 32,719 people NHTSA (2015) estimates were killed in the U.S. in 2013. A 2013 Centers for Disease Control and Prevention (CDC) report on the leading causes of death in the U.S. for 2010 found that "unintentional motor vehicle accidents" were the most frequent cause of deaths among the 5 to 9 years, 10 to 14 years, and 15 to 24 years of age groups. They were also the leading causes of injury related deaths among all ages (Centers for Disease Control and Prevention, 2013). Motor vehicle collisions were the second leading cause of injury related deaths among 6 of the 7 remaining age groups (Centers for Disease Control and Prevention, 2013). However, precise estimates of the number of civilians killed in motor vehicle collisions involving police officers in the United States are unavailable. The lack of research is shocking considering that several sources have indicated police crashes actually result in more deaths to citizens than officers. The British Home Office reported that 76 out of 92 deaths (82.6 percent) that resulted from officer-involved crashes in the United Kingdom from 1990 to 1993 were members of the public (Rix et al., 1997). In a presentation at the 69th Annual Meeting of the American Society of Criminology, Hansen, Rojek, Alpert, Wolfe, and Tiesman (2013) reported that 13 people

were killed in officer-involved vehicle collisions in California over 2 years (2008-2009) and only 5 of them were peace officers.

The deadly consequences of officer-involved collisions on everyday American citizens over time are evident in NHTSA's (2005-2015) FARS data (see Figure 2.5). According to NHTSA, police vehicle crashes killed more citizens than officers during each of the past 10 years. From 2004 to 2013, police vehicle collisions caused an average of 69.2 citizen deaths and 30.6 officer deaths per year. The maximum number of annual citizen deaths was 90 in 2007 and the minimum number of citizens killed in collisions with police officers was 50 in 2010. Unlike officer fatalities, the number of citizen motor vehicle fatalities increased from 2010 to 2013. In terms of officer fatalities, FARS data from 2004 to 2013 show a similar trend as was found in the LEOKA and NLEOMF data—an overall decline over the past decade and a low in 2013.
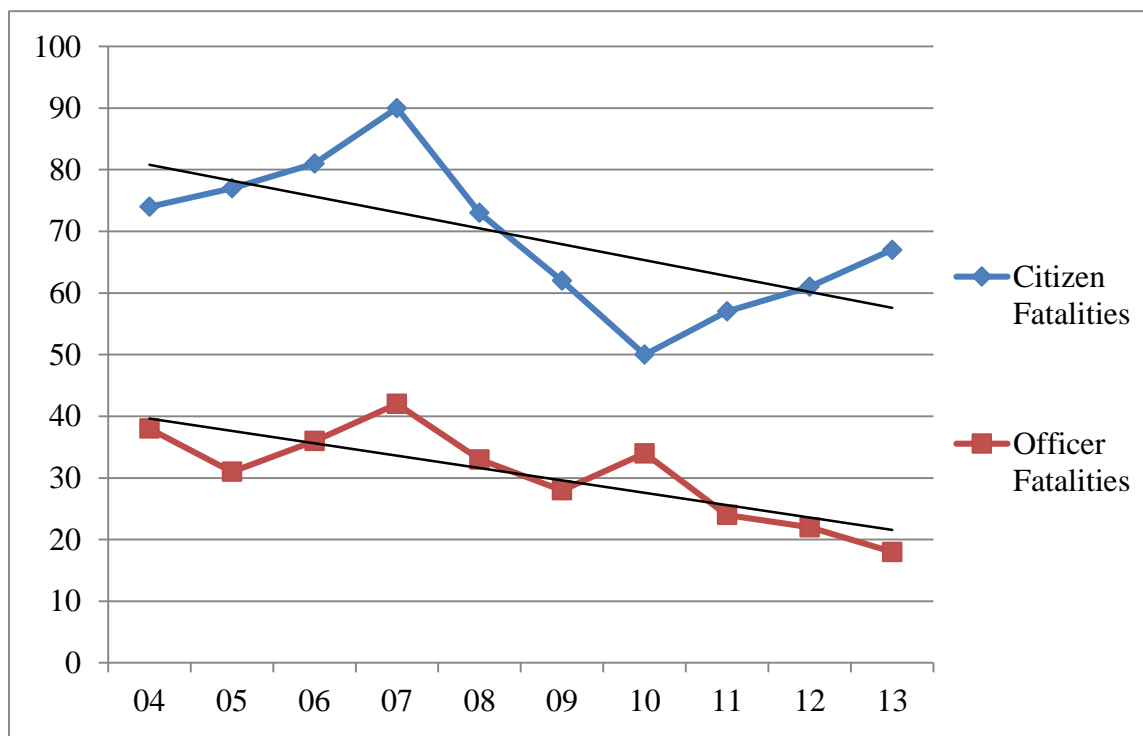
Figure 2.5. NHTSA (FARS) data on motor vehicle-related deaths: 2004-2013.

Citizen Injuries

Nonfatal motor vehicle collisions are also extremely costly in the United States. The National Highway Traffic Safety Administration (2015) estimated that 2,313,000 people were injured in vehicle collisions on U.S. roadways in 2013. In 2011, motor vehicle crashes were the fourth leading cause of nonfatal injuries treated in hospital emergency departments in the United States for the 6 age groups from 15 to 65 years and older, as well as among the entire population. During 2010 and 2011, the approximately 3.9 million emergency department visits for motor vehicle collisions accounted for 10.1 percent of the total injury-related emergency department visits in the United States (Albert & McCaig, 2015). Officer-involved vehicle collisions cause considerable nonfatal harm among the general public as well but this issue has been largely overlooked. For example, Hansen et al. (2013) found that 48.3 percent of serious injuries, 49.9 percent of other visible injuries, and 51.6 percent of complaints of injuries that resulted from officer-involved collisions in California during 2008 and 2009 were sustained by members of the public. Looking abroad, Rix et al. (1997) found officer-involved collisions in England and Wales from 1990 to 1993 caused 511 serious injuries to law enforcement officers and 514 serious injuries among the greater public. Overall, it appears that estimates of the harm caused by officer-involved vehicle collisions that have excluded citizens have substantially underestimated the total destruction that has resulted from police collisions.

Financial Costs

The total extent of the losses due to officer-involved vehicle crashes to surviving family members, employing agencies, and greater communities are difficult to quantify

but the financial costs can be estimated and are alarming on their own. The National

Highway Traffic Safety Administration conducted a comprehensive study of all vehicle

collisions in 2000, not just incidents that involved police officers, and reported the total

cost of a fatal crash was $977,208 (Blincoe, Seay, Zaloshnja, Miller, Romano, Luchter, et

al., 2002). A follow-up reported that the cost of a fatal collision had risen to $1.4 million

in 2010, not including lost quality of life (Blincoe, Miller, Zaloshnja, & Lawrence, 2014).

These estimates of the total cost of a fatal collision in the U.S. included emergency

services, property damage, medical care, and lost productivity (Blincoe et al., 2002,

2014). In the cases of police line of duty deaths, surviving family members receive more

than $333,000 from the Public Safety Officers' Benefits Program[5] (Public Safety

Officers' Benefits Program, 2014). The amount awarded by the federal government is the

same for officers killed on the streets and in their vehicles.

The number of deaths is dwarfed by the number of police officers who have

suffered debilitating and costly injuries resulting from vehicle collisions. In terms of per

incident costs, NHTSA estimated each non-fatal crash in the U.S. during 2010 cost

between $13,000 and $1,100,000 depending on severity, but did not examine police

officer-involved collisions specifically (Blincoe et al., 2014). Similar to fatal collisions,

costs have not been calculated specifically for collisions that have involved police

officers. However, rough estimates based on the number of fatal police collisions and the

costs per incident in the general public suggest that the costs of these events are

tremendous. Many of the costs related to officer collisions will be borne by local

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[5] Officers killed on or after October 1, 2013 receive $333,604.68 from the Bureau of
Justice Assistance Public Safety Officers Benefits program. Additional benefits vary by
state, employer, and membership in groups like the National Rifle Association.

governments, which employ the majority of police in the United States, and all will consume resources that could be used elsewhere.

The liability resulting from vehicle collisions can also pose considerable costs to law enforcement agencies and local governments. For instance, the Los Angeles Times reported that the LAPD paid almost $24 million over 9 years in approximately 400 civil cases that resulted from officer-involved collisions (Rubin, 2012). Car crashes were the reason for one out of four lawsuits filed against the LAPD during this period (Rubin, 2012). The city only went to trial in a few of these cases, which suggests acknowledgment of some liability associated with these collisions (Rubin, 2012).

Explaining Officer-Involved Vehicle Collisions

Research into the correlates of officer-involved vehicle collisions is worthy of study because of the considerable impact (no pun intended) on members of the public as well as officers. The extant literature regarding the causes of on-duty collisions is examined in this section but there is a broad deficiency of empirical knowledge and research on the topic. Although 425 officers were killed in vehicle crashes in the decade from 2004 to 2013, slightly fewer than the 510 killed by suspects (FBI, 2005-2014), and an unknown number of citizens have been killed as well, much more attention has been devoted to negative consequences of firearms than motor vehicles. In the field of law enforcement, the risks posed by the motor vehicle have been largely overlooked (Cappitelli, 2015)[6]. Until recently, researchers of officer use of force and officer safety have focused more attention on tools including CED's and OC spray than on motor vehicles. One exception has been research on police pursuit driving specifically (e.g.,

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[6] Conversely, Tiesman, Heick, Konda, and Hendricks (2015) found risk perceptions scores for vehicle collisions were significantly higher than those for intentional violence.

Alpert, 1987; Alpert, 1997; Alpert & Dunham, 1989). However, police pursuits have accounted for only a small portion of the total officer collisions, from about 5 percent (Alpert & Dunham, 1989) to 10 percent (Noh, 2011)[7]. Thus, research limited to pursuit-related collisions can only provide a partial picture of officer-involved crashes.

It is unfortunate but true that little is known about the causes or correlates of officer-involved vehicle collisions (Stephens, Fielder, & Edwards, 2013). On the positive side, heightened interest has also been observed over the past few years among practitioners and academics who have partnered to discover means of reducing harmful driving behaviors. Examples include the Officer Safety and Wellness group that was created by the Bureau of Justice Assistance and Office of Community Oriented Policing Services, the International Association of Chiefs of Police (IACP) Research Advisory Committee, and the CalPOST SAFE Driving Campaign's Research Advisory Committee. Finally, President Obama's Task Force on 21st Century Policing (2015) also included hearings on these issues.

Much of what we know about officer-involved vehicle collisions has been provided by two federal and one state organization: the British Home Office (Rix et al., 1997), the California Commission on Peace Officer Standards and Training (Gustafson, 2009), and the National Highway Traffic Safety Administration (Noh, 2011). An early examination of officer-involved vehicle collisions was conducted by Rix et al. (1997), who studied 770 crashes that involved police in England and Wales from 1990 to 1993 and resulted in 1,025 persons being injured and 92 deaths. More recently, NHTSA (Noh, 2011) conducted a study of fatal officer-involved collisions in the United States from

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[7] On the other hand, an examination of 770 collisions in England and Wales found that 39 percent of serious crashes occurred during a vehicle pursuit (Rix et al., 1997).

1980 to 2008, which took the lives of 823 officers. CalPOST was among the first practitioner organizations to devote itself to the problem of officer-involved motor vehicle collisions. CalPOST established the SAFE Driving Campaign, and created partnerships with a group of researchers from the University of South Carolina, Washington State University, the University of California – Berkeley, California State University – Sacramento, and the University of Colorado Denver. One CalPOST contribution to the extant literature focused on driver training but also examined several officer-level characteristics (Gustafson, 2009).

Finally, a handful of research articles have attempted to explain officer-involved vehicle collisions in the U.S., including those in the August, 2015 special issue of Policing: An International Journal of Police Strategies and Management that is dedicated to police crashes. In fact, most of the studies published in this journal issue were conducted by researchers affiliated with the CalPOST SAFE Driving Campaign. The diversity of approaches to better understanding officer-involved vehicle collisions is well-demonstrated by this issue that contains studies that have examined characteristics of officers (Hansen et al., 2015; James, 2015; James & Vila, 2015; Wehr, 2015; Wolfe et al., 2015), incidents (LaTourrette, 2015; Rice, Troszak, & Gustafson, 2015; Wolfe et al., 2015), organizations (Wehr, 2015), and states (Gustafson, 2015). Looking across this body of literature, characteristics that have been blamed for motor vehicle collisions have been similar to those that have that have been found relevant to explaining use of deadly and excessive force, vehicle pursuits, and citizen complaints—suggesting a potential link between these negative officer outcomes.

Research Findings Regarding Officer-Involved Collisions

Several researchers have examined demographic characteristics of officers in vehicle collisions. Not surprising considering their representation within law enforcement organizations, male officers have been disproportionately involved in serious and fatal collisions in the U.S. and abroad. In an analysis of FARS data, Noh (2011) found that 93.0 percent of officers killed in the U.S. between 1980 and 2008 were male. A study of 10 years of police crashes in California reported that 91.1 percent involved male officers (Wolfe et al., 2015). All 39 officers killed behind the wheel in the study by Wolfe et al. (2015) were male. Comparisons to non-involved peers were not made in these studies so it is unclear exactly how these figures related to the overall driving officer populations in those areas and times. In England and Wales, Rix et al. (1997) found approximately 90 percent of officers in serious or fatal collisions were male. For comparison purposes, 87 percent of officers at the time were male. On the other hand, Hansen et al. (2015) found nonsignificant gender effects on collisions in their survey of patrol officers in eight California agencies. Rice et al. (2015) found that female officers were more likely than male officers in California to have been culpable for their collisions.

Officer age is another demographic variable that has been linked to on-duty vehicle collisions. In his classic explanation of police behavior, Sherman (1980) stated that "conventional police wisdom holds that younger officers are more aggressive, and also more likely to make mistakes than older officers" (p. 71). It is also possible that younger officers have received less exposure to the negative consequences of unsafe driving. Simply put, they may not have responded to deadly collisions—a sobering experience for officers (Tiesman et al., 2015). Rix et al. (1997) reported that officer-

involved collisions peaked around 25 to 29 years of age and exhibited a steady decline afterwards. Overall, 41.0 percent of officers in injury or fatality collisions in the study by Rix et al. (1997) were between the ages of 25 and 34. After accounting for the age representation of all officers, Rix et al. (1997) concluded that serious collisions were more common among younger officers. For instance, individuals over 40 year of age represented 33 percent of officers in the U.K. but accounted for only 15 percent of serious collisions (Rix et al., 1997). More recently, Rice et al. (2015) found that younger drivers were significantly more likely than officers aged 50 years or older to be culpable for their collision involvement.

Regardless of the underlying reasons why age is associated with crashes, similar arguments also appear to apply to officer experience. In fact, Hansen et al. (2015) included measures of officer age and experience on their survey of California officers but could not model the effects of both variables due to multicollinearity issues. Nonsignificant effects of officer experience on any on-duty collision involvement and on-duty collision frequency were reported by Hansen et al. (2015).

Officer rank has also been examined in relation to vehicle collisions. Rix et al. (1997) found that 86 percent of officers in serious collisions were constables as compared with 76 percent of all officers in the U.K. at the time. Rix et al. (1997) also suggested that the relationship they found between age and collisions was because younger officers were more likely to be at the rank of constable and to be assigned an operational role—both of which demand more driving and therefore place young officers at greater risk for collisions. Hansen et al. (2015) also noted that younger officers are more likely to be working in patrol, typical among entry-level officer assignments, and therefore face

increased exposure to driving-related issues including collisions all else being equal. Hansen et al. (2015) found that supervisors were significantly less likely than patrol officers to be in 1 or more as opposed to 0 collisions as well as 2 or more versus 0 collisions. In fact, officer rank was one of only three consistently relevant variables in the models presented by Hansen et al. (2015).

Another body of literature that holds promise with respect to reducing officer-involved collisions considers the effects of officer fatigue. Much of this research has been conducted by Vila and colleagues, who have studied effects on officer fatigue that secondary employment (Vila, 2000, 2009; Vila & Kenney, 2002), excessive hours on-duty (Vila, 2000, 2006 2009; Vila & Kenney, 2002; Vila, Kenney, Morrison, & Reuland, 2000), and shift work (Amendola, Weisburd, Hamilton, Jones, & Slipka, 2011; Vila, 2006). In turn, officer fatigue has been shown to have negative effects on officer safety, health, and on-duty accidents (Vila et al., 2000). In fact, the effects of fatigue on officer performance levels have been compared with the effects of alcohol (Vila, 2000, 2009; Vila & Kenney, 2002). The relationship between officer fatigue and collisions were recently considered in experiments conducted by James and Vila (2015), who found significantly worse post-shift driving performance among officers working night shifts than day shifts. A study by Rajaratnam, Barger, Lockley, Shea, Wang, Landrigan et al. (2011) reported that 40 percent of officers had sleep disorders—approximately twice the rate among the general public.

Other studies have examined the relevance of training on driving. For instance, research conducted in California found that officers who completed an Emergency Vehicle Operations Course (EVOC) or Law Enforcement Driving Simulator (LEDS)

were significantly less likely to be in collisions (Gustafson, 2009). Alternatively, Rix et al. (1997) found that the most qualified "advanced level" drivers were in more serious collisions than the least trained "basic level" drivers and concluded that "there would appear to be no simple relationship between driving skills and involvement in serious accidents" (p. 19). Rix et al. (1997) add that "this apparently paradoxical situation is, however, explained in terms of the types of activity each group was involved in" (p. 19), because advanced drivers were more likely to be in pursuits than basic drivers. Furthermore, advance drivers were actually less likely than basic drivers to strike vehicles or people during pursuits (Rix et al., 1997). The finding that officers with more driving training and experience may be placed in more dangerous situations should be kept in mind when considering the effects of age and experience on collisions.

With the return of war veterans from Afghanistan and Iraq, law enforcement agencies may receive more applications from potential employees with military experience in the near future. It has been suggested that combat veterans may have unique difficulties driving safety, particularly in the period immediately following deployment. The United States' Army Medical Department (2011) focused on safe driving among veterans in a publication titled, "Post-Combat Driving: The American Road." The publication reported a survey of combat veterans found 25 percent had disregarded stop signs, 49 had become anxious when cars approached too quickly, and 20 percent had been anxious during routine driving during the previous 30 days. The Army argued the driving behaviors that kept soldiers safe at war were the same behaviors that threatened their safety back home. Although the paper did not explicitly discuss the

mechanisms behind this unsafe driving at home, it referred to feelings of stress, anxiety, frustration, and anger (United States Army Medical Department, 2011).

Researchers have also examined how agency driving culture may impact individual officers' safe driving and collision involvement. Wehr (2015) conducted interviews with California officers and found that aspects of agency culture that were related to collisions included morale, field training, supervision, and adherence to policies and procedures. Hansen et al. (2015) also studied the effects of supervision and enforcement concerning agency driving policies on collisions, but used a survey of patrol officers in eight California agencies. Hansen et al. (2015) found significant effects of perceived likelihood of supervisory enforcement of speeding and technology-use (cell phone use for calls and texting) policies on self-reported collision frequency. There were no discernable effects on collisions for supervision and enforcement of policies regarding seatbelt use or code driving (Hansen et al., 2015).

A few studies have considered influences at the situational- or environmental-level. One variable that appears relevant to this study is time of day. For instance, Wolfe et al. (2015) found that officer-involved collisions over a one decade timeframe in California were most likely to have occurred between noon and 6pm, and suggested that this may be due to evening rush hour traffic. The research by Wolfe et al. (2015) suggests that collisions may be related to citizen demand, risk exposure, and opportunity.

Conclusion

The tools available to police officers to accomplish their mandate have changed dramatically over the history of police, among the most notable being the addition of the motor vehicle to daily patrol and many other functions. Indeed, motor vehicles have

become an omnipresent aspect of policing in the United States and have drastically changed the daily routines of officers. Although vehicles are a relatively new tool and weapon in the field of law enforcement, crashes have been quickly climbing to the top of the list of problematic police events. Indeed, officer-involved vehicle collisions pose considerable threats to officer and public safety on American roadways. Over the past decade, motor vehicle collisions accounted for 42.5 percent of all officer deaths in the United States while 51.0 percent of line-of-duty deaths were caused by felonious assaults (FBI, 2004-2013). In some areas, officer-involved vehicle collisions have been found to have caused more deaths to citizens than officers (Hansen et al., 2013). The number of serious and minor injuries to members of the law enforcement community and general public is far greater than the number of fatalities, and although these collisions are less distressing in personal terms, the financial burden to families, agencies, and communities should not be discounted. Overall, many of the costs associated with officer-involved vehicle collisions are borne by members of the public, a problem that could potentially threaten the vital yet tenuous trust between the police and the public. In fact, traffic safety has become a foundational role of police in the United States (Richardson, 1974). Despite the dangers to public and officer safety, little research has been conducted in this area. For this reason alone, police crashes are worthy of the level of investigation that has been afforded other harmful events. Still, many variables that appear to predict collision involvement have mirrored those implicated in other negative officer outcomes

CHAPTER 3

LINKING VEHICLE COLLISIONS TO OTHER NEGATIVE OFFICER OUTCOMES

Based on the personal and financial damage caused to officers, their families, agencies, and the general public, it appears that officer-involved vehicle collisions are quickly climbing to the forefront of concerning behaviors. However, potential for harm to officers and agencies is not the only connection between officer involvement in vehicle collisions and other undesired behaviors. Although differences exist, there exist several reasons to support the hypothesis that the same officers involved in collisions are also disproportionately represented among their peers in other negative outcomes including deadly and excessive force, citizen complaints, and vehicle pursuits.

Exploring the links between these events is the purpose of Chapter Three. The chapter begins with a discussion of the role of police. Next, Chapter Three turns to the importance of monitoring undesired police behaviors in the United States. The remainder of this chapter pieces together the various pieces of evidence that suggest officers involved in vehicle collisions may also be disproportionately represented among the causes of other undesired outcomes in their employing agencies. First, similarities in explanatory variables are explored across several negative outcomes. Second, likenesses in agency responses to negative officer outcomes are discussed.

The Relevance of Negative Officer Outcomes

The balance of individual freedoms with governmental control over citizens forms the keystone of democratic government. The modern, democratic institution known as the

police was named after the ancient Greek city-state or polis, where societal development and prosperity required former strangers to live together in a mutually-beneficial manner. Social norms arose including the reduction of violence and other coercive acts that had formerly been accepted means of settling disputes between private parties. Reduced violence and other antisocial acts had the ability to increase societal order and economic success so the need naturally arose for a public body that could intervene justly and fairly between private parties, often at their own request, when no other legal or legitimate[8] recourse was available. Certain aspects of public police, an institution comprised of individuals nested in organizations, naturally emerged as agents of many governments. The foundation of these public bodies was built on achieving the societal goal of decreased disorder and violence.

Democratic public police and their inseparable coercive powers originally arose from the citizenry. The institution was a natural governmental response to societal needs and later citizen requests for a public entity that promoted order and justice by intervening in private, volatile situations for which there was no other solution. Bittner (1970) described police activities as addressing, "Something-that-ought-not-to-be-happening-and-about-which-somebody-had-better-do-something-now" (p. 39). Thus, the legitimacy of the institution has been and always will be based on citizen's views regarding the police success in reducing actions that could damage the internal integrity of societies.

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[8] Tyler defined legitimacy as "a psychological property of an authority, institution, or social arrangement that leads those connected to it to believe that it is appropriate, proper, and just" (2006, p. 375).

The police must balance their use of legally authorized tools provided to them as agents of government, many of which have been banned from all other citizens, and their role in reducing those same behaviors among the public. Logically, police should use the minimal amount of force necessary to accomplish their function because any excesses pose risks to overall societal prosperity and order, which thereby undermine the purpose of the police institution. As Skolnick (1999) observed, "Order achieved through democratic policing is concerned not only with the ends of crime control, but also with the means used to achieve those ends" (p. 1).

Because the role of police is to protect the public, force and other undesired acts can be legitimately used to protect themselves and others and thereby increase community safety (Adams, 1999). Legally and socially authorized use of non-negotiable coercive powers over citizens characterizes the police occupation across the world (Bittner, 1970). Klockars (1985) explained, "No police anywhere has ever existed, nor is it possible to conceive of a genuine police ever existing, that does not claim a right to compel other people forcibly to do something. If it did not claim such a right, it would not be a police" (pp. 9-10). Bittner drew analogies to medical doctors, the only people with authority to prescribe federally-controlled drugs, and priests, the only citizens who administer sacraments (Brodeur, 2007).

Police are different from other occupations with distinct authorities because their powers are non-negotiable but interactions with members of medical and religious communities, on the other hand, are voluntary (Brodeur, 2007)[9]. Police officers are also granted exceptional powers to detain and arrest citizens, thereby taking their liberty, in

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[9] Max Weber in 1919 defined the state by its monopoly on legitimate force (Weber, Owen, Strong, & Livingstone, 2004).

order to satisfy their mandate of law enforcement. American police officers are given discretion to use coercive and even deadly force, and possess a variety of lethal and non-lethal weapons in their arsenal. Adams (1999) notes, "However, the amount of force used should be proportionate to the threat and limited to the least amount required to accomplish legitimate police action" (p. 1). Bratton (1999), former chief of the NYPD and LAPD, stated, "There is no more difficult challenge in a free society than the legitimate exercise of force" (p. 19).

Negative Officer Outcomes in the United States

The United States has provided a unique case study of the importance of legitimate government actions and the classic balance of individual freedom with societal order. The U.S. was founded by individuals seeking to escape the oppression of government over their lives. The American Revolution involved armed rebellion against the ruling English government that had become illegitimate in the eyes of many citizens due to unjust intrusions into private lives and commerce. Framers of the U.S. Constitution began shaping this country by defining and limiting the powers of government. The First and Second Amendments to the Constitution grant citizens' rights to speak out against and bear arms to oppose, respectively, unauthorized government intrusions into their lives. The Fourth through Eighth Amendments, one-half of The Bill of Rights, among other things limited the actions of domestic government agents and members of the criminal justice system including police. Originally intended with respect to the federal government, most of these constitutional provisions have been applied to the states because of the Due Process Clause of the Fourteenth Amendment.

Less than one hundred years later, the American Civil War was fought to decide the role of the federal government in state and private affairs. The point is that American police emerged in a society that was established because of and has remained ever-concerned with excessive power of government actors over individual citizens (Stephens, 2011). Police in England on the other hand were established at a time when citizens viewed their government with a great deal of legitimacy (Manning & Van Maanen, 1978). The practical implications of police being viewed as legitimate in the eyes of the public they serve will be addressed shortly.

Growth in emerging American cities led to increased crime and disorder but a lack of support existed for the establishment of what would now be considered an organized police force   because immigrants were concerned with government power over individual citizens. Early American settlers from Western Europe maintained close ties, communication, and trade with their birthplaces, especially London. The birth of modern, democratic public police is usually associated with the Parliamentary Police Act of 1829 authored by Sir Robert Peel in metropolitan London, England. Eventually, cities in the Northeast borrowed English concepts such as the night watch, sheriff, and constable.

Unique aspects about American police formation created conditions and fostered concerns that remain the focus of research and other stakeholder attention regarding police officer behavior. The historical basis for the formation of the American nation, the way the police role has been defined in this country, and the impact of several police reform movements and court decisions made a substantial impact on the American police institution during the 20th century. Considering the historical backdrop, it is no surprise

that research and general interest about coercive police officer actions has been concentrated in the United States.

American public police arose from societal desire for a mechanism of reducing internal violence and other forms of disorder primarily during the mid-1800's. However, early American experiments with policing suffered from the same problems they were created to address. Violence was a hallmark of American policing during the 19th century—it was used by private parties against the police and was expected in return (Walker, 1998). Police violence against citizens was unpunished and increased hostility towards the institution (Walker, 1992). Subsequent police organizations that popped up during Westward Expansion embraced self-protection and frontier justice (Manning & Van Maanen, 1978). The discretionary authorization of coercive powers and an unclear police mandate allowed brutality and corruption to reign as officers carried out the political and financial whims of the elite (Alpert & Dunham, 2004), largely free of legal repercussions (Reiss, 1970).

The Progressive Movement of the early 20th century ushered in efforts to define and maintain the proper role of police in the United States and was led by reformers such as chiefs August Vollmer and O. W. Wilson and President Hoover. Hoover established the National Commission on Law Observance and Enforcement, also known as the Wickersham Commission in 1929 and the resulting chapter, "Lawlessness in Law Enforcement," described how brutality was extensively practiced by police officers in the United States (National Commission on Law Observance & Enforcement, 1931). The Progressive Movement cast a spotlight on the lack of legitimacy with which the police were viewed by the American public. It was clear that unauthorized applications of their

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unique authorities including corruption and excessive use of force necessitated a defined police role. A second aspect of this reform was that police were to be viewed as professionals, a prerequisite of which was self-regulation. In fact, this wave of political and social reform through the 1960's became known as the era of self-regulation (Alpert & Dunham, 2004).

The Wickersham Commission and Progressive Movement decreased violence and corruption among American police by ushering in a professional reform among the institution. However, the reform movement had two unintended consequences: it allowed police to define their role in terms of crime and law enforcement and it permitted internal regulation. American public police have been granted considerable coercive powers as a public body as well as the authority to exercise those powers in a largely discretionary and open-ended manner with little supervision or oversight in order to reduce crime. Some of this discretion is the result of America's preoccupation with local control over government officials but much resulted from the Progressive Movement and professionalization movements.

Internal regulation largely disappeared from police departments when major social movements including protests of the Vietnam War and the Civil Rights Movement during the 1960's and 1970's resulted in violent and lethal conflicts between American citizens and police. Nearly all of the major riots between 1964 and 1968 were the result of encounters between police and citizens (Feagin & Hahn, 1973). This era revealed another difference between English and American models of police according to Manning & Van Maanen (1978): the former respected ethnic diversity while the latter did not. The National Advisory Committee on Civil Disorders (1968), commonly known as

the Kerner Commission, and the National Commission on the Causes and Prevention of Violence (1969) were convened to investigate the riots and the police role in these events and concluded the police had used far too much force against citizens.

American police history has been further marked by instances of unauthorized use of coercive force against the citizenry and responses in the shape of reform movements. A 1989 riot occurred in the city after a Miami police officer stopped and killed a Black motorcyclist (Schmalz, 1989). In 1992, the acquittal of four LAPD officers who were videotaped beating motorist Rodney King also resulted in rioting in major cities including Los Angeles and Atlanta, and the Christopher Commission (1991) was formed in response. It is no surprise that a casual glance at the history of policing in the United States, as well as commentary and research on police, clearly demonstrates a principal desire to define proper officer behaviors as well as limit and punish improper applications of that authority.

The Violent Crime Control and Law Enforcement Act of 1994 authorized the United States Department of Justice to investigate police departments for patterns and practices of undesired behaviors such as excessive force. Some investigations have led to formal consent decrees between agencies and the USDOJ. The consent decrees vary between jurisdictions but many require police to improve their data reporting and collection systems for deadly force events, pursuits, and other concerning actions. Additionally, many agencies have been required to implement early warning systems to track and detect problematic officer behaviors (Police Executive Research Forum, 2013).

Shifts in police strategies have occurred over the history of American police in hopes of reducing negative officer outcomes. Many police reformers have recommended

closer contact with citizens to improve the behaviors of police officers and one notable

shift in police tactics has been the establishment of Community Oriented Policing (COP)

in many U.S. cities. Community policing requires communities and police to work

together and increase responsiveness and accountability (Adams, 1999). Some

communities have sought to restrict police use of force (Adams, 1999). Reducing police

misconduct was another goal of some agencies in implementing community policing

(Lersch, 2005). According to Bittner, community policing has forced American police to

increasingly include peacekeeping in their role and to grant some authority over their

actions to the people (Brodeur, 2007).

Another contemporary movement in policing strategy was the emergence of

Problem-Oriented Policing (POP), which shifted the focus from means to ends. However,

POP also emphasized the importance of working with citizens to produce safety and

order (Goldstein, 1990). It has been suggested that within the framework of POP,

perpetrators of misconduct may be viewed as one type of problem (Walker et al., 2001).

Both POP and COP have further increased public expectations of the police in terms of

both means and ends. Officers working in these frameworks have also been expected to

maintain closer relations with community members, thereby increasing the importance of

legitimate and illegitimate officer behaviors.

Another policing strategy has been more aggressive tactics and zero tolerance,

ideas based on broken windows theory (Adams, 1999). Broken windows involves

focusing on less serious quality of life and order maintenance offenses but concern has

been raised that attention to a broader group of non-serious offenders will increase the

amount of force and abusive force used by police (Adams, 1999). Even though American

police have defined their mandate as law enforcement, even the most noted police practitioners in this nation have argued that the end measure of crime control should not be the only concern (Bratton, 1999). Rather, police should be concerned about the means used to achieve these crime outcomes as well (Bratton, 1999; Skolnick, 1999).

Police officer-involved vehicle collisions are socially undesirable and should be minimized. Still, such outcomes are commonly accepted by practitioners and larger society as unfortunate but inevitable results of the police role and mandate. Gradually, this blasé attitude has shifted and today police are held to the highest professional and personal standards yet. In addition to evolving public expectations, highly publicized crashes and research on less visible but more common officer collisions have demonstrated the negative impact of these events on agencies and the public.

Negative Officer Outcomes and Police Effectiveness

The significance of individual acts of police misconduct has been shown to have negative impacts beyond threats to the liberty and freedom of citizens and the existence of the police institution itself. Indeed, the negative impact of police misconduct is varied and far-reaching. In the past 50 years, police officer behaviors in the form of excessive force against citizens have led to riots in many of America's major cities (Feagin & Hahn, 1973). These events have created negative publicity, led to expensive litigation, created operational difficulties for addressing those volatile situations, and reformed entire police organizations. Those riots also inspired the belief that citizens obeyed laws and cooperated with police only when they viewed the institution with legitimacy (Reiss, 1971).

Research by Tyler (1990) showed compliance with the law depended upon legitimacy and legitimacy depended on the fairness of agents of the law including police. Empirical research on police-citizen encounters has also supported this finding and found citizens were more likely to comply with police demands (Mastrofski, Snipes, & Supina, 1996; McCluskey, Mastrofski, & Parks, 1999) and assist police by reporting crimes (Sunshine & Tyler, 2003; Tyler & Fagan, 2008) when they viewed police as legitimate. A meta-analysis by Mazerolle, Bennett, Davis, Sergeant, & Manning (2013) identified eight evaluations of police interventions based on procedural justice principles that were designed to increase cooperation (N=2) or compliance (N=6) with police. The evaluations were based on data collected from community (N=1), offender (N=4), and victim (N=1) samples. Mazerolle et al. (2013) found seven out of eight increased either cooperation or compliance with the police.

Beyond the individual encounter, researchers have also shown that police legitimacy is positively related to citizen-reported satisfaction and confidence in the institution and perceived effectiveness in crime prevention (Tyler, 2004). Bayley (2002) argued, "In order to become effective at preventing crime, police need to be protective of human rights so that they can enlist the willing cooperation of the public" (p. 143). A procedural justice model of policing has proposed the use of procedural justice principals when interacting with citizens as a way to increase compliance with the law and cooperation with the police without threats of force or fear of punishment (Schulhofer, Tyler, & Huq, 2011).

Researchers have also shown that perceptions of police legitimacy were related to crime rates in the jurisdictions they patrolled. Kane (2005) conducted research in New

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York City and disaggregated the 74 precincts into low, high, and extreme disadvantage using U.S. Census Bureau data. He operationalized police legitimacy as the number of instances of career-ending police misconduct recorded by the NYPD from 1975 to 1996. Kane (2005) found no relationship between misconduct and violent crime in low disadvantage neighborhoods. In high disadvantage neighborhoods police misconduct had a significant effect on violent crime and in extreme disadvantage communities police misconduct had a strong effect on violence. In fact, police misconduct was the strongest predictor of violent crime in his models. Ethnographic researchers, such as Elijah Anderson (1999), have also explained how a lack of faith in police leads residents of inner city neighborhoods to engage in criminal behaviors as a means of protecting themselves.

Undesired police behaviors, even those committed by officers with laudable intentions, may lead to antisocial responses by the public and thereby increase the difficulty of achieving public safety and crime control. Bayley (2002) argued, "when police violate the rule-of-law…they also raise the likelihood that encounters with the public will generate hostility and violence" (p. 143). Bayley (2002) concluded "that it is in the interests of the police, both individually and collectively, to adhere to the rule-of-law…In short, a stronger, evidence-based case can be made that defending human rights enhances police effectiveness than that doing so hampers it. Illegality in policing is a risky and generally unproductive strategy" (p. 146). In a comprehensive review of research on police use of force published by the National Institute of Justice, Adams (1999) described the relationship between the police and public as follows:

"Police are drawn from the community, and as police they continue to operate as members of the community they serve. The community, in turn, enters into a solemn and consequential relationship with the police, ceding to them the power to deprive persons of 'life, liberty, and the pursuit of happiness' at a moment's notice and depending on them for public safety. Without police, the safety of the community is jeopardized. Without community support, police are dispossessed of their legitimacy and robbed of their effectiveness" (p. 1).

A tarnished reputation in the eyes of the public is not the only harm to law enforcement agencies when officers exceed their powers and violate the rights of citizens. Liability in the form of civil settlements has demonstrated that undesired officer events can also have a negative impact on effectiveness by damaging budgets. For instance, Bayley (2002) reported legal liability for misconduct in New York City from 1994 to 2002 at $176.9 million. Bayley (2002) also cited an article in the *Los Angeles Times* that estimated liability from the Rampart scandal alone at $125 million. These funds could have been used on salaries for additional officers, increased training and safety equipment, and other more effective ways. An unpublished paper by Skolnick in 2001 reported that Los Angeles may vacate up to 1,500 convictions due to the Rampart scandal as well. Again, this represents a considerable loss of public resources. Weisburd et al. (2001) summarized the problem and wrote, "Every year, incidents of police abuse of authority cost local communities tens of millions of dollars in legal damages. Tax dollars are wasted. Careers are destroyed. The public trust is compromised" (p. 9).

Monitoring Co-Occurring Negative Officer Outcomes

Concern in the United States regarding unwarranted police officer use of force and coercion, especially against minority and young citizens, has been reflected in the great deal of attention from the police practitioner and researcher communities over the past 50 years. The courts also played a significant role in calling for less harmful police and holding offending officers and agencies accountable. Beginning around 1970, federal funding has spurred research on negative officer behaviors including deadly force, excessive force, racial profiling and other forms of citizen maltreatment, and vehicle pursuits. Police agencies have responded with increased training, more restrictive policies, and sweeping changes in accountability mechanisms. Agencies have improved channels for receiving information regarding negative officer behaviors from citizens and have used early intervention systems to monitor officers disproportionately involved in negative outcomes.

The fields of medicine and public health have closely monitored the co-occurrence of undesired outcomes, which is termed comorbidity, in rating the performance of organizations such as hospitals. In criminal justice, the expected correlation between officer involvement in vehicle collisions and in other undesired behaviors has been manifested in many ways by police leaders including the increased deployment of early intervention systems (EIS), also known as early warning systems (EWS). These tools vary enormously but are designed to identify problematic officers, most often by tracking officer representation in formal citizen complaints filed with their employing agencies (Walker et al., 2001). In fact, early intervention systems that track complaints about a variety of behaviors they view as unacceptable have been required as

conditions of federal consent decrees between police agencies and the United States

government. Some agencies also include other forms of internal data such as peer

complaints and internal investigations, vehicle pursuits, firearm discharges, conducted

energy device use, and other non-deadly and lethal force events.

Although little empirical investigation has been devoted to the causes and

correlates of officer-involved crashes, many findings from the broader literature that has

examined undesired police behaviors appear applicable to explaining vehicle collisions as

well. Another one of the emerging findings regarding officer-involved vehicle collisions

is that some portion are caused by officer actions that have violated agency policies. Is it

possible that those officers who violate agency driving policies may also violate policies

related to use of force and other important officer activities? Agencies' risk managers

have also recently instructed practitioners to simultaneously monitor a host of other

concerning but less costly on-duty behaviors in hopes of reducing civil liabilities from

crashes, which in some agencies have averaged millions of dollars per year (Rubin,

2012).

The Prevalence of Negative Officer Outcomes

Promoting a safe society was the original motivation for forming the police

institution, which still derives much of its legitimacy from citizens' views regarding the

extent to which police officers help accomplish this function. Political and social unrest

during the 1960's and 1970's challenged the ability of police to regulate themselves and

created another shift in American policing that would open the door to external oversight

and interested independent researchers. Police organizations have increasingly kept data

on undesired police events often as partial conditions of consent decrees with the United

States Department of Justice (Police Executive Research Forum, 2013). The federal government responded to social unrest with increased funding for research on police use of force, deadly force, and other potentially concerning topics. The combination of funding and data increased the motivation and ability of researchers to study police.

Negative officer outcomes have been studied using a variety of methods that have generated inconsistent estimates of events such as use of force, as might be expected. Police actions such as use of force and collisions are difficult to measure observationally because they are rare events. Observing a sufficient number of incidents may be expensive and time consuming. In addition to being infrequent, many actions such as corruption take place in private or in virtual space. The sensitive nature of misconduct events may also introduce bias due to reactivity, a problem confronting all observational studies where the subjects know they are being observed. Because of these difficulties, observational studies of police misconduct have typically been one part of larger examinations of police behavior. For instance, Reiss (1968), who served as research director for President Johnson's Commission on Law Enforcement and the Administration of Justice, studied police-citizen encounters in Boston, Chicago, and Washington, D.C. during 1966. Reiss was interested in the ways citizen age, race, gender, and class, demeanor, role in the encounter, emotional state, and sobriety impacted police demeanor or "manner," which included formal behaviors and informal actions such as threats (Friedrich, 1977). Observers collected data on 840 eight hours shifts that included 3,955 encounters with 11,422 citizens (Friedrich, 1977).

Others have studied negative officer outcomes with official law enforcement agency data. Fyfe and Kane (2006) examined misconduct in the NYPD from 1975 to

1996, which was operationalized as personnel records that indicated employment termination. The study period was roughly anchored by the endings of the Knapp Commission (1972) and Mollen Commission (1994) and included officers involved with both scandals (Fyfe & Kane, 2006). The study first identified all officers who had been separated from the NYPD for misconduct during the time frame, a total of 1,542 (Fyfe & Kane, 2006). Next, each of these officers was matched to a randomly selected member of their respective academy classes from 1948 to 1996 (Fyfe & Kane, 2006). Several other publications have been based on these data as well (e.g., Kane & White, 2009, 2013). Overall, two conclusions from the body of research on negative officer outcome prevalence are relevant to this study: negative officer outcomes (1) are rare in the United States and (2) are clustered within small groups of officers who have accounted for disproportionate amounts of unwanted outcomes in their agencies.

Negative Officer Outcomes are Rare in the United States

Judging from the extensive negative effects that undesired police behaviors have had in the United States, one may suspect that such actions are common but this is not the case. The lack of standard definitions for officer actions such as use of force in addition to the observational, self-report, and official police records that have been used to measure these events has resulted in varied estimates. Still, it is clear that police use of force, misconduct, and other undesired events are rare in the U.S. The National Institute of Justice reviewed prior research on police use of force and concluded that the belief that police use force infrequently is known with substantial confidence as fact (Adams, 1999).

In 1977, political scientists Ostrom, Parks, and Whitaker collected information on police-citizen encounters in 24 departments in the metropolitan areas of Rochester, New

York, St. Louis, Missouri, and Tampa-St. Petersburg, Florida for the Police Services Study (PSS). Worden and Shepard (1996) reanalyzed the PSS data and found excessive force in approximately one percent of police-citizen encounters (Worden, 1996). An observational study by Bayley and Garofalo (1989) reported information about 467 potentially violent encounters between NYPD officers and citizens, 37 of which resulted in use of force (7.9 percent).

Other estimated use of force rates have been based on official police or criminal justice records. A longitudinal study of employment termination records found 1,543 NYPD officers were dismissed for misconduct from 1973 to 1996, a group that represented about 2 percent of the 78,000 total officers employed by the NYPD during the 22 year study period (Kane & White, 2013). The Christopher Commission (1991), one of the more famous investigations of a police agency that focused on the LAPD after the beating of motorist Rodney King, found that force was used in 1 percent of arrests made by officers in that department. Croft (1985) researched the Rochester and Syracuse (New York) police departments and found a use of force rate of 0.94 per 1,000 calls for service. It must be kept in mind that estimates based on calls for service, police-citizen encounters, potentially violent encounters specifically, and during arrests will produce vastly different estimates of police use of force, all else being equal.

The co-occurrence of force used by police and suspects makes excessive force or brutality difficult to identify because police may use legitimate force and even lethal force to defend themselves against attacking suspects. Garner et al. (1996) reported that Phoenix police officer used force in 22 percent of arrests while suspects used force against the police in 14 percent of these arrests. Bayley and Garofalo (1989) studied 467

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encounters and found 31 incidents where police used force against suspects and 11 times when suspects used force against police. Overall, Alpert and Dunham's (1997) research on the balance between citizen and officer force (the "Force Factor") found that officers typically followed the use of force continuum and used force equal to that encountered from resisting suspects.

In addition to varied means of identifying and recording undesired behaviors, different ways of operationalizing the dependent variable have also caused variations in estimated rates of undesired police events including use of force. Research that has used broad definitions of use of force and included grabbing or handcuffing suspects has produced larger estimates of use of force than research limited to more serious events. The reason for this is clear when considering the findings of Alpert and Dunham (1999), who examined 882 official Control-of-Persons Reports from late 1993 through the end of 1995 that were completed by supervisors in the Miami-Dade Police Department and found that 64 percent of use of force events in Miami involved grabbing or holding suspects. Garner and Maxwell (1999) found that police officers in 6 jurisdictions used handcuffs in 82 percent of all arrests but that their use of other forms of physical force and weapons was far less frequent. Closely related to the type and amount of force used, measuring force using citizen injuries has resulted in smaller estimates than studies that included non-injury force events as well. Differences in the minimal amount of force required for an event to be recorded as an official use of force event have an immense effect on estimated police officer use of force rates.

Negative Outcomes are Clustered Within Small Groups of Officers

It is also clear that negative outcomes are clustered within relatively small groups of officers who account for disproportionate numbers of these acts in their respective agencies. The Christopher Commission (1991) investigated the LAPD after the beating of Rodney King and found that out of 8,450 sworn officers employed over the 4 year study period, 183 had received 4 or more complaints of excessive force or improper tactics and 44 officers had 6 or more complaints. Two-thirds of LAPD officers over the four year study period had no citizen complaints (Christopher Commission, 1991). The Kolts Commission (1992) investigated neighboring LASD and also found that excessive force complaints were clustered within a relatively small group of officers. In Boston, the St. Clair Commission (1992) randomly sampled complaints and found 10 percent of officers accounted for 45 percent of all complaints filed from 1989 to 1990. To provide an exception, the Knapp Commission (1972) investigated a scandal in the New York City Police Department that was made famous by New York Times reporting and the movie *Serpico*. The Knapp Commission (1972) revealed that over one-half of plainclothes officers were committing financially-motivated corruption in the NYPD at the time. Twenty years later, the Mollen Commission (1994) was convened to investigate further corruption in the NYPD. However, the Mollen Commission (1994) found a more isolated problem than existed two decades earlier.

In the police research literature, Lersch (1998b) found only 59 out of approximately 500 officers averaged more than 1 citizen complaint per year in a large, Southeastern agency. Lersch (2002) later reported 181 out of 280 patrol officers received no complaints, 54 received 1 complaint, 29 received 2 complaints, 10 received 3

complaints, and 6 officers received 4 or 5 citizen complaints. Brandl et al. (2001) demonstrated that less than 10 percent of officers in a large, Midwestern police department received 25 percent of citizen complaints that alleged excessive force by the agency. In criminological research beyond policing it has been repeatedly shown that small groups of offenders have accounted for disproportionate amounts of crime (Braga, 2012; Chaiken & Chaiken, 1984; Greenwood & Abrahamse, 1982; Peterson & Braiker, 1981; Williams & Lucianovic, 1979; Wolfgang et al., 1972). The effects of this research on criminal justice in the U.S. have been reflected in selective incapacitation correctional policies (Auerhahn, 1999; Harvard Law Review, 1982) and three strikes legislation (Clark, Austin, & Henry, 1997).

Explaining Negative Officer Outcomes

Threats have evolved over time and today vehicle collisions are one of the leading causes of death in the United States. The addition of cars, trucks, and motorcycles to the fleets of police agencies nationwide has proven advantageous in many ways, but has also been very costly. Still, police officer-involved motor vehicle collisions have only recently become a focus among police practitioners and researchers. On the other hand, larger bodies of research exist on other troubling police activities including use of force and deadly force specifically, citizen complaints for a variety of behaviors, and vehicle pursuits. It appears that many of the research findings regarding other undesired officer behaviors may also apply to officer involvement in vehicle collisions. Unfortunately, additional research into the correlates of police car crashes is needed until these similarities are clear. Still, several lessons from the existing literature will be used to theoretically support and methodologically inform this study.

Police research is often categorized by theoretical paradigm or unit of analysis. Binder and Scharf (1980) examined violent encounters between police and citizens by characteristics of the officers, citizens, and encounters. The same year, Sherman (1980) reviewed quantitative research on four police behaviors including police violence (justified or unjustified use of physical force against citizens) using a framework of five explanations: individual characteristics of officers; situational, organizational, and community characteristics; and legal variables. Sherman (1980) concluded that "The present state of the field is best characterized as a series of bivariate assertions about the impact of certain variables on police behavior" (p. 70). Since that time, multivariate analyses have become more common in the police behavior literature. Similarly, researchers of police misconduct specifically have explored sociological, psychological, organizational correlates (Worden, 1996), and anthropological explanations (Kappeler et al., 1998). Because previous researchers of a wide range of police officer behaviors have considered individual-level, situational- and environmental-level, and organizational-level explanations, the current study follows this trend through the next few sections.

Individual-Level Explanations of Negative Outcomes

Police reformers since Theodore Roosevelt have assumed that the individual characteristics of officers were relevant to their behaviors (Fogelson, 1977). Indeed, a variety of individual-level explanations mostly psychological in nature have been offered for police officer misconduct. This body of research has assumed that officers were predisposed to a particular orientation that may lead to undesired behaviors, officers who were referred to as bad apples, rotten apples, or rogue officers. The logic for the

individual-level argument lies in research that has demonstrated small percentages of officers have accounted for the vast majority of misconduct in their respective agencies.

Age and Experience. The effects of age and length of service have been difficult to separate because the majority of police have been hired between the ages of 21 and 30 (Sherman, 1980). Cohen and Chaiken (1972) examined a single cohort and found that the officers who were oldest when appointed were less likely to receive citizen complaints for discourtesy, excessive force, and racial slurs. Lersch and Mieczkowski (1996) examined three years of citizen complaint data from a large Southeastern agency and found younger and less experienced officers were more likely to be problem officers (those with five or more complaints) than older and more experienced officers. Brandl et al. (2001) took a similar approach with a single year of excessive force complaints and found significant age differences between low- and high-complaint groups of officers in a large Midwestern police department, with the latter averaging an additional 5 years of age. Brandl et al. (2001) also found significant differences between low- and high-complaint groups of officers in mean length of service as the low-complaint averaged 12.3 years of service compared with only 7.3 years for the high-complaint group. Regression models with the entire sample of 800 officers demonstrated statistically significant effects of age and length of service (Brandl et al., 2001). In the NYPD, increased age at appointment and increased length of service were among the most influential protective factors with respect to career-ending misconduct from 1975 to 1996 (Kane & White, 2009; 2013). On the other hand, Worden (1996) found no effect of age on officer use of force with observations of officers from 24 police departments.

Wolfe and Piquero (2011) found a negative relationship between officer age and the number of citizen complaints and internal affairs investigations. However, Wolfe and Piquero (2011) reported years of service had a positive relationship with complaints and internal investigations based on data from the Philadelphia Police Department. Other researchers have uncovered an effect of experience but not age on officer use of force (Bayley & Garofalo, 1989).

Alpert and Dunham (1999) found a negative relationship between officer age and the amount of force used but cautioned this effect may have been due to differences in the assignments of younger and older officers, which was not measured in their study. Adams (1999) also noted that the deployment of younger officers in high crime areas may explain the overall relationship between age and use of force found in the literature. Adams (1999) explained that agencies often rely on seniority when assigning officers so older officers receive more favorable assignments.

Harris (2009, 2010, 2010, 2011) has applied aspects of the life course framework of developmental psychology, and more recently criminology, to explain the complaint careers of officers from a large, Northeastern agency. First, Harris (2009) tracked citizen complaints among officers and found they rose quickly in the first few years, peaked at year 3, then declined to year 14. Second, Harris (2010) used the same data and the career criminal framework and found three trajectories for the relationship between experience and misconduct. The low-rate officers had consistent rates of misconduct over their careers, the mid-rate trajectory were very similar to the aggregate findings from his earlier (2009) research, and the high-rate of complaint group of officers began receiving complaints of misconduct earlier in their careers and ultimately received more complaints

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over their careers. These high complaint officers sound similar to the life-course-persistent antisocial individuals identified by Moffitt's (1993) research on criminal offending. All three groups of officers were very similar after year 14 (Harris, 2010). Finally, Harris (2011) expanded the length of careers examined beyond the initial 14 years and found the group of officers with the highest complaint rates had increased complaints from years 16 to 23.

A few studies have focused on the stability of deviance among officers by examining misconduct that took place at earlier ages. Cohen and Chaiken (1972) found prior job dismissal and military discipline were related to rule violations but not prior arrests for petty crimes. Success in the police academy and during probation also reduced misconduct and disciplinary actions (Cohen & Chaiken, 1972). Research in the NYPD found significant risk factors for career-ending misconduct in general and criminal misconduct specifically included prior criminal histories, public order offense histories, and prior employment disciplinary and reliability problems (Kane & White, 2013). Kane and White (2013) further reported the individual-level predictors of officer misconduct were consistent over a 22 year period in the NYPD. The Mollen Commission (1994) also found prior arrests among many of the suspended and dismissed officers.

Gender. Increasing the number of female police has been suggested as a means of reducing the amount of force used by police (Christopher Commission, 1991; Skolnick & Fyfe, 1993). However, this relationship has received mixed support in the empirical literature. No gender differences in use of force were reported by Alpert and Dunham (1999), but research by Steffensmeier (1979), Lersch and Mieczkowski (1996), Lersch (1998a), and Hickman, Piquero, and Greene (2000) have found female officers received

fewer citizen complaints than their male counterparts. Hickman et al. (2000) reported that nearly all of the gender gap found in the Philadelphia Police Department's official records of discipline was due to differences in charging—not processing.

Researchers have also found no significant differences between male and female officers in terms of serious, career-ending, misconduct events (Kane & White, 2009; 2013). Kane and White (2013) did note that women who were fired for misconduct were more likely to be for drug possession or administrative/probationary failures than their male counterparts and summarized their finding as follows: "Female officers who got into trouble tended to be problems for the organization, while men tended to be problems for the community" (p. 13). Others have reported that women received fewer complaints of excessive force in particular (Brandl et al., 2001). The Christopher Commission (1991), which examined the LAPD actions after pursuing and famously beating motorist Rodney King, also concluded that female LAPD officers committed less misconduct, especially in the form of excessive violence. Worden (1996), on the other hand, uncovered no significant effect of gender on excessive force in multivariate analyses of the PSS data.

Race/Ethnicity. Increased minority representation in policing has also been suggested to reduce violence encounters with citizens (Fyfe, 1988; U.S. Commission on Civil Rights, 1981). This argument is particularly relevant in minority neighborhoods that have been traditionally patrolled by White officers. Skolnick (1999) argued that race and ethnicity "are bona fide occupational qualifications for urban police departments" (p. 3). The result is that minority officers in some agencies have been disproportionately assigned to minority neighborhoods as a way of decreasing social distance and increasing trust.

The effects of race and ethnicity on officer misconduct are unclear and inconsistent. Brandl et al. (2001) found no racial differences between groups of officers who had received high and low numbers of citizen complaints regarding excessive force. Hickman et al. (2001) found no significant race differences in the formal documentation of complaints or findings of guilt. Kappeler, Sapp, and Carter (1992) found no race effect on guilty determinations either. Kerstetter, Rasinski, and Heiert (1996) examined a sample of citizen complaints to the Chicago Police Department in 1985 and found both White and Black investigators were more likely to make a not sustained disposition when the citizen was the other race but that officer race was non-significant.

Alpert and Dunham (1999) found no overall effect between ethnicity and officer use of force but determined that officers used more force in encounters with suspects of the same race than other races. This finding was consistent for White, Black, and Hispanic officers in the Miami-Dade Police Department. Alpert and Dunham (1999) offered several possible explanations for this finding. First, it could have been due to an agency practice of assigning officers to areas with citizens of the same ethnicity (Alpert & Dunham, 1999). Second, diversification of Miami neighborhoods could have made officers more comfortable interacting with and using force against citizens of their own ethnicity (Alpert & Dunham, 1999). Third, officers may have been hesitant to use force against citizens of other races because of the racial and political implications of such events in the city (Alpert & Dunham, 1999). Earlier, Reiss (1972) found Black officers in three large cities used more unjustified force generally and specifically against Black citizens.

A handful of studies have found minorities overrepresented among negative officer outcomes. Cohen and Chaiken (1972) followed the cohort of NYPD officers hired in 1957 and found a significant race effect on citizen complaints. Friedrich (1980) reported Black police were more likely to use force but less likely to use excessive force. Lersch (1998a) found minority officers were overrepresented among male but not female officers who received citizen complaints. Lersch (1998c) also examined internal and citizen complaints in a large, Southeastern police department and found minority officers were significantly more likely to receive complaints and to have complaints those sustained by internal affairs although there were no significant race differences in departmental disciplinary actions. There were differences in the types of complaints White and minority officers received, however, with minority officers more likely to receive complaints specifically related to demeanor, poor performance, and improper conduct, while White officers were more likely to be associated with departmental rule violations, avoiding duty, and excessive force. Rojek and Decker (2009) found Black officers disproportionately represented in five years of official internal and citizen complaint data from a Midwestern police department. However, Black and White officers were treated equally in terms of findings of guilt and discipline (Rojek & Decker, 2009). Another study of police misconduct found race was the strongest predictor of career-ending misconduct in the NYPD, where Black officers were 3.27 times more likely to be dismissed than White officers over a 2 decade period (Kane & White, 2009; 2013). Latino officers were also significantly more likely to be dismissed from the NYPD for misconduct than their White coworkers (Kane & White, 2009; 2013).

Education. Chief August Vollmer connected American police officer's with the University of California, Berkeley in the early 20th century (Vollmer & Schneider, 1917). Since that time, formal education has been repeatedly recommended as a means of improving the behaviors and performance of police (Carter & Sapp, 1990; Goldstein, 1977; Roberg & Bonn, 2004; U.S. Commission on Civil Rights, 1981; Worden, 1990). In turn, increased education has been offered as a solution by advisory panels and committees including the President's Commission on Law Enforcement and Administration of Justice (1967), the National Advisory Commission on Criminal Justice Standards and Goals (1973), the National Advisory Commission on Higher Education for Police Officers (1978), and the American Bar Association's House of Delegates (1979). The federal government supported this position with the 1968 Law Enforcement Education Program that provided education grants and loans to police officers (Carter & Sapp, 1990). However, research on the impact of education on undesired officer behaviors has been inconsistent. In 2004, the National Research Council concluded that there was not enough evidence available to support the call for higher education as a means of improving policing. Several have even speculated that college education may have negative effects on policing. At the individual-level, it has been suggested that burnout occurs when educated officers are not provided opportunities to use what they have learned (Trojanowicz & Nicholson, 1976). Concern has also been expressed that increased education requirements will lead to the exclusion of minority and female officers (Decker & Huckabee, 2002).

Mixed findings have been found with respect to the impact of education on use of force. Analyzing the POPN data, Terrill and Mastrofski (2002) found a negative

relationship between use of force and educational attainment. Later, Paoline and Terrill (2007) examined this relationship between three categories of officer education using the POPN data and found that those with some college used less verbal force than those with a high school education but that only a four year college degree decreased physical force significantly. Rydberg and Terrill (2010) found that officers with some college used less force in encounters with citizens. Worden (1996) found no difference in the use of excessive force by those with and without bachelor's degrees but higher amounts of reasonable force among those with four year degrees. Another area of officer use of force behavior that has demonstrated mixed effects of officer education is involvement with shootings. For example, Sherman and Blumberg (1981) found that officers with college degrees were equally likely to use their firearms as their less educated peers. On the other hand, McElvain and Kposowa (2008) found that those with college degrees were less likely to be in shootings.

Cohen and Chaiken's (1972, 1973) study of an officer cohort found that those with some college education received fewer citizen complaints over their careers with the NYPD. Similar results were found decades later by Kane and White (2009; 2013), who reported that having an Associate's or Bachelor's degree when hired were among the strongest protective factors to career-ending police misconduct in the NYPD. More educated officers in Dade County, Florida received fewer citizen complaints and complaints of excessive force specifically (Cascio, 1977). Other research found that 58 percent of Florida officers' highest educational attainment was a high school degree but these officers accounted for 75 percent of disciplinary cases in the state (Cunningham, 2006). Florida officers with a four year college degree represented 24 percent of officers

in the state but only 11 percent of state disciplinary cases (Cunningham, 2006). Lersch and Kunzman (2001) found deputies in a large, Southeastern sheriff's office with college degrees received significantly fewer complaints and had significantly fewer sustained administrative violations than those with high school or GED diplomas. Researchers have also found that college education increased officer acceptance towards limits on use of force (Smith & Ostrom, 1974; Worden, 1990). Telep (2011) found that a pre-service bachelor's degree significantly decreased officer attitudes that were supportive of abuse of authority, based on survey data collected by the Police Foundation (Weisburd, Greenspan, Hamilton, Bryant & Williams, 2001; Weisburd, Greenspan, Hamilton, Williams, & Bryant, 2000).

However, Truxillo, Bennett, and Collins (1998) found no relationship between having a college degree and disciplinary problems. Croft (1985) found no educational differences between groups of officers who received high and low numbers of excessive force complaints, nor did Brandl et al. (2001). Still others have found mixed effects of education on use of force. For instance, Kappeler, Sapp, and Carter (1992) found a negative relationship between educational level and the number of sustained citizen complaints but no difference in sustained internal complaints. Pate and Fridell (1993) analyzed nationally representative data from 1,111 agencies and found a beneficial effect of education on officers who worked in sheriff's offices but a weak or nonexistent relationship among officers in city departments. Null findings could potentially be explained by Van Maanen's (1975) argument that education should not have a strong impact on officer behavior because it will be overwhelmed with the effects of officer socialization. Others have speculated that the impact of college depends on the type of

degree (National Advisory Commission on Higher Education for Police Officers, 1978) and whether the education took place before or after becoming an officer (Worden, 1990). The inconsistent prior findings with respect to the impact of education on undesired officer behaviors indicate that future research is necessary. Of course, some have argued that policing is more of a craft than a profession and have therefore prioritized the importance of specialized training over formal education (Bayley & Bittner, 1997; Paoline & Terrill, 2007).

Productivity. Productivity has been offered by practitioners and researchers alike as a means of explaining officer involvement in a disproportionately high amount of vehicle collisions and other concerning events. However, the direct relationship between officer-level measures of productivity and undesired behaviors has received little empirical attention in the literature. Exceptions include a study by Lersch (2002), who examined citizen complaints in a large agency over one year and found the total number received by individual officers was significantly related to several measures of productivity: the mean number of arrests, traffic citations, and field reports. Brandl et al. (2001) also discovered a positive relationship between arrests and citizen complaints in one large Midwestern police department. More specifically, officers who received 3 or more citizen complaints of excessive force made an average of 24.2 arrests for index crimes and averaged 177.8 arrests total that year, while the group of officers who received 2 complaints made only 12.8 arrests for index offenses and 62.9 total arrests on average. However, Brandl et al. (2001) also found significant differences in assignments between groups of high- and low-complaint officers, with the former disproportionately assigned to the highest crime areas. In a model with all 800 officers, the effect of assignment

disappeared but the significant impact of arrest numbers on citizen complaints made

remained significant. Brandl et al. (2001) concluded that "the strongest evidence

provided in this study was that complaints were related to arrests made" (p. 527). The

cross-sectional nature of the study made it impossible to tell if arrests led to complaints,

or if excessive force led to arrests. The studies were focused on one agency apiece and

individual beats were not disaggregated by Brandl et al. (2001) and Lersch (2002).

One argument is that officer productivity is positively related to the number of

situations, and in some cases their seriousness, that could potentially result in undesired

outcomes, all else being equal. Officers with low productivity measures may avoid

collisions, use of force, pursuits, and other negative outcomes because they lack the

requisite conditions. Such logic is supported by Alpert and Dunham's (1997) "Force

Factor" that showed officers used levels of force proportionate to those encountered from

resisting suspects. Thus, particularly productive officers may be exposed to increased risk

of situations requiring use of force or leading to excessive force. This hypothesized

relationship may be particularly strong when productivity is measured by arrests because

prior researchers have shown excessive force occurs most often during arrest (Adams,

1999). The potential relationship between officer productivity and misconduct was also

supported by survey findings by Weisburd et al. (2000, 2001) and the Police Foundation,

who solicited responses from 919 officers to the following statement: "An officer who

makes many arrests will get many complaints." Weisburd et al. (2001) found 46.6 percent

of officers agreed with this statement and another 11.3 percent strongly agreed.

Contributions by Klinger (1997) and Smith, Makarios, and Alpert (2006) have

explained how negative outcomes may be related to the effects productivity levels have

on officer's perceptions of neighborhoods and individual residents. Both explanations suggest that officers who make many arrests in high crime areas eventually begin to regard much crime as normal. It reasons that officers may come to view negative outcomes in those areas as within the norms of acceptable officer behaviors as well. A positive relationship between productivity and misconduct such as this may help explain increased complaints from disadvantaged areas found by Kane (2002). Klinger (1997), among others, also noted that police in such areas have fewer resources to devote to each incident. Shortcuts that take the form of misconduct may result from officers striving for productivity.

Increased productivity also may increase the likelihood that an officer is falsely reported for undesired behaviors. Toch (1995) explained, "An officer may also be highly productive and may initiate a larger-than-usual amount of enforcement activity. He may disrupt the felonious plans of many disgruntled (and complaint-prone) offenders" (p. 95). Case in point, Skolnick (1999) reported being told by police that drug dealers have frequently filed complaints against the most effective officers. Thus, productivity may be positively related to the number of arrests, use of force incidents, and other situations that increase the likelihood of negative outcomes, all else being equal, but extremely productive officers may be more likely to receive complaints for imagined behaviors too.

Productivity may also explain some of the more aforementioned research findings regarding the impact of officer characteristics, including officer age, experience, and gender, on undesired behaviors. For example, Friedrich (1977) and Worden (1989) have both argued that younger officers were more aggressive on the job. Friedrich (1977) reanalyzed data collected by Reiss (1967) in metropolitan areas and found less

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experienced officers made more arrests, had more citizen contacts, and took more crime reports. He also found more experienced patrol officers were friendlier to non-offenders (Friedrich, 1977). Researchers have shown female officers, when compared with their male colleagues, made fewer arrests (Bloch & Anderson, 1974; Morash & Greene, 1986; Sherman, 1975) and fewer overall citizen contacts (Bloch & Anderson, 1974).

Personality Type. Other interested parties have focused on officer personality characteristics, especially as related to brutality (e.g., Christopher Commission, 1991). Worden (1996) reviewed prior research on police use of force and also determined five personalities more likely to use force were officers who viewed their roles in terms of crime fighting. Scrivner (1994) surveyed a national sample of police psychologists regarding the characteristics of officers who had been referred to them for excessive force. Scrivner (1994) found five profiles of officers who committed excessive force: "officers with personality disorders…that are manifested in antisocial, narcissistic, paranoid, or abusive tendencies," "officers whose previous job-related experience places them at risk…such as justifiable police shootings," "officers who have problems at early stages in their police careers…[that] consists of young and inexperienced officers, frequently seen as hotdogs, badge happy, macho, or generally immature," "officers who develop inappropriate patrol styles…particularly sensitive to challenge and provocation," and "officers with personal problems…such as separation, divorce, or even perceived loss of status" (p. 3).

Only a few have applied criminological theories to understand the personalities of misbehaving officers and many have analyzed surveys collected by Greene and Piquero (2001) from 483 officers in the Philadelphia Police Department. Hickman et al. (2001)

utilized Tittle's (1995) control balance theory, which focused on the amount of control

one was subjected to relative to the amount of control they could exercise, and found

officers with control deficits were more likely to report hypothetical misconduct to

superiors than colleagues with control surpluses. Another theoretically driven study from

this data was provided by Pogarski and Piquero (2003), who tested the effects of

elements of deterrence theory on misconduct and found "deterrence considerations…

figure prominently in police misconduct decisions," especially certainty and celerity (p.

381). Other studies based on the Philadelphia data were conducted by Chappel and

Piquero (2004), who examined social learning theory, and Lawton (2007), who utilized a

racial threat framework.

Noble Cause Beliefs. Instead of presuming that police were naturally antisocial and

trying to explain why most officers still made the decision to not act in deviant ways, an

argument known as the noble cause assumes these individuals are good and attempts to

explain why a few act in an undesired way. This hypothesis was explained by Bayley

(2002), who argued that the traditional view of police as lacking prosocial values has

been misguided. Instead, Bayley (2002) stated, "The problem is that they believe that the

violation of law and of human rights is sometimes required for effective law

enforcement" (p. 134). Bayley (2002) drew a clear line between officers who committed

misconduct for personal gain, which included promotions and direct financial benefits,

and those "who have engaged in questionable practices because they believe such

practices enhance the effectiveness of law enforcement, [for whom] the situation is

morally more ambiguous" (p. 146). Many previous researchers have also hypothesized

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the presence of some form of noble cause beliefs among those predisposed to the policing occupation.

Muir (1977) was among the first to suggest that public safety could not always be achieved legally, and thus the morality of police behaviors that were used to handle offenders should not be judged in legal terms only. A few years later, Klockars (1980) evoked the popular movie *Dirty Harry* and argued that police were committed to good ends (arresting dangerous suspects) but at the same time were legally bound by available means of achieving those ends. Noble cause corruption was explained by Crank and Caldero (2000) as being "a profound moral commitment to make the world a safe place to live. Put simply, it is getting bad guys of the street" (p. 35). Crank, Flaherty, and Giacomazzi (2007) specifically defined the noble cause as related to misconduct: "the achievement of a good greater than the harm caused by any illegal behavior of the police" (p. 105). Crank et al. (2007) tested the noble cause in the Ada County (Idaho) Sheriff's Office with twelve scale items on a survey distributed to 59 deputies and found deputies were not uniformly committed to the noble cause, that the noble cause was a multi-dimensional construct. Regarding the effect of crime on noble cause beliefs, Crank et al. (2007) found only limited support for the alternative hypothesis: serious crime, youth issues, street crime, citation problems, and a combined measure of crime and disorder were not related three measures of noble cause. The deputies did support the use of deception when they perceived problems with domestic and alcohol crime, public order problems, and general disorder. Wolfe and Piquero (2011) tested the effects of noble cause beliefs on the numbers of citizen complaints, internal affairs division

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investigations, and departmental disciplinary charges and found no significant effects on officer misconduct.

Organizational-Level Explanations of Negative Outcomes

Individual-level research on police misconduct takes a rotten apple approach but organizational-level research suggests a rotten barrel is to blame (Armacost, 2003). Organizational research has helped explain the clustering of problems in agencies and longstanding historical problems (Walker, 1992). For example, Kane and White (2013) reported the NYPD has had commissions formed to investigate misconduct approximately every 20 years since the mid-1800s. Misconduct in the LAPD has tended to revolve around brutality as reported by the Christopher Commission (1991) and a follow-up report five years later (Bobb, Epstein, Miller, & Abascall, 1996). Brutality was also a focus of the Kolts Commission (1992) in the LASD and research by Cohen and Chaiken (1968) in Long Beach. Skolnick and Fyfe (1993) argued that 20 officers watching the beating of Rodney King for over 2 minutes by officers who expected them to cover up the incident is difficult to explain with the rotten apple theory.

Scrivner (1994) surveyed a group of police psychologists regarding police brutality and concluded, "The multiplicity of profiles belies the popular stereotype of a few bad apples being responsible for most excessive force incidents" (p. 1). Scrivner (1994) added, "Excessive force needs to be considered a result not only of individual personality traits but also of organizational influences" (p. 1). Both the Christopher Commission (1991) and Kolts Commission (1992) reports questioned the use of psychological screening to identify officers at risk of excessive force. All research on individual-level explanations of officer behavior has been limited by the fact that police

have historically been selected from a homogenous pool of applicants (McManus, 1969; Grant & Grant, 1996). The result has been little variation in many officer-level variables. However, numerous characteristics of police organizations, mostly related to culture, have been offered to explain misconduct by their employees.

Culture. The influence of police organizations on officer behaviors including misconduct may be understood in two parts: the occupational culture of police broadly and the specific organizational cultures of individual police organizations. Worden (1996) defined police occupational culture as "outlooks and norms that are commonly found among patrol officers in   police agencies" (p. 29). Organizational culture was a focus of the Christopher Commission (1991), which described the policing style of the LAPD and the failure of management to stop the actions of a small minority of problematic officers. The Christopher Commission (1991) noted that the LAPD was too aggressive in their tactics and this was explained by the agencies focus on statistics such as arrest numbers. The Christopher Commission (1991) examined personnel files of the problem officers and found positive performance evaluations that rarely noted the complaints they had received and continued promotions. Thus, the LAPD formally and informally rewarded tactics that resulted in arrests and overlooked complaints in promotional considerations. The Kolts Commission (1992) investigated the LASD and found this agency also rewarded aggressive tactics and overlooked instances of excessive force and resulting lawsuits in their evaluations of deputies. The Human Rights Watch (1998) examined 14 agencies in the U.S. and reported, "Those who claim that each high-profile case of abuse by a rogue officer is an aberration are missing the point: problem officers frequently persist because the accountability systems are so seriously flawed" (p. 33). Another study

concluded that while the individual-level predictors of police misconduct were invariant, changes in the NYPD's hiring and retention practices, drug testing policies, and punishment of misconduct led to changes in the annual rates of misconduct in the NYPD from 1975 to 1996 (Kane & White, 2013).

Orientation towards arrest was also a primary factor in Wilson's (1968) work on organizational culture and officer behaviors. Research on political culture increased in the United States during the 1960's and Wilson (1968) expanded this research into police organizations. Wilson (1968) also created a 2x2 typology of organizational styles or strategies including the watchmen style, legalistic style, and service style that were based on how frequently and formally agencies interacted with citizens, including arrests. Wilson (1968) explained how each operational style impacted the way street officers behaved and also described pertinent organizational factors such as supervision and discretion. Wilson's (1968) work is considered a classic but research results have not provided strong support for his claims about local political style and police activities in observational research (Liederbach & Travis, 2008) or official arrest data (Zhao & Hassell, 2005).

Kappeler et al. (1998) developed a comprehensive anthropological framework for understanding police misconduct. Kappeler et al. (1998) argued that the unique occupational culture of policing provides individual officers with a working personality including a worldview that distinguishes between insiders and outsiders, police and others. Skolnick and Fyfe (1993) similarly argued how police organizations created subcultural conditions that fostered a siege mentality among members. According to Kappeler et al. (1998), the police worldview reinforced the 'us versus them' mentality

when officers were taught about their unique coercive powers, when they were isolated

from others due to the paramilitary nature of policing, and when they eventually believed

they alone created order. In addition, the police subculture emphasized bravery,

autonomy, and secrecy (Kappeler et al., 1998). Cultural themes or rules of behaviors that

shaped interactions have been developed by police that included isolation from society

and solidarity among police (Kappeler et al., 1998). Lastly, postulates or specific

statements that directed the behaviors of individual officers emphasized how to maintain

isolation and solidarity (Kappeler et al., 1998).

Secrecy. Secrecy is a key component in research that has examined the so-called code of

silence as an aspect of police culture (Alpert, Noble, & Rojek, 2015). Westley (1956)

conducted interviews and two years of direct observation and concluded that secrecy was

an important aspect of the police subculture. He found most officers would not report or

testify against their partners for stealing (Westley, 1956). Officers who follow the so-

called code of silence have been less likely to report misconduct by colleagues (Knapp

Commission, 1972; Mollen Commission, 1994). With a particular focus on secrecy, the

Mollen Commission (1994) documented three types of perjury committed by officers:

testimonial, documentary, and falsification of reports. These behaviors were so

widespread in the NYPD that the Mollen Commission (1994) created a new term for the

practice: testilying. Wolfe and Piquero (2011) found code of silence beliefs were related

to the number of self-reported internal affairs division investigations, in an unexpected

direction, but not the number of citizen complaints or departmental disciplinary charges

the Philadelphia officers received. Klockars, Ivkovic, Harver, and Haberfield (2001)

provided hypothetical scenarios to officers and found the seriousness of misconduct was

strongly related to officers' willingness to report the actions to superiors as well as the levels of discipline they felt was warranted.

Treatment of Employees. Research has also demonstrated that officer behaviors also depend upon the extent to which they are treated with fairness and justice by their organizations[10]. Organizational justice consists of distributive justice or the fairness of outcomes, procedural justice or the decisions that precede an outcome, and interactional justice, which is the interpersonal treatment received from an authority figure when enacting organizational procedures. Wolfe and Piquero (2011) analyzed data collected by Greene and Piquero (2001) in the Philadelphia Police Department regarding the impact of perceived organizational justice on self-reported numbers of formal citizen complaints, internal affairs investigations, and charges resulting from violations of the discipline code. They found officers who viewed their employer as just were less likely to receive citizen complaints, internal investigations, and departmental disciplinary charges. The cross-sectional nature of the data barred the authors from determining if officers reported, investigated, or disciplined for misconduct reacted by viewing the department as unfair or unjust, or if perceived lack of organizational justice led to misconduct. Friedrich (1977) found no differences between more and less satisfied police officers in their treatment of citizens.

Finances. An economic argument has been made to explain misconduct in several large agencies. For instance, Skolnick and Fyfe (1993) reported that LAPD officers they had spoken with viewed losses in civil court "as a reasonable price for the presumed deterrent effect of the department's most violent responses to lawbreaking…the cheapest way to

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[10] In a meta-analysis, Cohen-Charash and Spector (2001) found counterproductive work behaviors were negatively related to distributive and especially procedural justice.

deter potential offenders is to encourage cops to be aggressive—or proactive—and to tolerate and foot the bill for their excesses" (p. 205). Skolnick and Fyfe (1993) concluded that in large agencies "verdicts and settlements are cheaper than paying for enough new cops to make a real difference in a department's ability to mount a street presence" (p. 207). A study of the NYPD over several decades concluded that agency finances were associated with the observed decline in career-ending misconduct from 1974 to 1979 (Kane & White, 2009, 2013). Kane and White (2009, 2013) noted that it was during this time a financial crisis forced the agency to decrease its size from 32,000 to 21,000 officers in a few months. No new officers were hired by the NYPD for the next five years (Kane & White, 2009, 2013). Kane and White (2009, 2013) concluded with respect to the financial argument, "the manpower shortage forced the department to become more tolerate of its officers' misdeeds" (p. 70). Later, the emergence of the NYPD from that fiscal crisis led to hiring of officers between 1980 and 1984 before their background investigations had been completed and subsequent increased misconduct (Kane & White, 2009, 2013). This argument may explained findings of the Christopher Commission (1991) that reported supervisors were aware of who the problematic officers were but had not attempted to control their behaviors. Limited agency finances may also impact the amount of hours officers are asked to work for the police department as well as the amount of secondary hours they work when off-duty.

Situational-Level Explanations of Negative Outcomes

Researchers have also examined situational characteristics of police misconduct, which have been referred to as "rotten branches" and "rotten pockets" (Armacost, 2004). For instance, Sherman (1974) referred to the 77th Precinct of the NYPD where the

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infamous Buddy Boys worked who were eventually convicted of robbery, theft, bribery, extortion, and drug dealing as a rotten pocket. The most relevant situational-level variables to this study are neighborhood conditions and suspect resistance.

Neighborhood Conditions. Ecology of crime research has demonstrated that structural conditions, particularly those found in inner-city America, were related to crime in those areas (Shaw & McKay, 1942). Klinger's (1997) ecology of patrol explanation focused on the impact of levels of crime and argued that officers exposed to increased levels of crime had altered understandings of normal crime and victim deservedness. Klinger (1997) theorized that as crime increased officers became more cynical, viewed victims as not deserving police attention, viewed crime as increasingly normal, and had fewer resources at their disposal per incident. A similar argument to Klinger (1997) was made by Smith et al. (2006) who applied script theory to the study of citizen demeanor. Script theory suggested officers' repeated situations with disrespectful suspects may cause them, over time, to begin to view such behaviors as normal (Smith et al., 2006). Smith et al. (2006) noted that this may have created disconnect between officer and observer perceptions of disrespect, which thereby biased observational studies on this topic.

This line of research has also been extended to focus on police misconduct as the dependent variable. As Toch (1995) reasoned, "The most obvious variable that could produce a spurious high-incident-of-force officer (that is, one whose frequent use of force may not be problematic) is his or her assignment. Some officers may face a profusion of situations requiring the lawful exercise of force. These situations may result from locally high rates of crime, or from a proliferation of subjects who assault police officers or

physically resist legitimate arrests" (p. 95). The Christopher Commission (1991) also

noted the importance of levels of crime on officer misconduct.

Kane (2002) examined the effect of social disorganization on police misconduct.

Kane (2002) merged the NYPD data on career-ending misconduct with Census data to

examine the effects of social ecological conditions. He found that aspects of social

disorganization—structural disadvantage and population mobility—were associated with

changes in levels of misconduct by NYPD officers from 1975 to 1996. Kane (2002)

argued that systemic resource deprivation, barriers to upward mobility, political

marginalization, and disrupted social networks prevented residents of these areas from

filing allegations of misconduct. Disadvantaged communities also offered unique

opportunities for misconduct, Kane (2002) suggested. Lersch (1998b) examined citizen

complaints to one large police department in the Southwest within the census-tract

context that they occurred and found those tracts with above average numbers of

complaints had fewer white residents, lower median income, lower educational level,

higher poverty levels, and higher unemployment levels. After disaggregating the

complaints into four types, Lersch (1998b) found complaints of excessive force

specifically were more likely to originate in disadvantaged census tracts.

Suspect Resistance. Police are called upon to handle situations and suspects when no

other recourse is available to citizens. Many suspects are not cooperative, as might be

predicted by the need for a police response in the first place. Not surprisingly, research

has shown that suspects' behaviors during their interactions with police are important in

predicting the officers' own actions. In fact, Garner et al. (1996) found that suspects'

actions were the strongest predictor of police use of force in Phoenix. Ethnographic

research by Anderson (1999) demonstrated how behaviors used to project a tough image and thereby protect residents of violent inner-city neighborhoods may have placed them at risk of violence from the police.

Research on the situational effects on police officer behavior began with Reiss (1968), who utilized a theoretical framework based on the social nature of encounters and tools of systematic social observation. Reiss (1968) found 48 percent of excessive force cases occurred when suspects challenged officer authority or physically resisted arrest. Shortly thereafter, Chevigny (1969) examined use of force complaints to the New York City Civil Liberties Union and found disrespect was the primary cause. Westley (1970) examined officers' views towards force and reported 37 percent thought excessive force was justified by citizen's disrespect towards officers. Alpert and Dunham (1999) found that 97 percent of use of force events in Miami involved resisting suspects and one-quarter of suspects assaulted arresting police officers. Overall, this body of literature has demonstrated that negative police officer outcomes are more likely to occur when suspects were resisting.

Conclusion

Police were borne from a societal need for a public institution that could settle disputes involving citizens and were granted authority use coercive force and exceptional tools to accomplish this goal. Some amounts of force were expected and thus legitimized. Balancing public governmental roles in promoting societal safety and success with the rights of private citizens has been a foundational concern since the institutions of democratic government and public police were established in this nation. Interest in police officer behaviors has centered on their use of coercive force against citizens, a

tenuous balance considering the reduction of force between strangers forms their societal foundation. Geographic and temporal differences in public expectations, along with events that have highlighted officer misconduct, have altered the breadth and types of concerning police behaviors worldwide.

Officer misconduct, broadly speaking, remains important to monitor because it has direct consequences on citizen support of the police institution, agency finances and even crime. The costs of police misconduct to individual agencies and officers are also too high to overlook. Finally, researchers have shown officer actions that are viewed unfavorably by the public and damage citizen perceptions of their legitimacy also undermine police effectiveness. Because the police exist precisely to reduce harmful events in society, including vehicle collisions, officers who contribute to negative outcomes thereby threaten the foundational role of the institution.

Empirical research findings have been mixed with respect to the relevance of officer-level variables on negative police outcomes. An NIJ examination of prior research concluded with modest confidence that, "use of force appears to be unrelated to an officer's personal characteristics, such as age, gender, and ethnicity" (Adams, 1999, p. 6). Similar conclusions regarding officer use of force were reached by Alpert and Dunham (1999), who concluded as follows: "officer characteristics did not make much of a difference in whether force was used or in the level of force used" (p. 51). In earlier research, the United States Commission on Civil Rights (1981) also found problematic officers were of all genders, races, and ethnicities. Regardless of statistical significance, however, the reasons for these relationships appear as though they would apply to most if not all forms of negative outcomes.

Furthermore, studies that have considered the effects of age, experience, gender, race and ethnicity and other officer characteristics have usually failed to account to the differential assignment of officers in the United States based on these characteristics. For instance, young and unexperienced officers are disproportionately assigned high-crime areas due to the provision of preferential assignments based on seniority in many agencies. Agencies may also be more likely to give young and male officers more challenging assignments because they are believed to be more physically capable. Minority officers may be more likely to work in high crime areas if agencies attempt to match the ethnicities of officers with the neighborhoods they are assigned to patrol. These more challenging assignments with higher call volumes may also lead to more collisions.

In addition to inconsistent research findings, the rotten apple approach to examining undesired officer behaviors has been criticized because municipalities may only be liable if an officer's actions are related to a "custom or policy" of their agency (Armacost, 2003, p. 471). Thus, administrators responsible for entire organizations can merely remove those problematic individuals and prevent blame on their employers. Not surprisingly, the rotten apple approach has been criticized for preventing organizational reform (Knapp Commission, 1972). Finally, research at the individual-level has ignored the importance of organizational and situational variables, which some believe are more amenable to change (Armacost, 2003).

Research on negative officer outcomes has also been conducted at the organizational and situational levels. Once again, similarities among explanations of officer use of force, deadly force, excessive force, complaints for a variety of reasons, and pursuits suggest some relationships among these undesired officer events. For

instance, agencies that reward risk-taking by officers may report more negative outcomes than more safety-oriented organizations. Secrecy related to numerous negative outcomes may also be a cultural value in some agencies. Other agency concerns such as poor finances or treatment of employees could also have wide-ranging effects on officers. Lastly, situational-level research has demonstrated that negative outcomes are more likely when suspects resist arrest and in areas with higher crime rates and social disorganization.

CHAPTER 4

METHODOLOGY

This study is based on a survey of patrol officers and their supervisors (sergeants and lieutenants only), which addressed the following three interrelated research questions: (1) What are the effects of officer involvement in deadly force events, vehicle pursuits, complaints for excessive force, and complaints for other reasons on their involvement in vehicle collisions? (2) Are the effects of negative outcome involvement on vehicle collision involvement different among the subset of at-fault collisions specifically? (3) Are these effects different for officers in one collision as compared with their peers in multiple collisions during the previous four years? These questions were answered with a survey of officers in the Prince George's County Police Department[11].

Chapter Four begins with a description of the research site and particular attention is paid to PGPD officer involvement in vehicle collisions and other negative outcomes. Next, the data collection procedures are detailed. Finally, the missing data strategy, measurement of variables, and analytical method are explained and justified.

The Prince George's County Police Department

Site Description

Prince George's county is located in an urban area of Maryland that borders Washington, D.C. and is 37 miles south of the city of Baltimore (Prince George's

County, 2013a). According to the United States Census Bureau (2015), Prince George's county is part of the Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area. In 2010, the county was 482.69 square miles in size and had a population of 863,420 persons, for a population density of 1,788.8 persons per square mile (United States Census Bureau, 2015). In comparison, the population density for the state of Maryland was 594.8 (United States Census Bureau, 2015). When the last U.S. Census was conducted in 2010, Prince George's county was the second most populous county in the state of Maryland (United States Census Bureau, 2015). The estimated population of Prince George's county in 2014, the year this study was conducted, was 904,430 (United States Census Bureau, 2015). In 2013, an estimated 22.7 percent of residents were 18 years of age or less and 51.9 percent of the population was female. In terms of racial composition, 26.6 percent of residents were white only and 65.1 percent were black or African American only. Hispanics comprised 16.2 percent of Prince George county residents in 2013. During the period of 2009 to 2013, the median household income was $73,623 and 9.4 percent of county residents were living below the poverty level (United States Census Bureau, 2015).

The Prince George's County Police Department is a large agency with an authorized strength of 1,420 sworn officers and 263 civilians (Prince George's County, 2013b). According to the Bureau of Justice Statistics' 2008 Census of State and Local Law Enforcement Agencies, the PGPD was the 47th largest law enforcement agency in the country overall and the 28th largest local police department in the U.S., based on an estimated 1,578 actual full-time sworn officers (Reaves, 2011). Of these officers in the PGPD, approximately 1,093 were assigned to duties including answering calls for service

from the public (Reaves, 2011). PGPD patrol officers are divided into six Districts, which

have headquarters spread across the nearly 500 square mile county (see Appendix A for a

map of the PGPD Districts). The Districts are divided into Sectors and the Sectors are

divided into Beats. The agency began in 1927 and was reorganized in 1931 (Prince

George's County, 2013b). Rapid growth has characterized the county population and

police department during its existence and they now serve over 800,000 residents (Prince

George's County, 2013b). In 2001, the PGPD handled over 500,000 calls for service

(Prince George's County, 2013b).

Crime statistics for Prince George's county and the Prince George's County

Police Department are available from the Federal Bureau of Investigation's (n.d.)

Uniform Crime Reporting program and from the Maryland State Police (n.d.). The FBI

data is reported at the agency-level while the data provided by the Maryland State Police

is at the county-level. FBI UCR information for the PGPD is limited to raw numbers of

offenses reported. Crime rates per 100,000 people are not available for the county.

According to the FBI, crime rates are not provided for agencies that reported less than a

complete years' worth of data. FBI data show there were 3,955 total violent crimes

reported to the PGPD during 2012, the most recent year for which data is available. The

most frequent violent crime in the county was robbery (N=1,996), followed by

aggravated assault (N=1,765), forcible rape (N=145), and murder and nonnegligent

manslaughter (N=49). There were 24,192 total property crimes reported to the PGPD

during 2012, which included 15,115 larceny-thefts, 4,758 burglaries, and 4,319 motor

vehicle thefts. Crime data for the entire county is compiled by the Maryland State Police

and available in raw numbers and rates per 100,000 residents. Unfortunately, the county-

level data cannot be disaggregated by law enforcement agency. County-level data indicate a larger number of crimes than those limited to the PGPD. For instance, Prince George's county witnessed a total of 63 murders, 173 rapes, 2,260 aggravated assaults, and 2,450 robberies in 2012—a total of 4,946 violent crimes. The state data show that this translates into a violent crime rate of 562 crimes per 100,000 people, based on a 2012 population of 879,645. They also demonstrate that 2012 was the fourth straight year of declining violent crime rates with a 5.2 percent drop from 2011 rates. The property crime rate in Prince George's county has also been falling since 2008 and was 3,539 per 100,000 residents in 2012.

PGPD Officer Involvement in Vehicle Collisions

Information on PGPD officer involvement in vehicle collisions is available from the agency, organizations that promote the interests of the law enforcement community including the ODMP and LEOMF, and local media accounts. In terms of official agency data on collisions, the PGPD provided data on all officer-involved collisions reported to the agency from January 1, 2009 to December 31, 2012. This database had been maintained by Sergeant Major Walters in fleet management for many years and more recently by Sgt. Ashton. Information on all collisions reported to the agency involving officers, not only those that resulted in injuries or deaths, and detailed repair cost estimates were among the strengths of these data. In addition, the PGPD provided a database with worker's compensation claims that resulted from on-duty vehicle collisions during the same four year period. These data provided context to the issue of officer-involved collisions in the PGPD. These data also demonstrate that the PGPD is a suitable

site to study vehicle collisions because the agency provides a sufficiently large sample of crashes.

During the four year study period of 2009 through 2012, a total of 1,147 collisions involving PGPD officers were officially recorded by the agency. The damages to the PGPD vehicle fleet totaled $2,504,082.00 over this 4 year period—an average of $626,020.50 per year. Sixty two collisions resulted in no damages to the involved vehicles. Another 139 vehicles sustained damage estimated at $100.00 or less. The highest estimated damage to a single vehicle was $ 26,950.00. Damages equal to or in excess of $10,000.00 were sustained by 39 PGPD vehicles. Motor vehicles classified as totaled numbered 148, which did not include the vehicles removed from the fleet but kept by the agency for salvage parts.

The PGPD fleet management database also included brief details regarding officer and citizen injuries associated with collisions involving their officers from 2009 to 2012. Out of the 1,147 collisions, 170 collisions resulted in injuries to 190 PGPD officers. Fewer collisions (N = 109) led to citizen injuries. Still, 147 citizens were reported to have been injured in collisions involving PGPD officers. The specific details of the citizen injuries are unknown.

Details of the officer injuries may be gleaned from the worker's compensation claim database. A total of 311 worker's comp claims were made as the result of injuries sustained during on-duty vehicle collisions. There were recoveries for 6.4 percent (N = 20) of these claims. The workers' comp recoveries from 2009 to 2012 for motor vehicle collisions totaled $205,707.59—an average of $51,426.90 per year. The average amount recovered in these 20 cases was $10,285.38. The maximum amount an officer received

for worker's comp was $32,000.00 for a tibia and fibula broken in a collision. The minimum recovery was $1,094.29 for unspecified back pain.

Historically, the PGPD has witnessed six officer deaths that were classified as "vehicular accidents" and the deaths of two additional officers attributed to "vehicle pursuit" out of 28 total line of duty deaths (ODMP, 2015). These do not include the two PGPD officers killed by "vehicular assault" in 1982 and 2008. The first PGPD officer death due to a vehicle collision was Private Edward Dennis Merson, who was killed in a crash while on patrol September 1, 1937. More than 55 years would elapse before the next officer, Lieutenant Roger Peck Fleming, would die while driving a PGPD vehicle. The death of Lt. Fleming took place on October 27, 1992 during a pursuit on the Baltimore-Washington Parkway. On February 28, 1994, Sergeant John Louis Bagileo was killed when his vehicle collided with a utility pole while responding to a call for officer backup. Officer Kilonzo Musili Masembwa was also killed after his patrol vehicle collided with a utility pole on November 10, 2000 while responding to back up fellow officers. Sergeant Anthony Michael Walker, who was serving as president of the Prince George's County Fraternal Order of Police at the time, was in a single vehicle crash and died 10 days later on November 15, 2003.

The five year period from March, 2010 to March, 2015 has been the most tragic in the agency's history, in terms of vehicle deaths, with the loss of four officers. Corporal Thomas P. Jensen died on March 9, 2010 from injuries he sustained 10 days earlier after crashing into a utility pole responding to a burglary call. On August 20, 2012, Officer Adrian Morris was killed and his partner, Officer Michael Risher, was injured when their vehicle left the roadway and crashed during a pursuit on Interstate 95. Officer First Class

Kevin D. Bowden was killed two months later in October, 2012 while off duty. Recently, Officer Brennan Rabain was killed while driving his patrol vehicle off-duty, which is allowed by the agency, with his girlfriend in the car. The passenger reportedly thought Officer Rabain was going to pull over a speeding vehicle when he lost control and crashed into a fence. These fatal PGPD officer-involved collisions and the co-occurrence of vehicle pursuits and fatal collisions in the PGPD demonstrate that this is an appropriate site to study vehicle collisions and vehicle pursuits.

The deaths of Officers Jensen, Morris, and Bowden led to a heightened awareness of the safety hazard posed by vehicle collisions in the PGPD and, more importantly, action on the part of a few key executives in the agency. The awareness began in late 2012 with then-Assistant Chief Kevin Davis who later left the PGPD to lead the neighboring Anne Arundel County Police Department (Stawinski, 2014). At the time, Chief Mark A. Magaw was determined to prevent future tragedies in the agency and Assistant Chief Davis realized that over one-quarter of PGPD officer deaths were due to vehicle collisions (Stawinski, 2014). Despite similarities among the deaths of Officers Bagileo and Jensen and those of Officers Fleming and Morris, the PGPD discovered that collisions "reached beyond assignment or speed or experience and into every corner of the department—a cultural dynamic" (Stawinski, 2014). Several noteworthy changes have been implemented in the PGPD since that time.

Beginning in early 2013, Assistant Chief Kevin Davis and Deputy Chief of the Bureau of Patrol, H. P. "Hank" Stawinski, began giving a weekly presentation during in-service training. This presentation every Tuesday afternoon has focused on the driving-related deaths of their colleagues in the agency and is termed "Arrive Alive." The

purpose of these discussions was to shift the agency culture regarding safe vehicle operations. The weekly training sessions began with the agency leaders noting that an internal audit of PGPD officers found approximately 45 percent used safety belts while the rate among the general public in Maryland was estimated at 90 percent. Next, Davis and Stawinski addressed several key aspects of the agency driving culture. According to Stawinski, "The first cultural dynamic identified was the tendency to marginalize the dangers of driving because it was done at all times of day, in all conditions, and in every manner from patrol to pursuit." This oversight among officers had led to the belief among some that seatbelts posed a tactical disadvantage and thereby actually decreased officer safety. The leaders noted that PGPD data on the other hand showed that the odds of a vehicle collision were higher than those for an armed confrontation. The second "cultural dynamic" addressed by Deputy Chief Stawinski and then-Assistant Chief Davis was driving too fast and a general tendency towards "over response," which the agency defined as "driving too quickly to less urgent calls for service." These observations were based on PGPD reviews of in-car camera footage, red light and speed camera violations, and collision reports. Additionally, several PGPD officers killed in collisions were travelling near or in excess of 100 miles per hour. The Arrive Alive presentation was actually updated in April, 2014 with video from PGPD dash cameras to demonstrate the issue with an actual collision. The third and final topic addressed in the Arrive Alive training session has been the fact that "today's patrol officer must contend with many more distractions inside their cruiser than at any time in the past." In addition, the public can drive in an unexpected manner when confronted by emergency vehicles. PGPD officers are encouraged to pay close attention to such concerns while driving in order to

reduce distractions and reaction times. The PGPD's message to officers regarding these three aspects of safe agency driving culture is the following: "Slow down, Buckle up, Pay attention, Arrive alive." The agency also began showing eight video testimonials from mothers, fathers, spouses, and friends of PGPD officers killed in vehicle collisions. In fact, the Arrive Alive presentation now features stories of PGPD officers exclusively in an attempt to personalize the message for the agency. Another strong message is sent by the fact that in-service training sessions are held in the PGPD Training Academy classroom where Officers Jensen, Morris, and Bowden also sat.

The PGPD has also used other methods of increasing awareness of safe vehicle operations throughout the agency. Arrive Alive stickers were placed on the dashboards of PGPD vehicles. Weekly safe driving messages have been created and broadcast over the law enforcement radio channels every six hours. A visual reminder for officers to buckle up was updated at the exit of the employee parking lot at PGPD headquarters located at 7600 Barlowe Road in Landover. The new sign provided a stark visual contrast with the previous. Another strong visual message is the severely damaged patrol car now stationed outside the District Five Station in Clinton.

Assistant Chief Kevin Davis and the chair of this dissertation, Dr. Geoff Alpert had met years earlier and realized their shared interests in reducing officer-involved vehicle collisions. At the invitation of Dr. Alpert, Assistant Chief Davis travelled to attend a meeting of the CalPOST SAFE Driving Campaign in May, 2013 to share his agency's efforts at reducing collisions. A few months later, the PGPD formed a research partnership with USC to conduct this study. Shortly thereafter, Mr. Davis left the PGPD to become Chief of the neighboring Anne Arundel County Police Department. This study

continued under the leadership of Deputy Chief Stawinski, Major Peter Eliadis, and Mr. Carlos Acosta of the PGPD.

PGPD Officer Involvement in Other Negative Outcomes

Law enforcement officer involvement in risky, potentially harmful, and socially undesirable behaviors has been a longstanding interest among policing researchers. As discussed in the review of the extant literature, the negative officer outcomes of interest have shifted over the course of American history from acts of corruption and brutality to more common and less extreme actions. Two internal accountability measures that have been used in U.S. police organizations including the PGPD to control the behaviors of their employees are internal affairs units and early intervention systems. The PGPD Internal Affairs Division operates an early intervention system (IAPro). At a meeting at PGPD headquarters early in the planning stages of this study, a member of internal affairs reported that the PGPD monitors officer involvement in deadly force events and vehicle pursuits, as well as officer receipt of citizen complaints. This study operationalized negative outcomes as those currently monitored by the PGPD in order to allow the agency to decide precisely which officer behaviors they were most concern with. In addition to deadly force and vehicle pursuit involvement, this study includes receiving citizen complaints for excessive force and for all other reasons among negative outcomes.

Empirical research on problematic police behaviors in the United States has typically been conducted in large agencies for several reasons. One of the foremost reasons is that a sufficiently large sample is needed and deadly and excessive force, vehicle pursuits, and citizen complaints are rare events. As one of the largest law enforcement agencies in the country, the Prince George's County Police Department has

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employed officers who have been involved in a number of negative outcomes over the years and serves as an appropriate site for this research. For instance, the previous section provided two examples of when vehicle pursuits led to deadly collisions for PGPD officers. Data on deadly force, vehicle pursuits that did not end with fatalities, and citizen complaints were not available from the PGPD. Thus, information presented herein was gleaned from reports by the U.S. Department of Justice. A few media accounts are also cited. In the following section, examples are provided of PGPD officer involvement in deadly force, excessive force, and other concerning events.

Federal oversight of the PGPD began in July, 1999, when the Department of Justice began an investigation into misconduct in the canine section (United States Department of Justice, 2004a). The government alleged that the PGPD violated 42 U.S.C. Section 14141 by engaging in a pattern or practice of excessive force in the canine section and also referenced the county's failure to adopt and implement proper management practices and procedures (United States Department of Justice, 2004a). As a result, the PGPD was under a consent decree from 2004 to 2007. Among the requirements in the consent decree were limiting the deployment of canines in situations that presented a significant risk of bites to suspects wanted for felonies or reasonably believed to be armed. They also required supervisor approval before the deployment of canines and limited the circumstances when a canine may be allowed to bite or apprehend a suspect. Reports became required for all apprehensions and bites even if arrest or injury did not result.

On the same day in 2004 that the PGPD entered into a consent decree regarding the canine section, the agency and county also entered into a memorandum of agreement

with the Department of Justice that lasted until 2009 (Davis, 2009). The monitoring resulted from an investigation that began October, 2000 into widespread use of excessive force in the agency (United States Department of Justice, 2004b). The agency made a series of reforms under the watch of an external monitor that included the installation of video recorders in over 600 vehicles, a computerized tracking system, and internal review of officer-involved shootings (Davis, 2009). The PGPD was required to review and revise its use of force policies and procedures. For instance, every use of force incident required notification of supervisors who needed to respond to the incident, interview and examine suspects, and document the events (United States Department of Justice, 2004b). The PGPD was also required to "enhance and expand" its early warning system to include the following: all uses of force; the number of OC spray and foam canisters, and ammunition for pepperball launchers used by officers; all injuries to prisoners; all instances in which force is used and a subject is charged with "resisting arrest," "assault on a police officer," "disorderly conduct," or "obstruction of justice;" all critical firearm discharges, both on-duty and off-duty; all complaints (and their dispositions); all criminal proceedings initiated, as well as all civil or administrative claims alleging misconduct, and all civil lawsuits served upon, the county, or its officers, or agents, resulting from PGPD operations or the actions of PGPD personnel; all vehicle pursuits; and all disciplinary action taken against officers (United States Department of Justice, 2004b).

The memorandum of agreement between the PGPD and the U.S. Department of Justice ended in 2009. At the time the agreement ended, it was reported that the FBI was investigating the PGPD for shooting dogs owned by a nearby mayor who was cleared of all charges and that the Maryland State's Attorney was investigating at least two fatal

shootings by PGPD officers (Davis, 2009). In 2011, a PGPD officer pled guilty in federal court to cocaine trafficking, extortion, and firearms offenses and in 2014 was sentenced to 10 years in prison (Associated Press, 2014). In March, 2015, a pursuit involving PGPD officers ended when the suspect crashed and killed an innocent victim in another vehicle after injuring an officer during a traffic stop.

In summary, the Prince George's County Police Department appears to be an appropriate site for studying the relationship between officer involvement in vehicle collisions and other negative outcomes including deadly and excessive force, vehicle pursuits, and citizen complaints for several reasons. As one of the largest law enforcement agencies in the nation, the PGPD provides a relatively large sample of patrol officers—the focus of this study. The large sample increases the likelihood that rare events will have occurred over time. Indeed, information from the agency, U.S. DOJ, and local media demonstrate the PGPD officers have been involved in collisions, deadly force situations, vehicle pursuits, and other high-risk and potentially harmful on-duty behaviors. Relevant to data collection procedures, the consent decree with the U.S. DOJ required the PGPD to maintain records of and include in their early intervention system all instances of deadly force, vehicle pursuits, and citizen complaints.

Data Collection

This study examines the relationships between police officer-involved vehicle collisions and other negative outcomes as defined by the PGPD. Negative outcomes are defined as deadly force events, vehicle pursuits, and receiving citizen complaints for excessive force and other reasons. The research questions are explored with surveys of PGPD patrol officers and their supervisors. Original data collection was necessary in this

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case because of the novelty of the research questions and overall lack of prior empirical

investigation into collisions in particular. In order to collect information on such

potentially sensitive events, a research partnership was formed between USC and the

PGPD[12].

Officer Surveys

Officer-involved motor vehicle collisions have been studied using officer

interviews and focus groups (e.g., Wehr et al., 2012), analyses of official records (e.g.,

Gustafson, 2009, 2012, 2015; Noh, 2011; Rix et al., 1997; Wolfe et al., 2015), and officer

surveys (e.g., Hansen et al., 2015). An officer survey was selected for the current study

because this design offered several advantages over other methodological approaches[13].

First, the officer survey enabled the collection of attitudinal information that could not be

observed and/or background information that would not be included in official agency

records. Self-reported data collected from citizens instead of officers would suffer from

the same limitations. Second, the survey elicited information from 329 officers in the

PGPD regarding their experiences over a 4 year timeframe—a sample that would have

been cost-prohibitive for observational, interview, or other qualitative approaches. Third,

the anonymous survey was designed to reduce issues regarding the social undesirability

of negative outcomes, some of which may not have been reported to supervisors or peers.

Although these concerns were not removed entirely, they were diminished in scale

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[12] A Research Mentorship Grant was awarded by the Department of Criminology and
Criminal Justice at USC to cover printing and shipping costs as well as travel expenses
for survey distribution and collection.

[13] The original design and non-disclosure agreement called for a mixed methods approach
consisting of officer surveys and records of deadly force, pursuits, and collisions that are
kept by the PGPD internal affairs unit.

relative to research based on official agency reports, focus groups, or individual officer interviews.

Another advantage of the survey-based research design was the collection of information regarding all on-duty collisions, not only those that were reported to supervisors or some other member of the PGPD. The research design thereby improved upon prior studies of officer-involved vehicle collisions that have been limited to official government records of fatal collisions (e.g., Gustafson, 2012, 2015; Noh, 2011), serious collisions causing injury or death that were recorded by employing agencies (e.g., Gustafson, 2009; Rix et al., 1997), or collisions that met requirements for reporting to the state department of motor vehicles (e.g., Wolfe et al., 2015). An officer survey was also an advantageous means of measuring involvement in deadly force events and vehicle pursuits, both of which may go unreported for a variety of reasons. Although these benefits could be achieved in theory with observational methods, the associated costs would be prohibitive. Another way of collecting information directly from officers about negative outcomes while reducing concerns regarding social desirability bias is asking them to respond to hypothetical scenarios. For this reason and others, many researchers have collected self-reported misconduct data with officer surveys as well. For instance, Greene and Piquero (2000) administered surveys in the Philadelphia Police Department to a random sample of 504 officers from the population of 3,810 at the rank of patrol officer, sergeant, or lieutenant that elicited expected responses to hypothetical misconduct situations. Misconduct was operationalized in these vignettes as relatively favorable responses to hypothetical scenarios involving theft, excessive force, and accepting gifts

and meals. However, it is unknown how closely officer' responses to hypothetical scenarios are related to their actual behaviors on the street.

Another benefit of measuring negative officer outcomes with an officer survey instead of official records is that temporal variations have been found in the reporting of these behaviors by citizens and the official recording by agencies. First of all, differences have existed in citizen expectations of police over the course of American history. Second, procedures required for filing complaints have been eased for citizens. As a result of these changes and others, concerning officer behaviors are now more likely to be reported to employing agencies when observed by the public. Furthermore, calls for increased accountability have improved investigations of citizen complaints and other allegations of negative officer outcomes. In the PGPD and several other organizations nationwide, increased attention has been paid to on-duty collisions. In sum, differences may exist in official agency records of deadly force, pursuits, complaints, and collisions that are not driven by officer behaviors. Accurately measuring objective differences in negative PGPD officer outcomes was prioritized over the measurement of subjective differences in the recording these behaviors by the PGPD, which is also an important issue but beyond the scope of this research.

The PGPD Officer Driving Experience Survey

Data for this study were collected with a survey of patrol officers and their supervisors (sergeants and lieutenants only) in the Prince George's County Police Department. The study was limited to patrol, as opposed to including PGPD detectives, administrators, and those working non-patrol duties because the patrol division spends the most time behind the wheel on a per officer basis. Those PGPD officers killed in

vehicle collisions have exclusively been assigned to patrol as well. The survey instrument

was pretested on November 6, 2014 by four members of the University of South Carolina

Police Department who included one lieutenant, one sergeant, one corporal, and one

officer. Included with the survey were a one page cover letter (see Appendix B) that

explained the project and provided contact information for the author and Institutional

Review Board at USC. The survey and cover letter were approved by the PGPD,

Fraternal Order of Police, and dissertation committee. The survey packet also included a

letter of support from Fraternal Order of Police Lodge 89 President Dean M. Jones,

which emphasized the voluntary nature of the project but also asked officers for their

participation (see Appendix C). The survey instrument, cover letter, and support letter

were compiled in postage-paid envelopes that could be sealed after completion and

returned in person or via mail to USC.

Data were collected in the PGPD from patrol officers and their immediate

supervisors (sergeants and lieutenants only), who were asked to participate in a survey

concerning attitudes and experiences regarding driving, collisions, and policing broadly

speaking. The surveys were administered at roll call meetings in district stations from

November 13 to 16, 2014. The author attended roll calls in an attempt to solicit

participation in the study from as many officers as possible across various shifts. A total

of 19 roll calls were visited by the author over the course of 5 days. This included the day

shift roll call meetings at 6:30 am, the evening shift roll calls at 3:30 pm, and the

midnight shift roll call meetings at 11:30 pm, in addition to several swing shifts. Surveys

in Districts One through Five were distributed in-person while those in District Six were

dropped off with supervisors to hand out to their officers.

The author was given time at the beginning or end of each roll call meeting to introduce himself, describe the purpose of the study, and emphasize the anonymous nature of the survey (i.e., no identifying information would be collected and all raw data would be stored in the author's locked office). Officers who volunteered to participate were then provided a questionnaire to be completed and returned in a sealed envelope (officers could either hand the envelope directly to the author or mail it with the paid-postage at a later time). In addition, an online survey option was created and the link was included on the cover letters and emailed to patrol officers and supervisors in a final attempt to contact those officers who were not present at the roll calls. This in-person data collection procedure was modeled after research conducted by Hansen et al. (2015) on officer-involved collisions in eight California law enforcement agencies.

A total of 329 surveys were returned that included 273 in-person, 54 by mail, and another 2 completed online. Captain Yuen in the Bureau of Patrol estimated that the 6 PGPD district stations had 981 sworn officers at the time of this research, which equates to a 33.5 percent response rate. Alternatively, the BJS (2008) *Census of State and Local Law Enforcement Agencies* indicates that in 2008 there were 1,093 PGPD officers assigned to duties including civilian calls for service (Reaves, 2011). Based on this official government estimate of PGPD patrol strength in 2008, the 329 surveys represent a 30.1 percent response rate. In similar research conducted in eight California law enforcement agencies, Hansen et al. (2015) reported that at least one-third of patrol officers are absent from any given roll call meeting due to court appearances, sick leave, vacation leave, and other reasons. Response rates using this adjustment to the available PGPD patrol officer population are 50.3 percent based on the PGPD staffing estimate and

45.1 percent based on 2008 BJS figures (Reaves, 2011). Out of the 329 returned surveys, 228 were returned with no missing data on any of the measures used in this study. Another 101 surveys were missing information on 1 or more variables. Because only 69.3 percent of the surveys were complete, a strategy for addressing missing data was necessary. A copy of the survey instrument is available in Appendix D.

Missing Data Strategy

Missing data is a common problem in real (not simulated) datasets (Royston & White, 2011). Nearly one in three surveys in this study (30.7 percent) had with missing information on one or more variables of interest. Analyses of a dataset with missing cases can result in biased and/or inefficient parameter estimates and biased standard errors (White, Royston, & Wood, 2009). All methods of dealing with missing data make assumptions about the nature of the missing data. Little and Rubin (2002) described three types of missing data, each of which should be dealt with differently. Data missing completely at random (MCAR) means that the probability of data being missing does not depend on observed or unobserved values (Little & Rubin, 2002). When all missing data in a dataset are MCAR, the missing data are ignorable and a complete case analysis may be conducted using listwise deletion. Listwise deletion is appropriate with data MCAR because the cases with no missing data may be assumed to be a random sample of all cases including those with data missing on one or more variables. A loss of power is the only drawback of handling data MCAR with listwise deletion. For instance, listwise deletion reduced the sample size in this study (N=329) to between 225 and 229 depending on whether the model, a decrease of approximately one-quarter to one-third (see Appendix E). However, complete case analyses make more assumptions about the

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missing data than current approaches including multiple imputation. Data missing at random (MAR) means that the probability of data being missing does not depend on the unobserved data, conditional on the observed data (Little & Rubin, 2002). A variety of imputation procedures have been developed for handling data MAR. Finally, data missing not at random (MNAR) means that the probability of data being missing does depend on the unobserved data, conditional on the observed data. MAR and MNAR cannot be distinguished with observed data alone (White et al., 2010). Multiple imputation, which was used in this study, assumes data is MAR although it may be used with MNAR data in certain circumstances (White et al., 2010).

Multiple Imputation Model

Multiple imputation is a simulation-based statistical method of handling missing data (StataCorp, 2013). Multiple imputation was designed in 1970 to deal with missing data in survey research (Rubin, 1976). It has increased in popularity greatly since that time (StataCorp, 2013; White et al., 2010). Multiple imputation uses the distribution of observed data to estimate possible missing data values, which include random components to account for uncertainty of estimates (White et al., 2010). This process is repeated multiple times and results in datasets that are analyzed individually and identically to obtain parameter estimates (White et al., 2010). These parameter estimates are combined into an overall estimate and variance-covariance matrix using Rubin's rules based on asymptotic theory and Bayesian statistics to obtain estimated coefficients, standard errors, and confidence intervals (White et al., 2010). The combined variance-covariance matrix accounts for both within-imputation and between-imputation uncertainty (White et al., 2010). Multiple imputation produces unbiased estimates and

standard errors (White et al., 2010). Single imputation, which is an alternative to multiple imputation, does not capture between-imputation uncertainty and results in standard errors that are too small (White et al., 2010). Multiple imputation is available in many statistical software packages today (Horton & Kleinman, 2007). A multiple imputation program called ICE was written for Stata versions 9.2 and above (Royston, 2004, 2005). Stata version 11 included the first multiple imputation system (Royston & White, 2011). The current study used StataCorp's (2013) Stata version 13.1 for Windows.

Missing data that is monotone means that there is a pattern to the missing data structure. An example is when missing data on one item means that all of the following items on that survey also are missing. The missing data in the current study is not patterned. This distinction is important because monotone missing data can be imputed sequentially without iteration (White et al., 2010). Multiple imputation by chained equations (MICE) is an approach developed to handle missing values on several variables that are not monotone missing, whereby an imputation model is built for each variable with missing values. Unlike single imputation, MICE requires iteration that accounts for possible dependence among the estimated parameters (StataCorp, 2013). Because there is a model for each variable, MICE is able to simultaneously handle different types of independent and control variables. This was important because the current study includes continuous, ordinal, nominal, and binary covariates. MICE has also been termed fully conditional specification and sequential regression multivariate imputation. According to StataCorp (2013), "The general idea behind MICE is to impute multiple variables iteratively via a sequence of univariate imputation models, one for each imputation

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variable, with fully conditional specifications of prediction equations: all variables except the one being imputed are included" (p. 7).

One of the reasons that MICE is a popular method of handling missing data is the ability to impute different types of variables (StataCorp, 2013). There are several options available for imputing continuous variables including linear regression, truncated regression, interval regression, poisson regression, and negative binomial regression. Linear regression is the default when there are more than 5 values but the other methods were developed to address truncated, censored, and overdispersed variables. In addition to truncated regression, an alternative method developed for continuous data with a restricted range is predictive mean matching (PMM), which was used in this study. PMM only samples from values that are actually observed in the data and this usually results in imputed values that closely match observed values in the data (Royston and White, 2011; StataCorp, 2013). This is beneficial when the assumption of normality may be violated and when extrapolation beyond the observed values is unnecessary (StataCorp, 2013). PMM was used to impute the 4 independent variables and the 11 continuous control variables so that their minimum and maximum values did not exceed those actually reported by PGPD officers. The dichotomous, nominal, and ordinal variables were imputed using logistic, multinomial logistic, and ordinal logistic regression, respectively. Standard texts on multiple imputation suggested creating three to five imputed datasets, however, the trend has been towards larger numbers of imputations (Royston & White, 2011; White et al., 2010). Graham, Olchowski, and Gilreath (2007) suggested more than 20 imputations when the fraction of missing data was between 0.1 and 0.3. This study used 50 imputations.

Description of Measures and Sample

Dependent Variables

The outcome of interest is PGPD officer involvement in on-duty vehicle collisions. Collisions were limited to those involving on-duty officers because many of the predictors are based on officers being on duty. Officers were instructed to limit their responses to on-duty vehicle collisions that occurred during the previous four year period only (November, 2010 to November, 2014). Collision involvement is operationalized several different ways to determine whether the effects of involvement in vehicle pursuits, deadly force events, excessive force complaints, and complaints for other reasons on vehicle collisions varies among officers with multiple collisions and among the subset of at-fault collisions.

Considering the effects of negative outcomes on any vehicle collision involvement and on the frequency of on-duty collisions allows for the possibility that repeat offenders are quantitatively and qualitatively distinct from their peers with zero or only one collision. For instance, Hansen et al. (2015) found different variables predicted involvement in zero versus one versus two or more on-duty collisions among patrol officers in eight California agencies. Collision frequency was measured in the survey as a count but was recoded for this study to indicate involvement in zero, one, or multiple collisions.

There exists some debate in the literature regarding whether it is best to study all negative police outcomes or the subset of preventable negative outcomes only. This debate has been most evident concerning the measurement of all use of force incidents versus excessive force incidents only but an analogous issue arises in the current study

regarding the study of all vehicle collisions versus preventable collisions only. On the one

hand, police officers are largely defined by their authorized use of force in particular

conditions so some amount of force is unfortunately unavoidable. This suggests that it

may be more fruitful to focus on excessive force incidents only, which are far less

frequent in nature and are more likely to result in complaints of brutality. However,

definitions of excessive force are subjective. For example, Klockars (1996) suggested the

following test: "Excessive force should be defined as the use of more force than a highly

skilled police officer would find necessary to use in that particular situation" (p. 8).

However, it was unclear how these highly skilled police officers could be identified and

how many were likely to exist in an agency. Definitions of excessive force also vary

across time and place, for instance, between the police, courts, and public (Adams, 1999).

For these reasons, some have advocated for examining all use of force incidents to

remove the inherent subjectivity in defining excessive force specifically (Adams, 1999).

Adams (1999) supported his position with an analogy to hospitals tracking mortality

rates, which could be caused by misbehavior or many other factors, as a means of

identifying problematic outliers. The current study will examine all collisions as well as a

subset of at-fault collisions, recognizing the subjectivity in this determination made by

agency investigators. An earlier study of serious collisions in England and Wales found

that only 7 percent were preventable by the officers involved (Rix et al., 1997).

On-Duty Collision Involvement. *On-duty collision involvement* is a dichotomous

outcome variable defined as one or more on-duty crashes in the previous four years (1 =

yes; 0 = *no*). This variable enabled estimates of the effects of negative outcome

involvement on officers with zero collisions compared to their peers who had been in at least one collision during the study period.

On-Duty Collision Frequency. Officers were asked to report the number of total on-duty collisions they had been involved in during the past four years. *On-duty collision frequency* is a trichotomous recode of the count variable (i.e., zero collisions, one collision, two or more collisions). This recoding was necessary to account for the highly skewed distribution of the collision frequency variable. It enabled comparisons of the effects of negative outcome involvement on vehicle collisions for officers with only one collision and their peers in the PGPD with two or more collisions in the previous four years.

At-Fault Collision Involvement. Analyses were also conducted on a subset of collisions where the officer was judged by the PGPD to be at-fault for any reason. Analyses of the subset of at-fault collisions was necessary to see if a difference existed between the characteristics that make an officer more likely to be involved in any collisions as compared with preventable collisions attributed specifically to officers' actions. Previous researchers have followed a similar path when examining other negative outcomes, for instance, citizen complaints and a subset of founded complaints. Similar to on-duty collision involvement, *at-fault collision involvement* was first modeled as a dichotomous variable that indicated one or more at-fault collisions in the past four year period (1 = *yes;* 0 = *no*).

At-Fault Collision Frequency. *At-fault collision frequency* is a measure of the number of on-duty vehicle collisions in the prior four years that were ultimately found by the PGPD to be preventable. At-fault collision frequency was initially measured as a count

but was recoded trichotomously (i.e., zero collisions, one collision, two or more collisions) for this study.

Independent Variables

The primary area of inquiry for this study is the relationship between officer involvement in vehicle collisions and their involvement in other negative outcomes. Negative outcomes were operationalized as those currently monitored by the PGPD internal affairs unit's early intervention system (IAPro) that included involvement in vehicle pursuits and deadly force events in addition to receiving complaints for excessive force and for all other reasons. This design thereby allowed the PGPD to determine the events they deemed concerning and worth monitoring to identify problematic officer behaviors. Use of force events broadly speaking are too numerous for officers to be able to specify an accurate number over the four year study period and would thereby introduce unnecessary error into the study. For this reason, use of force events were limited to deadly force incidents and those that resulted in citizen complaints of excessive force.

Vehicle Pursuits. Respondents estimated the number of *vehicle pursuits* they were in during the previous four years. The number of self-reported pursuits involving PGPD officers ranged from 0 to 60 during the period of November, 2010 to November, 2014.

Deadly Force Events. Officers were asked to report the number of *deadly force events* they had been involved in during the previous four year period. Officers were instructed that deadly force events were defined as times when officers used force likely to cause death or serious injury, including, but not limited to, the use of a firearm. PGPD officers

reported involvement in 0 to 10 incidents involving deadly force over the 4 year study period.

Excessive Force Complaints. Excessive force may be defined in two ways: too much force in one incident, or appropriate amounts of force in too many incidents (Adams, 1995). Citizen complaints for excessive force in the current study are based on perceived use of too much force in a single incident. A survey question asked officers to report how many *excessive force complaints* they received in the past four years. The maximum was an officer who reported 7 to 8 excessive force complaints. These were averaged so the number of excessive force complaints ranged from 0 to 7.5.

Other Complaints. Finally, PGPD officers reported the number of complaints they had received for all other reasons during the previous four years. The *other complaints* variable ranged from 0 to 10. The purpose of this variable was to capture the variety of problematic behaviors that officers can commit, which was noted by Klockars (1996) when he stated, "police can engage in all sorts of objectionable behavior without transgressing criminal or civil definitions of excessive force" (pp. 6-7).

Control Variables

A variety of control variables were included in this study to isolate the effect of involvement in vehicle pursuits, deadly force incidents, excessive force complaints, and complaints for other reasons on officer-involved vehicle collisions in the PGPD. Control variables were necessary because they had non-zero correlations with the dependent variable(s) as well as one or more independent variables. Failure to control for variables correlated with the dependent and independent variables could have resulted in misspecified models and thus misleading and potentially incorrect conclusions. The

control variables were selected based on theory, prior research, and practical

considerations regarding the number of predictors that could be included. This became

particularly important when the final sample size was considerably smaller than expected.

Variables were included to control for officer demographics and background information

as well as officer attitudes toward a variety of job-related items including supervision in

the PGPD, productivity and workload, and limitations on their behaviors.

A number of attitudinal questions that have been used by prior researchers to

study officer-involved vehicle collisions, use of force, and other negative outcomes were

included on the survey instrument. Several scales informed by theory and prior research

were proposed based on these attitudinal measures. Scales were created because they are

an efficient data reduction device (Babbie, 2013), which was necessary to specify

regression models with 6 to 10 cases per independent variable as recommended by Neter,

Wasserman, and Kutner (1989). There are a maximum of 34 variables in the models with

329 cases, or 9.68 cases per variable, which was a conservative interpretation of Neter et

al.'s (1989) recommendations. Scale factor and reliability analyses were conducted on the

proposed scales before they were created and included in this study. These steps resulted

in dropping one or more items from several of the proposed scales. In other cases, the

proposed scales were not created because they did not meet the following requirements.

First, Principal axis factor (PAF) analyses determined whether or not the items that

comprised the proposed scales in-fact loaded onto a single factor in the data. Following

Tabachnick and Fidell (2007), only those items with minimum factor loadings of 0.32

were retained and combined into additive scales. Next, reliability analyses were

conducted on the scales and Cronbach's alpha values were examined. A total of 29

individual survey items that were measured on 5-point Likert scales were summed to create the following 8 scales.

Productivity Links. Several statements allowed officers to voice their sentiments regarding the relationship between officer productivity and involvement in five types of negative outcomes. Respondents indicated the strength of their agreement on a four-point Likert scale (1 = *strongly disagree* to 4 = *strongly agree*) to the following statements: (1) "An officer who makes many arrests will get in many vehicle collisions," (2) "An officer who handles many non-crime calls for service will get in many vehicle collisions," (3) "An officer who makes many arrests will get many citizen complaints," (4) "An officer who makes many arrests will get in many deadly force events," and (5) "An officer who makes many arrests will get in many vehicle pursuits." Principal axis factor analysis showed that the first of the five items had a factor loading of only 0.27 so it was discarded. The remaining four items (factor loadings > 0.53) were summed to create the *productivity links* scale, which demonstrated acceptable internal consistency ($\alpha = 0.74$).

District Productivity. Officers were provided a series of four questions that asked them to rate the productivity of their district relative to neighboring districts (1 = *much lower* to 5 = *much higher*). The following questions were included to comprise the *district productivity* scale: (1) "How would you rate the number of violent crime arrests made by your district relative to neighboring districts?" (2) "How would you rate the number of non-violent crime arrests made by your district relative to neighboring districts?" (3) "How would you rate the number of calls for service handled by your district relative to neighboring districts?" (4) "How would you rate your district's overall level of productivity relative to neighboring districts?" Principal axis factor analysis showed that

the four items loaded onto a single factor (factor loadings > 0.72). Scale reliability analysis demonstrated strong internal consistency ($\alpha = 0.91$).

Officer Productivity. Officers were also asked to rate their own productivity levels relative to peers in the PGPD with a similar set of four questions as follows: (1) "How would you rate the number of violent crime arrests you make relative to other PGPD officers?" (2) "How would you rate the number of non-violent crime arrests you make relative to other PGPD officers? (3) "How would you rate the number of calls for service you handle relative to other PGPD officers?" (4) "How would you rate your overall level of productivity relative to other PGPD officers?" Responses were provided on a five point Likert-type scale (1 = *much lower* to 5 = *much higher*). As expected, these four items loaded onto a single factor (factor loadings > 0.78) and were therefore summed together to create the *officer productivity* scale ($\alpha = 0.91$).

Preferred Assignment. As another means of measuring officers' sentiments towards productivity and workload, three questions asked officers about the characteristics of their preferred assignment. The survey items read as follows: (1) "If given the choice, would you prefer to work in an area with a high level of violent crime?" (2) "If given the choice, would you prefer to work in an area with a high level of calls for service?" (3) "If given the choice, would you prefer to work on a particularly busy shift? (1 = *yes;* 0 = *no*). The three items loaded onto a single factor (factor loadings > 0.71) and showed strong internal consistency ($\alpha = 0.78$) so they were added together to create the *preferred assignment* scale.

Supervision Behaviors. Respondents reported also on supervision practices in the PGPD. More specifically, they were asked a series of questions to gauge the perceived likelihood that supervisors would enforce certain policies. Specifically, officers were

asked, "How likely are supervisors in your agency to enforce policies related to:" (1)

seatbelt use, (2) collision reporting, (3) speeding in violation of policy, (4) emergency

driving, (5) pursuit driving, (6) excessive force, and (7) misconduct? For each item,

officers were asked to respond on a five-point, Likert-type scale from (0 = *N/A (no such*

policy in department), 1 = *very unlikely*, 2 = *unlikely*, 3 = *likely*, 4 = *very likely*). Similar

measures of supervision were used by Hansen et al. (2015) in a survey of eight California

law enforcement agencies. Although Hansen et al. (2015) focused on supervision of

agency driving policies regarding seatbelt use, cell phone use, texting, speeds, emergency

responses, and vehicle pursuits, their study still evidenced that supervision of agency

policies could indeed impact collision involvement.

Principal axis factor analysis indicated that the seven supervision behavior items

loaded onto two factors. The first factor included supervision of seatbelt use, speeding,

and emergency driving (factor loadings > 0.57). These three items were combined to

create the *routine events supervision* scale (α = 0.75). The remaining items that measured

the likelihood of supervisors enforcing PGPD policies regarding collision reporting,

pursuit driving, excessive force, and misconduct loaded together (factor loadings > 0.64)

and were therefore summed into the *rare events supervision* scale (α = 0.90).

Driving Limitations. Several items were based on the Police Foundation (Weisburd et

al., 2001) use of force survey but were altered for this study to focus on officer views

toward limitations on driving instead of use of force. According to Weisburd et al., the

Police Foundation use of force survey instrument was based on their earlier work (i.e.,

Pate & Hamilton, 1992; Wycoff & Oettmeier, 1993), the Criminal Justice Commission

(1995) survey of the Queensland Police Service, and consulting with a number of

policing scholars. The following statements were included to measure PGPD officers views towards limitations on their driving: (1) "It is sometimes acceptable to drive outside of policy to catch someone who physically assaulted an officer," (2) "It is sometimes acceptable to drive outside of policy during routine patrol," (3) "Police department rules about driving should not be any stricter than required by law," (4) "Always following the driving policies is not compatible with getting the job done," (5) "Police officers are not permitted to drive as is often necessary in policing," and (6) "Officers in the PGPD violate driving polices more often than necessary." The final question was reverse-coded for consistency. Responses were measured on a four-point Likert scale (1 = *strongly disagree* to 4 = *strongly agree*). Principal axis factor analysis demonstrated that these six survey items loaded onto two factors. One factor included the first four items (factor loadings > 0.36), which were summed to create the *driving limitations* scale ($\alpha = 0.63$)[14]. The internal consistency of this scale is slightly lower than recommended by many, in terms of validating a scale, but it was included to account for some of variation in the dependent variables. Higher scores on the scale indicate less favorable views towards agency limitations on police officer driving behaviors.

Other Limitations. Other survey items remained as originally posited by the Police Foundation (Weisburd et al., 2001) and likewise focused on officer attitudes regarding use of force in a broader context beyond driving. Following Weisburd et al., three items were included to measure attitudes towards limitations on officers' behaviors in a broader context beyond driving: (1) "In order to do their jobs, patrol officers must sometimes overlook department policies," (2) "In order to do their jobs, patrol officers must

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[14] The final two items from the originally proposed six-item scale were not combined because of negative bivariate Pearson's correlation coefficients.

sometimes overlook laws and legal guidelines," and (3) "It is okay for police officers to use more aggressive tactics than they otherwise would use if the community has asked them to do so." Respondents indicated the strength of their agreement on a four-point Likert scale (1 = *strongly disagree* to 4 = *strongly agree*). These statements loaded together (factor loadings > 0.59) and were therefore combined as originally proposed to create the three-item *other limitations* scale ($\alpha = 0.69$). This scale demonstrated internal consistency just slightly lower than the oft-recommended 0.7. Higher scores on this scale indicate less favorable views towards limitations on officer behaviors other than those related to on-duty driving.

Officer Characteristics. Fourteen officer demographic and background variables were also included as controls in this study. Three of these control variables were nominal (race/ethnicity, educational attainment, and district assignment) and were therefore entered into the models as sets of dummy variables. Thus, there were actually 22 variables that assessed officer characteristics in the regression models that are explained in the following chapter. Officer *age* was measured continuously in years[15]. Male officers have frequently been found to be overrepresented in negative officer outcomes including collisions (Noh, 2011; Rix et al., 1997). Accordingly, this study includes controls for officer gender with the variable *male* (1 = *yes;* 0 = *no*). Officer race/ethnicity was measured with dummy variables for the following categories: *African American*,

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[15] The survey also included an item to assess respondents' *law enforcement experience*, which was measured continuously in years. However, when included together, *age*, *law enforcement experience*, and *officer rank* exhibited multicollinearity issues as evidenced by Variance Inflation Factor values above 2.5 and Pearson's bivariate correlation coefficients greater than 0.7. *Law enforcement experience* was removed because it had the largest VIF and because when *age* was removed the Pearson's correlation coefficient between *law enforcement experience* and *officer rank* remained above 0.7.

Caucasian, *Hispanic*, and *Other* (1 = *yes;* 0 = *no*)[16]. Education was measured in terms of

attainment, which is more common in the policing research than achievement or

undergraduate major. Officers were asked to select their highest level of education from

the following five options: *high school*, *less than two years of college*, *Associate's*

degree, *and Bachelor's degree or higher*[17] (1 = *yes;* 0 = *no*). Officers reported whether or

not they were in a *committed relationship* (i.e., married or in a long-term relationship) (1

= *yes*; 0 = *no*) and whether they have any *children* (1 = *yes*; 0 = *no*). These variables were

necessary because, as informal social controls, they have insulated officers from

involvement in collisions (Hansen et al., 2015) and other problematic officer behaviors

(see, e.g., White & Kane, 2013). To account for potential differences between officers

and supervisors (see, e.g., Hansen et al., 2015; Kane & White, 2009), a dummy *officer*

rank measure was included in the models (1 = *yes;* 0 = *no*)[18]. Officers also reported

which PGPD *district* (1-6) they were assigned to, which was measured with a set of

dummy variables because there was no natural ordering to the district assignments.

Officers were also asked to report if they had any *prior military experience* (1 =

yes; 0 = *no*). This study also controlled for previous employment as a sworn officer by

another law enforcement agency with the *prior policing experience* variable (1 = *yes;* 0 =

no). These two measures were included to control for potential differences in driving

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[16] Caucasian officers served as the reference group in all analyses.
[17] The survey instrument included categories for *Bachelor's degree* and *graduate degree* (Master's degree, Juris Doctor, Ph.D.). These two categories were combined into *Bachelor's degree or higher* because few PGPD officers reported having earned graduate degrees. *Bachelor's degree or higher* served as the reference group in all analyses.
[18] The survey instrument included categories for three ranks: officer, corporal, and supervisor (sergeant or lieutenant). Officer rank was dichotomized for this study because only two supervisors reported involvement in two or more collisions, which presented perfect prediction problems in the multinomial regression models.

training in particular between these officers and their peers in the PGPD. To account for general propensity towards traffic collisions, the *off-duty collisions* variable assessed the number of off-duty collisions each respondent was involved in during the four year study period. Officer fatigue due to long work-weeks, secondary employment, and lengthy daily commutes is positively related to collision involvement (e.g., Vila, 2000). To account for these differences, officers were asked to report their average, weekly number of *law enforcement hours* they spent working for the PGPD in addition to the average, weekly number of *other employment hours* outside the PGPD. Respondents also provided the average length in minutes of their round-trip *daily commute* to work at the PGPD. The final three measures were continuous variables.

Summary of Measures

This study examines the relationship between officer involvement in on-duty vehicle collisions and other negative outcomes. The outcome of interest—officer involved vehicle collisions—will be measured several different ways. The effects of negative outcome involvement are also considered on a subset of collisions deemed by the agency to be preventable. The four independent variables include officer involvement in deadly force situations, vehicle pursuits, citizen complaints for excessive force, and citizen complaints for all other reasons. In order to isolate the effects of these predictors on collisions, 26 control variables are included in this study. The controls include 8 scales that measure constructs such as promotional ambitions, attitudes regarding supervision, and views towards restrictions on driving. Control variables are also included for officer demographic and employment background variables. Descriptive statistics for the sample are provided in Table 4.1.

Table 4.1. Sample description.

	Mean	Std. Error	95% Confidence Interval		Min.-Max.
Dependent Variables:					
On-Duty Collision Involvement	0.451	0.028	0.396	0.505	0-1
On-Duty Collision Frequency	0.654	0.049	0.566	0.742	0-2
At-Fault Collision Involvement	0.296	0.025	0.246	0.345	0-1
At-Fault Collision Frequency	0.353	0.033	0.289	0.417	0-2
Independent Variables:					
Vehicle Pursuits	1.962	0.263	1.445	2.479	0-60
Deadly Force Events	0.121	0.389	0.045	0.198	0-10
Excessive Force Complaints	0.370	0.052	0.268	0.472	0-7.5
Other Complaints	0.836	0.095	0.650	1.023	0-10
Control Variables:					
Male	0.871	0.019	0.835	0.908	0-1
Age	32.068	0.426	31.231	32.906	22-57
Race-Ethnicity					
African American	0.392	0.027	0.339	0.445	0-1
Caucasian	0.426	0.028	0.372	0.480	0-1
Hispanic	0.084	0.015	0.053	0.114	0-1
Other	0.099	0.017	0.066	0.131	0-1
Educational Attainment					
High School	0.131	0.019	0.095	0.168	0-1
2 years or Less of College	0.360	0.027	0.307	0.412	0-1
Associate's Degree	0.122	0.018	0.086	0.158	0-1
Bachelor's Degree or Higher	0.387	0.027	0.334	0.440	0-1
In Committed Relationship	0.758	0.024	0.711	0.805	0-1
Have Children	0.472	0.028	0.418	0.527	0-1
Officer Rank	0.677	0.026	0.626	0.728	0-1
District					
1	0.195	0.022	0.152	0.238	0-1
2	0.239	0.024	0.193	0.286	0-1
3	0.183	0.021	0.141	0.225	0-1
4	0.220	0.023	0.175	0.265	0-1
5	0.092	0.016	0.061	0.124	0-1
6	0.071	0.014	0.043	0.099	0-1
Prior Policing Experience	0.135	0.019	0.097	0.172	0-1
Prior Military Experience	0.249	0.024	0.202	0.297	0-1
Law Enforcement Hours	46.862	0.619	45.646	48.079	5-92
Other Employment Hours	5.461	0.421	4.634	6.289	0-40
Daily Commute	50.015	2.149	45.788	54.243	1.5-300
Off-Duty Collisions	0.301	0.037	0.229	0.373	0-5
Productivity Links	8.891	0.121	8.653	9.128	4-16
Peer Productivity	13.929	0.202	13.532	14.326	4-20
Officer Productivity	12.554	0.176	12.208	12.899	4-20
Preferred Assignment	1.998	0.067	1.867	2.130	0-3
Routine Events Supervision	9.330	0.111	9.111	9.549	3-12
Rare Events Supervision	14.000	0.145	13.713	14.285	3-16
Driving Limitations	10.318	0.120	10.082	10.554	4-16
Other Limitations	6.657	0.098	6.463	6.851	3-12

Note. Sample descriptions are based on the first model presented in the results chapter.

Analytic Strategy

Statistical Analyses

Prior research suggests that repeat officer "offenders" are quantitatively and qualitatively different from their peers in terms of use of force incidents (Christopher Commission, 1991), corruption (Mollen Commission, 1994), and vehicle collisions (Hansen et al., 2015). Accordingly, two modeling strategies were used to assess whether officer involvement in on-duty vehicle collisions was impacted by their involvement in other negative on-duty outcomes. First, binomial logistic regression was used to determine the extent to which the independent variables predicted involvement in any on-duty collisions, net of statistical controls (see Table 5.1). This step in the analysis assessed whether officers involved in vehicle pursuits and deadly force events, in addition to those who received complaints for excessive force and other reasons, were more likely to be involved in any on-duty collisions compared to their counterparts who were not involved in these events in the prior four year period. In other words, the binomial model distinguished between officers with any on-duty collision experienced compared to those with none. This process was repeated with a subset of collisions that were ultimately judged to be preventable and therefore the drivers were ruled at-fault (see Table 5.3).

A multinomial logistic regression model was used to gauge whether negative outcome involvement is associated with repeated involvement in on-duty collisions (see Tables 5.2 and 5.3). Using *on-duty collision frequency* (the categorical operationalization of on-duty collision experience) as the dependent variable and letting "two or more collisions" serve as the reference category, the multinomial model explores whether self-

reported involvement in pursuits, deadly force situations, complaints for brutality, and complaints for other reasons, predict officer likelihood of experiencing "zero" versus multiple and "one" versus multiple on-duty collisions. This strategy assesses whether other negative on-duty outcomes are associated with the risk of being a repeat-on-duty collision "offender." Once again, the process was repeated with the subset of at-fault collisions (see Tables 5.5 and 5.6) but control variables measuring PGPD District assignment and prior law enforcement employment were removed from the analysis of at-fault collision frequency due to issues of perfect prediction.

Several model diagnostic tests were used to determine whether harmful levels of collinearity would bias the regression parameter estimates. First, none of the bivariate correlations between the independent variables reach the traditional │.70│ threshold (Pearson correlation coefficients < 0.63). Second, the variance inflation factors failed to reach the commonly used thresholds of 2.5 (Allison, 2001), 4.0 (Tabachnick & Fidell, 2007), or 10 (Menard, 1995; Neter et al., 1989). It appears that harmful levels of collinearity are not a concern in the following analyses. Identical regression models were fit to a subset of surveys that had no missing data on any variables. This analytical step was conducted to check the robustness of the results based on multiply imputed data. Results from the complete case analyses are presented in Appendix E.

CHAPTER 5

RESULTS

Chapter Five provides the results of four regression models that examine the

impact of officer involvement in deadly force, vehicle pursuits, and citizen complaints on

involvement in on-duty vehicle collisions. This approach allows for the examination of

all on-duty collisions and the subset of on-duty collisions ruled by the PGPD to be

preventable. The binary and multinomial logistic regression models also compare the

effects of negative outcomes given different amounts of on-duty and at-fault collision

involvement. Tables presenting the complete case analyses are provided in Appendix E.

Any On-Duty Collision Involvement

Table 5.1 presents the results of a binary logistic regression model that examines

the effects of deadly force, vehicle pursuits, citizen complaints for excessive force, and

other citizen complaints on involvement in any vehicle pursuits between November, 2010

and November, 2014, net of statistical controls (Hosmer & Lemeshow, 1989)[19]. All four

negative officer outcomes are measured continuously. The results indicate that receiving

citizen complaints for reasons other than excessive force has a statistically significant

impact on officer involvement in one or more vehicle collisions during the same four year

timeframe ($b = 0.280$, $p < 0.01$). This result is replicated in the analysis of complete

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[19] Statistics that estimate quantities can be combined across multiply imputed datasets
using Rubin's rules although some must be transformed to be normally distributed.
Statistics that are not estimators cannot be combined, which include likelihood ratio test
statistics, chi-square statistics, and goodness of fit test statistics (White et al., 2010).

Table 5.1. Logistic regression of undesired events on on-duty collision involvement.

	Any On-Duty Collisions (1 = yes)	
	b (SE)	OR
Independent Variables:		
Vehicle Pursuits	0.044 (0.042)	1.045
Deadly Force Events	0.117 (0.411)	1.124
Excessive Force Complaints	0.173 (0.191)	1.189
Other Complaints	0.280 (0.106)**	1.323
Control Variables:		
Male	- 0.105 (0.423)	0.900
Age	- 0.034 (0.028)	0.966
Race-Ethnicity		
African American	- 0.543 (0.328)	0.581
Hispanic	- 0.576 (0.518)	0.562
Other	0.001 (0.466)	1.001
Educational Attainment		
High School	0.497 (0.429)	1.644
2 years or Less of College	- 0.029 (0.319)	0.971
Associate's Degree	0.308 (0.445)	1.361
In Committed Relationship	- 0.155 (0.329)	0.856
Have Children	0.025 (0.328)	1.025
Officer Rank	0.202 (0.394)	1.224
District		
2	- 0.500 (0.475)	0.607
3	0.481 (0.444)	1.618
4	- 0.394 (0.429)	0.674
5	- 1.200 (0.620)*	0.301
6	- 0.214 (0.643)	0.808
Prior Policing Experience	0.095 (0.402)	1.099
Prior Military Experience	0.139 (0.320)	1.150
Law Enforcement Hours	- 0.021 (0.013)	0.979
Other Employment Hours	0.065 (0.020)***	1.067
Daily Commute	- 0.001 (0.004)	0.999
Off-Duty Collisions	0.996 (0.259)***	2.707
Productivity Links	0.019 (0.073)	1.021
Peer Productivity	- 0.034 (0.059)	0.966
Officer Productivity	- 0.021 (0.053)	0.979
Preferred Assignment	- 0.067 (0.121)	0.936
Routine Event Supervision	0.043 (0.087)	1.044
Rare Events Supervision	0.028 (0.064)	1.028
Driving Limitations	- 0.076 (0.074)	0.927
Other Limitations	0.032 (0.096)	1.032
Constant	1.779 (2.131)	6.046

Note. Entries are unstandardized partial regression coefficients (b), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

surveys only (N=228) as well ($b = 0.403$, $p < 0.01$) (see Table E.1). Odds ratios demonstrate that each citizen complaint received for reasons other than excessive force increases the relative odds of 1 or more on-duty collisions instead of 0 by 32.3 percent.

Another way of interpreting these effects is calculating the predicted probability of collision involvement for officers conditional on different numbers of other citizen complaints, holding all other variables in the model at their mean values. An advantage of this approach is straightforward interpretation—the probability of failure given different possible values of independent and/or control variables. A disadvantage of this approach is that a single officer cannot actually represent the mean of all variables. For instance, an officer cannot have the mean number of children (0.47) reported in the PGPD survey.

The probability of 1 or more vehicle collisions during the study period given 0 citizen complaints for reasons other than excessive force was 44.8 percent when all other variables are held at their means. However, the probability of being in at least 1 collision is 51.7 percent for officers who receive 1 citizen complaint for any reason except force, which increases to 58.6 percent among officers with 2 other citizen complaints. The probability of collision involvement increases to 71.1 percent for officers with 4 citizen complaints for reasons except force. In summary, the probability of being in 1 or more on-duty collisions in the previous 4 years is less than 50 percent for PGPD officers with 0 complaints but the probability exceeds this threshold among officers with 1 or more other complaints when all other covariates in the model are held at their mean values. Deadly force, pursuits, and force complaints are not significantly associated with on-duty collisions, which is also true in the complete case analysis.

Three control variables exhibit statistically significant effects on involvement in one or more collisions during the four year study period. The number of off-duty collisions is a significant predictor of involvement in on-duty collisions in the PGPD (b = 0.996, $p < 0.001$). More specifically, each off-duty collision increases the relative odds of an officer being in at least 1 collision as opposed to 0 collisions by 170.7 percent. The probability of being in an on-duty collision when all other predictors are held at their mean values is 43.2 percent for officers given 0 off-duty collisions, 67.3 percent for officers in 1 off-duty collision, and 84.8 percent for officers in 2 off-duty collisions. Off-duty collision frequency was also significantly associated with on-duty collision involvement in the complete case analysis (b = 1.287, $p < 0.001$).

Secondary employment is also significantly related to on-duty collision involvement (b = 0.065, $p < 0.001$). A significant relationship between secondary employment and any collision involvement was also found in the complete case analysis (b = 0.068, $p < 0.01$). Each hour worked outside of the PGPD increases the relative odds of 1 or more on-duty collisions versus 0 collisions by 6.7 percent. The probability of being in an on-duty collision is 41.8 percent given no employment outside the PGPD. However, the probability increases to 49.9 percent for officers working an average of 5 hours per week in second jobs and 58.0 percent for officers with an average of 10 hours per week of secondary employment.

Finally, officers assigned to District Five are significantly less likely than officers in District One to be in one or more on-duty collisions (b = - 1.200, $p < 0.05$). The relative odds of 1 or more collisions instead of 0 collisions is 69.9 percent lower for officers in District Five than their peers in the comparison group (District One). Every

officer patrolling District Five has a probability of any on-duty collisions in the previous

4 years equal to 28.3 percent while each peer in District One has a probability of 1 or

more collisions equal to 56.7 percent when all other covariates are held at their means.

Overall, officers in District One are approximately twice as likely as officers District Five

to be in an on-duty collision in the last four years. There are no significant effects of

District assignment in the complete case analysis of any collision involvement.

To summarize the results so far, the number of citizen complaints received for

reasons other than excessive force, the number of off-duty collisions, the number of hours

worked outside the PGPD, and assignment to District One as opposed to District Five all

significantly increase the likelihood of involvement in one or more vehicle collisions

during the four year study period among PGPD patrol officers and their supervisors.

Deadly force incidents, vehicle pursuits, and citizen complaints for force were not

significantly related to any collision involvement.

On-Duty Collision Frequency

The results of a multinomial logistic regression that examines the frequency of

officer on-duty collision experience are provided in Table 5.2, which presents a

comparison of officers in zero collisions versus one collision and Table 5.3, which

compares officers in zero versus two or more collisions and officers in one collision

versus multiple collisions. Consistent with the previous binomial logistic regression that

considers 0 versus 1 or more on-duty collisions, the number of citizen complaints for

reasons other than excessive force is significantly associated with being in 0 collisions

versus 1 collision ($b = -0.365$, $p < 0.01$). Every citizen complaint for a reason except

force decreases the relative odds of 0 collisions instead of 1 collision by 30.5 percent. For

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Table 5.2. Multinomial regression of undesired events on on-duty collision frequency.

	Zero vs. One	
	b (SE)	OR
Independent Variables:		
Vehicle Pursuits	- 0.024 (0.052)	0.976
Deadly Force Events	- 0.032 (0.436)	0.969
Excessive Force Complaints	- 0.161 (0.216)	0.851
Other Complaints	- 0.365 (0.117)**	0.695
Control Variables:		
Male	0.262 (0.491)	1.299
Age	- 0.010 (0.032)	0.991
Race-Ethnicity		
African American	0.809 (0.403)*	2.246
Hispanic	0.375 (0.613)	1.455
Other	- 0.305 (0.529)	0.737
Educational Attainment		
High School	- 0.307 (0.545)	0.735
2 years or Less of College	- 0.067 (0.385)	0.935
Associate's Degree	- 0.041 (0.546)	0.960
In Committed Relationship	- 0.140 (0.415)	0.869
Have Children	0.234 (0.398)	1.264
Officer Rank	0.177 (0.447)	1.194
District		
2	0.277 (0.567)	1.320
3	- 0.299 (0.534)	0.741
4	0.597 (0.518)	1.816
5	1.211 (0.757)	3.356
6	0.159 (0.751)	1.172
Prior Policing Experience	0.415 (0.520)	1.514
Prior Military Experience	- 0.083 (0.384)	0.920
Law Enforcement Hours	0.019 (0.017)	1.019
Other Employment Hours	- 0.040 (0.024)	0.961
Daily Commute	0.000 (0.004)	1.000
Off-Duty Collisions	- 0.947 (0.286)***	0.388
Productivity Links	0.043 (0.086)	1.044
Peer Productivity	0.003 (0.068)	1.003
Officer Productivity	- 0.011 (0.062)	0.989
Preferred Assignment	0.000 (0.146)	1.000
Routine Event Supervision	0.004 (0.102)	1.004
Rare Events Supervision	0.014 (0.071)	1.014
Driving Limitations	0.181 (0.091)*	1.199
Other Limitations	- 0.134 (0.119)	0.875
Constant	- 1.141 (2.576)	0.320

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

Table 5.3. Multinomial regression of undesired events on on-duty collision frequency.

	Zero vs. Two or More		One vs. Two or More	
	b (SE)	OR	b (SE)	OR
Independent Variables:				
Vehicle Pursuits	- 0.070 (0.052)	0.932	- 0.046 (0.050)	0.955
Deadly Force Events	- 0.111 (0.457)	0.895	- 0.079 (0.274)	0.924
Excessive Force Complaints	- 0.234 (0.243)	0.792	- 0.073 (0.235)	0.930
Other Complaints	- 0.139 (0.130)	0.870	0.225 (0.115)*	1.253
Control Variables:				
Male	- 0.116 (0.577)	0.891	- 0.378 (0.621)	0.686
Age	0.119 (0.043)**	1.264	0.129 (0.047)**	1.137
Race-Ethnicity				
African American	0.299 (0.441)	1.349	- 0.510 (0.510)	0.600
Hispanic	0.925 (0.716)	2.522	0.550 (0.806)	1.734
Other	0.589 (0.660)	1.801	0.894 (0.707)	2.444
Educational Attainment				
High School	- 0.379 (0.589)	0.685	- 0.071 (0.677)	0.931
2 years or Less of College	0.213 (0.424)	1.238	0.281 (0.483)	1.324
Associate's Degree	- 0.584 (0.575)	0.558	- 0.543 (0.665)	0.581
In Committed Relationship	0.454 (0.436)	1.575	0.595 (0.501)	1.813
Have Children	- 0.472 (0.438)	0.624	- 0.707 (0.499)	0.493
Officer Rank	- 0.753 (0.555)	0.471	- 0.930 (0.590)	0.395
District				
2	0.851 (0.645)	2.301	0.573 (0.719)	1.774
3	- 0.844 (0.571)	0.430	- 0.545 (0.640)	0.580
4	0.452 (0.579)	1.571	- 0.145 (0.655)	0.865
5	1.413 (0.862)	4.106	0.202 (1.011)	1.224
6	0.176 (0.879)	1.193	0.018 (0.969)	1.018
Prior Policing Experience	- 0.789 (0.625)	0.455	- 1.203 (0.625)*	0.300
Prior Military Experience	- 0.409 (0.437)	0.664	- 0.326 (0.495)	0.723
Law Enforcement Hours	0.020 (0.018)	1.020	0.001 (0.020)	1.001
Other Employment Hours	- 0.099 (0.027)***	0.906	- 0.059 (0.029)*	0.943
Daily Commute	0.001 (0.005)	1.001	0.000 (0.006)	1.000
Off-Duty Collisions	- 0.926 (0.298)**	0.396	0.021 (0.272)	1.021
Productivity Links	- 0.075 (0.098)	0.928	- 0.118 (0.110)	0.888
Peer Productivity	0.078 (0.079)	1.081	0.075 (0.086)	1.077
Officer Productivity	0.070 (0.076)	1.072	0.081 (0.083)	1.084
Preferred Assignment	0.220 (0.164)	1.246	0.220 (0.188)	1.246
Routine Event Supervision	- 0.147 (0.121)	0.863	- 0.151 (0.136)	0.860
Rare Events Supervision	- 0.158 (0.103)	0.854	- 0.172 (0.107)	0.842
Driving Limitations	- 0.098 (0.097)	0.906	- 0.280 (0.115)*	0.756
Other Limitations	0.067 (0.126)	1.070	0.201 (0.147)	1.223
Constant	0.364 (2.808)	4.041	1.505 (3.158)	4.505

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

instance, officers with 0 other citizen complaints have probabilities equal to 66.6 percent

of being in 0 collisions and 18.7 percent of being in 1 collision when other covariates are

at their mean values. However, the probability of 0 collisions decreases to 60.3 percent

while the probability of 1 collision rises to 24.4 percent given 1 citizen complaint for a

reason other than excessive force. Other complaint frequency is significantly associated

with on-duty collision frequency in the complete case analysis (N=225) as well (see

Table E.2). To summarize the effects of the independent variables in the two regression

models presented thus far, the number of other citizen complaints is significantly related

to collisions in the binary logistic model that assesses zero versus one or more collisions

as well as the multinomial model that compares zero collisions and one collision. Deadly

force, vehicle pursuits, and complaints for excessive force are not significantly associated

with on-duty vehicle collision frequency.

A more complicated story emerges regarding other citizen complaints when

examining officers in multiple collisions over the past four years in Table 5.3. The

relationship between other complaints and vehicle collisions is statistically nonsignificant

when comparing officers in zero versus two or more collisions, and is significant but in

the unexpected direction when comparing officers with one collision versus multiple

collisions ($b = 0.225$, $p < 0.05$). The relative odds of 1 collision versus multiple collisions

increase by 25.3 percent for each complaint filed for a reason other than force. Similarly,

when analyzing complete surveys only, other complaint frequency is not significantly

related to being in zero versus multiple collisions, and the relationship between other

complaints and collisions is also in the unexpected direction ($b = 0.273$, $p < 0.05$).

When predicting the probabilities of collision outcomes among officers given different numbers of other complaints and holding the other variables at their mean values, it becomes evident that the impact of other complaints on collision involvement is quite different for repeat collision offenders. First, each citizen complaint for a reason other than force decreases the probability of 0 on-duty collisions and increases the probability of 1 such collision in a linear fashion. The probability of 1 collision is 18.7 percent for officers given 0 other complaints, 24.4 percent for their peers with 1 such complaint, 31.0 percent for officers given 2 other complaints, 38.5 percent for officers given 3 other complaints, 46.5 percent for officers with 4 other complaints, and 54.6 percent for those with 5 complaints for reasons other than excessive force. However, the probability of multiple collisions increases until the third complaint, at which point the probability of multiple collisions actually begins to decrease. The probability of 2 or more collisions given 0 other complaints is 14.7 percent, which rises to 15.3 and 15.6 percent for officers with 1 and 2 other complaints, respectively. The probability of multiple collisions drops to 15.5 percent for officers given 3 other complaints, 14.9 percent for officers with 4 complaints, and 14.0 percent for officers with 5 complaints for reasons except force. The number of deadly force situations, pursuits, and complaints for excessive force are not significantly associated with the number of on-duty collisions that officers are in.

Consistent with the binomial logistic regression model, secondary employment remains significantly associated with the number of on-duty collisions among PGPD patrol officers and their supervisors. For each 1 hour increase in the number of hours worked outside the PGPD, officers have 9.4 percent lower relative odds of 0 instead of 2

or more on-duty collisions ($b = -0.099$, $p < 0.001$), and 5.7 percent lower relative odds of being in 1 as opposed to multiple collisions ($b = -0.059$, $p < 0.05$). For officers not working elsewhere, the probability of 1 collision and multiple collisions in the past 4 years is 21.1 percent and 10.0 percent, respectively, holding all other variables at their mean values. By far, the most probable outcome for officers not working second jobs is no on-duty collisions (68.9 percent). The probability of no on-duty collisions in the previous 4 years drops to 54.1 percent among officers working an average 10 hours per week outside the PGPD. Furthermore, the probability of multiple collisions in the past 4 years is 10.0 percent for officers with no other employment, which increases to 14.8 percent among officers working 5 hours per week outside the agency and 21.1 percent for officers working an average of 10 hours weekly in secondary employment. In the complete case analysis, secondary employment is only significantly related to being in zero as opposed to multiple collisions ($b = -0.102$, $p < 0.01$).

The number of off-duty collisions also remains significantly related to the number of on-duty collisions during the same period, whereby each off-duty collision is associated with 61.2 percent lower relative odds of 0 collisions versus 1 on-duty collision ($b = -0.947$, $p < 0.001$), and 60.4 percent lower relative odds of 0 instead of multiple on-duty collisions ($b = -0.926$, $p < 0.01$). The probability of 0 on-duty collisions is 67.8 percent for officers in 0 off-duty collisions, which decreases to 45.2 percent given 1 off-duty collisions and 24.4 percent among officers in 2 off-duty collisions. The probability of a single on-duty collision increases from 19.4 percent to 46.4 percent when comparing officers with 0 and 2 off-duty collisions, while the probability of multiple on-duty collisions increases from 12.8 percent 29.2 percent when officers in 0 off-duty collisions

are compared with peers in 2 off-duty crashes. Similar findings were found in the complete case analysis, whereby off-duty collision frequency is significantly associated with involvement in zero collisions versus one collision ($b = -1.202$, $p < 0.01$), and zero instead of multiple collisions ($b = -1.296$, $p < 0.01$).

Officer age emerges as a significant predictor of the number of on-duty collisions in the multinomial logistic regression models. Each additional year of age increases the relative odds of being in 0 as opposed to multiple collisions by 26.4 percent ($b = 0.119$, $p < 0.01$), and increases the relative odds of 1 versus 2 or more on-duty collisions by 13.7 percent ($b = 0.129$, $p < 0.01$). The probability of multiple collisions is 15.3 percent among the average (32.1 years of age) officer in the PGPD, which drops to 0.9 percent among the oldest officers in the agency (57 years of age) when all covariates are held at their mean values. However, the probability of 1 collision in the past 4 years is higher for 57 year old officers (32.6 percent) than 32 year old officers (23.4 percent). In the complete case analysis, officer age is only significant when comparing officers in zero and multiple collisions ($b = 0.104$, $p < 0.05$).

Another significant demographic variable in the multinomial model is race/ethnicity ($b = 0.809$, $p < 0.05$), whereby the relative odds of 0 collisions as opposed to 1 collision are 124.6 percent higher among Black officers than White officers. While the probability of 0 collisions is 68.0 percent for Black officers and 54.2 percent for White officers, the probability of 1 collision is 15.9 percent for Black officers and 28.5 percent for White officers. Black officers are also significantly more likely to report zero collisions instead of one collision in the complete case analysis ($b = 1.121$, $p < 0.05$). No other racial/ethnic effects are found with respect to on-duty collisions.

Prior employment by another law enforcement agency is only a significant predictor when officers with one collision are compared with officers in multiple collisions ($b = -1.203$, $p < 0.05$). Officers who have worked for another agency have 70.0 percent lower relative odds of being in 1 collision instead of multiple collisions than their peers who have only worked for the PGPD. The probability of 2 or more collisions is more than twice as high for officers who have worked for another law enforcement organization (28.0 percent) than their peers who have not worked elsewhere (13.8 percent). Prior employment by another law enforcement agency is not a statistically significant predictor of on-duty collision frequency in the complete case analysis.

The effects of responses to the driving limitations scale are inconsistent. Each 1 unit increase in the driving limitations scale is associated with 19.9 percent higher odds of 0 collisions versus 1 collision ($b = 0.181$, $p < 0.05$), but 24.4 percent lower odds of 1 collision compared with multiple collisions ($b = -0.280$, $p < 0.05$). When only complete surveys are analyzed, the driving limitations scale is only significant when comparing officers in one collision to peers in multiple collisions ($b = -0.282$, $p < 0.05$).

In summary, the number of citizen complaints for reasons other than excessive force is significantly associated with involvement in zero collisions versus one collision in a positive direction. The relationship between other complaints and being in zero versus multiple collisions is nonsignificant and the relationship between other complaints and one versus multiple collisions is negative. These inconsistent effects of other complaints on collisions suggest differences exist between officers in one collision and their peers in multiple collisions that are not accounted for by any of the other covariates in the model. Off-duty collision involvement, secondary employment, and age also

remain significantly associated with on-duty vehicle collisions. Each of these control variables is significant in two out of three comparisons in the multinomial logistic model. Black officers are significantly more likely than their White peers to be in zero versus one on-duty collision. There are no other effects of race/ethnicity on collision frequency. Prior employment by another law enforcement agency also emerged as a significant predictor in one comparison (one collision versus multiple collisions) but not the other two. Finally, responses to the driving limitations scale are significant in two comparisons but in opposite directions.

Any At-Fault Collision Involvement

Table 5.4 presents the results of a binary logistic regression that examines the effects of the number of deadly force events, vehicle pursuits, and citizen complaints on any at-fault collision involvement during the four year study period. At-fault collisions are a subset of on-duty collisions reported to the PGPD that are ultimately ruled to have been preventable. Counter to expectations, none of the negative outcomes are statistically significant predictors of being in one or more at-fault collisions. This is the first model in which other citizen complaints are not significantly associated with collisions. In a similar manner, none of the negative outcomes are significantly related to any at-fault collisions in the analysis of complete surveys only (N=227) (see Table E.4).

Consistent with previous models, the number of off-duty collisions remains significantly associated with the subset of on-duty collisions that were found to be preventable ($b = 0.498$, $p < 0.05$). Odds ratios show that the relative odds of being in 1 or more at-fault collisions as opposed to 0 in the previous 4 years increase by 64.5 percent with each off-duty collision. The probability of 1 or more at-fault vehicle collisions for

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Table 5.4. Logistic regression of undesired events on at-fault collision involvement.

	Any At-Fault Collisions (1 = yes)	
	b (SE)	OR
Independent Variables:		
Vehicle Pursuits	0.040 (0.032)	1.041
Deadly Force Events	0.217 (0.340)	1.242
Excessive Force Complaints	0.010 (0.177)	1.010
Other Complaints	0.140 (0.087)	1.151
Control Variables:		
Male	- 0.234 (0.423)	0.791
Age	- 0.048 (0.031)	0.953
Race-Ethnicity		
African American	- 0.104 (0.345)	0.901
Hispanic	- 0.628 (0.615)	0.534
Other	0.313 (0.472)	1.367
Educational Attainment		
High School	0.444 (0.448)	1.560
2 years or Less of College	- 0.271 (0.345)	0.763
Associate's Degree	0.692 (0.448)	1.998
In Committed Relationship	- 0.511 (0.339)	0.600
Have Children	0.267 (0.351)	1.306
Officer Rank	0.388 (0.422)	1.474
District		
2	- 0.511 (0.513)	0.600
3	0.509 (0.456)	1.663
4	0.004 (0.446)	1.004
5	- 0.712 (0.660)	0.491
6	- 0.111 (0.662)	0.895
Prior Policing Experience	0.131 (0.416)	1.141
Prior Military Experience	0.162 (0.345)	1.176
Law Enforcement Hours	- 0.001 (0.013)	0.999
Other Employment Hours	0.047 (0.020)*	1.048
Daily Commute	- 0.002 (0.004)	0.998
Off-Duty Collisions	0.498 (0.217)*	1.645
Productivity Links	0.012 (0.080)	1.012
Peer Productivity	- 0.018 (0.061)	0.982
Officer Productivity	- 0.060 (0.057)	0.942
Preferred Assignment	0.025 (0.132)	1.025
Routine Event Supervision	0.117 (0.098)	1.124
Rare Events Supervision	0.013 (0.070)	1.013
Driving Limitations	- 0.106 (0.081)	0.899
Other Limitations	0.042 (0.106)	1.043
Constant	0.682 (2.220)	1.978

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

officers in 0 off-duty collisions is 23.6 percent when all other variables in the model are held at their mean values. The probability of being in a preventable collision increases to 33.7 percent for officers given 1 off-duty collision, 45.6 percent for officers in 2 off-duty collisions, and 57.9 percent for officers in 3 off-duty collisions. Off-duty collision frequency is also significantly associated with any at-fault collision involvement in the complete case analysis ($b = 0.583$, $p < 0.05$).

Once again, the average number of hours worked per week outside of the PGPD is a significant predictor of at-fault collision involvement ($b = 0.047$, $p < 0.05$). Each hour of secondary employment increases the relative odds of 1 or more as opposed to 0 at-fault collisions by 4.8 percent. The probability of being in an at-fault collision during the past 4 years is 21.7 percent for officers who are not employed outside the PGPD, all else being held at its mean value. The probability of a preventable collision increases to 26.0 percent for officers working an average of 5 hours per week outside the PGPD and 30.8 percent for officers working an average of 10 hours of secondary employment. Secondary employment is also significantly associated with at-fault collision involvement when analyzing complete surveys only ($b = 0.054$, $p < 0.05$).

To summarize this binomial logistic regression, off-duty collisions and secondary employment outside the PGPD significantly increase the likelihood of involvement in any on-duty collisions and any at-fault collisions specifically. Unlike the binary logistic regression model that examines all on-duty collisions, complaints for reasons other than force and district assignment are not significantly associated with at-fault collision involvement specifically. The effects of negative outcomes beyond other citizen complaints remain nonsignificant.

At-Fault Collision Frequency

The results of a multinomial logistic regression of undesired event involvement on at-fault collision frequency are presented in Tables 5.5 and 5.6. The variables in this analysis are identical to previous models except prior employment by another law enforcement agency and PGPD District assignment are removed due to issues of perfect prediction[20]. Table 5.5 compares officers in zero at-fault collisions with officers in one at-fault collision in the previous four year period. Table 5.6 presents two comparisons: officers in zero versus officers in multiple collisions and officers in one collision versus multiple collisions.

As shown in Table 5.5, the number of complaints received for reasons other than force is significantly related to at-fault collision frequency ($b = - 0.175$, $p < 0.05$). Each other complaint decreases the relative odds of 0 at-fault collisions instead of 1 collision by 16 percent. This significant relationship is not found in the complete case analysis (see Table E.5). The relationships between the number of complaints for reasons except force and the number of at-fault collisions are not statistically significant when comparing officers with zero versus multiple collisions or officers with one collision versus multiple collisions (see Table 5.6). The probability of 1 at-fault collision is 5.0 percent for officers given 0 other complaints, which increases to 5.9 percent for officers given 1 other complaint and 6.9 percent for officers given 2 complaints for reasons except force, holding all other variables at their means. The probability of multiple at-fault collisions remains at 2.1 percent for officers with 0, 1, and 2 other complaints. Deadly force, pursuits, and complaints for excessive force are not significantly associated with at-fault

[20] In the complete case analysis (N=229), race/ethnicity is removed as well to address perfect prediction (see Tables E.5 and E.6).

Table 5.5. Multinomial regression of undesired events on at-fault collision frequency.

	Zero vs. One	
	b (SE)	OR
Independent Variables:		
Vehicle Pursuits	- 0.050 (0.039)	0.951
Deadly Force Events	- 0.279 (0.348)	0.757
Excessive Force Complaints	- 0.002 (0.177)	0.998
Other Complaints	- 0.175 (0.090)*	0.840
Control Variables:		
Male	0.278 (0.491)	1.321
Age	0.010 (0.032)	1.010
Race-Ethnicity		
African American	0.442 (0.369)	1.556
Hispanic	1.080 (0.719)	2.944
Other	- 0.472 (0.488)	0.305
Educational Attainment		
High School	- 0.447 (0.478)	0.640
2 years or Less of College	0.238 (0.365)	1.268
Associate's Degree	- 0.624 (0.476)	0.536
In Committed Relationship	0.331 (0.364)	1.392
Have Children	- 0.200 (0.380)	0.819
Officer Rank	- 0.713 (0.453)	0.490
Prior Military Experience	- 0.270 (0.363)	0.763
Law Enforcement Hours	0.012 (0.015)	1.012
Other Employment Hours	- 0.042 (0.021)*	0.959
Daily Commute	0.003 (0.004)	1.003
Off-Duty Collisions	- 0.385 (0.239)	0.681
Productivity Links	0.031 (0.089)	1.031
Peer Productivity	- 0.071 (0.049)	0.931
Officer Productivity	0.070 (0.060)	1.072
Preferred Assignment	- 0.154 (0.146)	0.857
Routine Event Supervision	- 0.152 (0.107)	0.860
Rare Events Supervision	0.045 (0.073)	1.046
Driving Limitations	0.165 (0.085)*	1.180
Other Limitations	- 0.128 (0.117)	0.880
Constant	0.933 (2.130)	2.541

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

Table 5.6 Multinomial regression of undesired events on at-fault collision frequency.

	Zero vs. Two or More		One vs. Two or More	
	b (SE)	OR	b (SE)	OR
Independent Variables:				
Vehicle Pursuits	0.032 (0.126)	1.032	0.082 (0.127)	1.085
Deadly Force Events	- 0.089 (0.746)	0.915	0.190 (0.739)	1.209
Excessive Force Complaints	- 0.080 (0.549)	0.923	- 0.079 (0.563)	0.924
Other Complaints	- 0.024 (0.216)	0.977	0.151 (0.220)	1.163
Control Variables:				
Male	0.397 (0.881)	1.487	0.119 (0.924)	1.126
Age	0.242 (0.096)**	1.274	0.232 (0.098)*	1.261
Race-Ethnicity				
African American	- 1.030 (0.827)	0.357	- 1.472 (0.868)	0.230
Hispanic	- 0.163 (1.115)	0.850	- 1.243 (1.270)	0.289
Other	0.096 (1.230)	1.101	0.568 (1.266)	1.764
Educational Attainment				
High School	- 0.393 (0.925)	0.675	0.054 (0.974)	1.055
2 years or Less of College	0.444 (0.784)	1.559	0.207 (0.831)	1.229
Associate's Degree	- 1.074 (0.936)	0.342	- 0.450 (0.987)	0.637
In Committed Relationship	1.434 (0.692)*	4.196	1.104 (0.733)	3.015
Have Children	- 0.533 (0.791)	0.587	- 0.707 (0.499)	0.717
Officer Rank	0.936 (1.071)	2.551	- 0.333 (0.841)	5.205
Prior Military Experience	0.296 (0.917)	1.344	0.566 (0.956)	1.761
Law Enforcement Hours	- 0.022 (0.027)	0.979	- 0.033 (0.029)	0.968
Other Employment Hours	- 0.054 (0.046)	0.947	- 0.012 (0.048)	0.988
Daily Commute	- 0.007 (0.009)	0.993	- 0.011 (0.010)	0.989
Off-Duty Collisions	- 0.607 (0.298)	0.545	- 0.222 (0.374)	0.801
Productivity Links	- 0.231 (0.159)	0.793	- 0.262 (0.172)	0.769
Peer Productivity	0.032 (0.098)	1.033	0.104 (0.104)	1.109
Officer Productivity	0.054 (0.134)	1.056	- 0.015 (0.142)	0.985
Preferred Assignment	0.166 (0.297)	1.180	0.320 (0.320)	1.377
Routine Event Supervision	0.014 (0.196)	1.014	0.166 (0.212)	1.180
Rare Events Supervision	- 0.323 (0.218)	0.724	- 0.368 (0.225)	0.693
Driving Limitations	- 0.161 (0.171)	0.851	- 0.327 (0.185)	0.721
Other Limitations	0.155 (0.205)	1.168	0.283 (0.223)	1.327
Constant	2.037 (4.911)	7.664	1.104 (5.151)	3.016

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

collision frequency when analyzing the multiply imputed cases or the complete cases.

The number of hours officers work outside the PGPD also remains statistically significant when examining at-fault collision frequency ($b = - 0.042$, $p < 0.05$), whereby each hour of secondary employment per week decreases the relative odds of 0 collisions instead of 1 at-fault collision by 4.1 percent. Similar to the effects of other complaints, this relationship is nonsignificant in comparisons of officers with zero versus two or more at-fault collisions and one collision versus two or more at-fault collisions. The relationship between secondary employment and at-fault collision frequency is statistically nonsignificant in the complete case analysis. The probability of 1 at-fault collision is 4.6 percent for officers who do not work outside the PGPD. The probability of 1 collision increases to 5.6 percent for officers working an average of 5 hours per week in secondary employment and 6.8 percent for officers working 10 hours per week outside the PGPD. The probability of multiple collisions for an officer not working outside the PGPD is 1.6 percent when all else is held at its mean, which increases to 2.6 percent for officers working an additional 10 hours outside of the agency. Counter to expectations and previous models presented in this study, off-duty collision frequency is not significantly associated with at-fault collision frequency in the multiply imputed dataset. Off-duty collisions are also nonsignificant in the complete case analysis.

Officer age is significantly related to the number of at-fault collisions officers are in during the previous four years. Each additional year of age is associated with 27.4 percent higher relative odds of being in 0 versus multiple collisions ($b = 0.242$, $p < 0.01$), and 26.1 percent higher odds of 1 collision versus multiple collisions ($b = 0.232$, $p < 0.05$). The average officer (32.1 years of age) has a probability of a single collision equal

to 5.7 percent and a probability of multiple collisions equal to 2.1 percent when all other variables are held at their mean values. Among the oldest officers in the PGPD (57 years of age) the probability of 1 collision decreases to 4.6 percent and the probability of multiple collisions drops below 0.0 percent. Age is also a statistically significant variable in the complete case analysis when comparing officers in 0 versus multiple collisions ($b =$ 0.243, $p < 0.05$), and when comparing officers in 1 collision versus multiple collisions ($b = 0.262$, $p < 0.05$).

Every 1 unit increase in the driving limitations scale is associated with 18 percent higher odds of 0 at-fault collisions versus 1 collision ($b = 0.165$, $p < 0.05$). However, nonsignificant effects in the opposite direction were found with respect to the likelihood of 0 versus multiple collisions and 1 collision versus multiple collisions. Responses to the driving limitations scale are nonsignificant predictors of at-fault collision frequency in the complete case analysis. Similar inconsistent effects are observed with respect to the driving limitations scale and all on-duty collisions.

Finally, being in a committed relationship is a significant predictor of at-fault collision frequency ($b = 1.434$, $p < 0.05$). The relative odds of being in 0 versus multiple collisions are 319.6 percent higher for officers in committed relationships. The probability of 0 collisions is 93.2 percent for officers in committed relationships and 87.2 percent for officers who are not and the probability of multiple at-fault collisions is considerably lower for officers in committed relationships (1.5 percent) than their uncommitted peers (5.9 percent). In the complete case analysis, being in a committed relationship is also only relevant when comparing officers in zero and multiple collisions ($b = 1.860$, $p < 0.05$).

In summary, each complaint for a reason except excessive force increases the relative odds of being in one at-fault collision as opposed to zero collisions during the four year study period. The effects of other complaints on at-fault collisions are nonsignificant when comparing officers with zero versus multiple collisions and one collision versus multiple collisions. The effects of deadly force, vehicle pursuits, and citizen complaints for force are nonsignificant in this and all previous models. Secondary employment is also positively associated with at-fault collisions but only in comparisons of officers with zero collisions and one collision in the previous four years. Each year of officer age significantly decreases the likelihood of multiple collisions. Being in a committed relationship significantly increases the relative odds of zero versus multiple collisions only. On the other hand, responses to the driving limitations scale significantly predict at-fault collision frequency only when comparing officers with zero and one collision.

CHAPTER 6

DISCUSSION AND CONCLUSION

Chapter Six explains the approach of this study and limitations of the research methodology. Suggestions are provided for improving the design of this study in future research. Next, the significant results are highlighted and contextualized within the limited extant empirical literature on officer-involved vehicle collisions. The policy implications of the findings are noted in terms of reducing vehicle collisions in the Prince George's County Police Department and other law enforcement agencies. Finally, concluding remarks are provided.

Summary of the Study

Public police exist to reduce harms in society so it is logical to remain vigilant in monitoring the amount of harm caused by police officers in accomplishing this mandate. The American public has been particularly watchful over police due to our unique history and development as a nation. In the United States, problematic police officer behaviors have evolved over time and have included corruption, brutality, and less extreme acts of excessive force. Part of this evolution has been driven by technological advances in tools available to police officers including OC spray, CED devices, and other less-lethal weapons.

In recent years, the threat posed by officer-involved vehicle collisions to the safety of police and the public has received increased attention from practitioners and researchers. Researchers have examined correlates of on-duty collisions at both the

incident- and officer-level in agencies across the United States (Noh, 2011; Wolfe et al., 2015) and beyond (Rix et al., 1997). Others have approached the issue at a more macro-level, for instance examining officer-involved collisions across states (Gustafson, 2012, 2015). Many pressing questions remain that could help inform agency policies and practices, including whether or not officers in collisions are also disproportionately involved in other negative on-duty outcomes.

The fundamental importance of researching negative officer outcomes such as car crashes is clear: these events are harmful and costly in many ways to all citizens. In this way, collisions are similar to other officer behaviors that threaten public and officer safety, erode confidence in the police, and have been addressed by agencies with officer training, policy changes, and closer supervision. There are several other reasons why officer involvement in one form of unwanted behavior, such as using too much force, may be related to vehicle collisions as well. First, Maryland and California law enforcement officials questioned whether or not officers in collisions were also disproportionately represented in other negative outcomes. Second, agencies co-monitor a variety of negative officer outcomes in hopes of identifying and addressing potentially problematic employees. Early intervention systems, a common means used by agencies to identify problematic officers, often monitor a variety of different behaviors at the same time including use of force, deadly force, citizen and internal complaints, and collisions (Alpert & Walker, 2000; Walker et al., 2001). Agencies also receive and investigate citizen complaints regarding numerous concerning officer behaviors as well. The approach of monitoring comorbidities, or the co-occurrence of negative outcomes, is popular in medicine and public health. Third, research is often limited to one negative

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outcome but researchers of negative officer events have tended to focus on the same characteristics of officers, agencies, and situations—suggesting particular variables may have predictive value across a variety of behaviors. Studies of negative outcomes at the officer-level, which suggests "bad apples" are to blame, is based on repeated research findings that small proportions of officers are responsible for a majority of negative outcomes in their agencies such as excessive force (Brandl et al., 2001; Christopher Commission, 1991; Kolts Commission, 1992; Lersch, 1998b, 2002). The clustering of problematic behaviors among a small proportion of the general public has been observed as well (Braga, 2012; Chaiken & Chaiken, 1984; Greenwood & Abrahamse, 1982; Peterson & Braiker, 1981; Williams & Lucianovic, 1979; Wolfgang et al., 1972). However, the empirical relationship between collisions and other negative officer outcomes had not been empirically tested.

This study examined the relationship between officer involvement in vehicle collisions and deadly force, citizen complaints for excessive force and other reasons, and vehicle pursuits over a four year timeframe. The research questions were answered with a survey of patrol officers and their supervisors in the Prince George's County Police Department, a large agency located in Maryland. The officer survey was anonymous and designed to maximize participation by PGPD officers. Survey distribution took place at daily roll call meetings across Prince George's county over several days. An online survey option was provided in an attempt to reach nonrespondents. Each survey packet included a cover letter from the author that explained the project and a support letter from their Fraternal Order of Police President asking for their participation. Finally, the research designed was approved by the PGPD, local FOP, and USC's Institutional

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Review Board. In the end, a total of 329 PGPD officers responded to a series of questions

regarding their involvement in negative outcomes in the past 4 years, in addition to a

variety of demographic, employment, attitudinal, and other measures. The results

provided several potential directions for reducing harmful events in law enforcement

organizations, but first, a brief elaboration on the shortcomings of this study is in order.

Limitations and Future Directions

This study is based on a survey of patrol officers and their supervisors (sergeants

and lieutenants only) in the PGPD. Several limitations of the research methodology and

potential remedies are worthy of discussion. The survey methodology provides a means

of collecting information on deadly force events, vehicle pursuits, and on-duty collisions

that were not reported to the PGPD and are therefore not captured by official agency

records. At the same time, this survey may provide a less complete picture of officer

involvement in negative outcomes than official records due to the fact that only

approximately one-third of PGPD patrol officers participated in the study[21]. Among the

one-third of officers who did participate, approximately two-thirds answered all of the

questions on the survey. Officer demographics were not available for the PGPD so a

comparison of respondents and nonrespondents was impossible. Whether or not the

survey respondents differ from the nonrespondents remains unknown and is a limitation

of the design. In future research, a mixed methods approach based on an officer survey

and official agency records may help alleviate these concerns.

A disadvantage of all self-reported data is that officers may underreport their own

involvement in negative outcomes, especially those that violate agency policies or local

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[21] Hansen et al. (2015) used a similar method in eight California agencies and obtained a
response rate roughly twice as high (65.8 percent versus 33.5 percent in this study).

laws. Concerns regarding underreporting may be less severe in a survey-based study such as this that is conducted by an independent third-party compared to studies based on official agency records. After all, reporting negative outcomes to one's employer may lead to internal investigations, disciplinary actions, and even terminations of employment. Anonymity was also provided to officers and would not have been possible with focus groups or officer interviews. Still, social desirability biases may be present in this survey-based study.

Another potentially problematic aspect of the research design was the designation of at-fault collisions specifically. The primary concern is the subjectivity that has been discovered regarding internal police investigations of negative officer outcomes. For instance, Hickman (2006) examined the 2003 LEMAS survey results and found that complaints investigated by agencies with internal affairs divisions were more than twice as likely to be not sustained and to result in officers being exonerated as complaints reported to agencies with other mechanisms for investigating complaints. Hickman (2006) also reported that agencies that investigated use of force complaints outside of the chain of command received such complaints at a rate three times higher than agencies without this policy. Finally, the rate of sustained complaints was more than twice as high for agencies that allowed citizens the right to administrative appeal (Hickman, 2006). In the past 10 years, the PGPD instituted changes in their internal collision investigation procedures that may have altered the likelihood that collisions were deemed preventable. According to a member of the PGPD leadership, the agency removed responsibility for investigating collisions from an officer's immediate supervisor to the agency's centralized collision investigation unit. After this change, the PGPD found that the rate of

preventable collisions increased dramatically. This study measured at-fault collisions that occurred in the previous four year period, during which there may have been changes in PGPG collision investigation procedures.

A third potential weakness is measuring negative outcomes by asking officers about receiving citizen complaints. In this study, officers are asked to report the number of complaints they receive for force and for all other reasons separately in hopes of capturing negative outcomes beyond deadly force and pursuits. In fiscal year 2014, 198 out of 873 total citizen complaints investigated by the PGPD (22.7 percent) were for use of force. In the policing literature, citizen complaints are among the most common means of measuring negative officer outcomes such as excessive force (e.g., Brandl et al., 2001; Christopher Commission, 1991; Kolts Commission, 1992; Pate & Fridell, 1993). One potential shortfall of citizen complaints that must be acknowledged is that members of the public and law enforcement officers may report vastly different interpretations of the same event.

In some cases, citizen complaints may capture behaviors that would be illegal for private citizens but were permissible due to the wide authority granted to police officers. This is because the general public is not aware of all laws and policies regulating officer behaviors or is operating on limited knowledge of an event. Furthermore, there exists a social desirability bias among officers and citizens to downplay their responsibility for antisocial and potentially illegal behaviors when giving reports that may become the subject of citizen complaint investigations. Another potential source of discrepancy beyond differences in interpretation of events is that suspects may over-report officer

misconduct in some cases hoping for plea agreements on charges that may have resulted from their altercations (Adams, 1995).

Irrespective of the underlying reasons, researchers have documented large differences in the ways police and the public interpret the same events. For instance, Rojek, Alpert, and Smith (2012) compared officer and citizen accounts of use of force incidents and found 42.9 percent of citizens claimed they had offered no resistance and another 23.8 percent claimed only passive resistance; none of the corresponding officers agreed with those assessments. Pate and Fridell (1993) found an average complaint substantiation rate of only 13 percent in their study of force. Finally, the 2003 LEMAS survey found a total rate of 6.6 citizen complaints regarding use of force per 100 sworn officers in large state and local agencies, while the rate of sustained complaints was just 0.5 per 100 sworn (Hickman, 2006). Gaps clearly exist between the ways that citizens and law enforcement interpret potentially troubling events.

Studying negative officer outcomes with complaints received and complaints sustained each has their downfalls and the more suitable choice depends on the research question at hand. The officer survey used in the current study inquired about complaints received instead of complaints sustained after investigation due to the aforementioned subjectivity in internal department investigations that have been found in the PGPD and other agencies. Police departments frequently monitor problematic officer behaviors by measuring the number of complaints received, some relying solely on this to identify problematic officers (Walker et al., 2001).

Although measuring negative officer outcomes with complaints received instead of complaints sustained removes some of the problems at the agency-level in terms of

complaint reception and investigation, it must be emphasized that subjectivity remains at the citizen complainant-level. To begin, citizens have provided differing accounts of the same officer misconduct events. Case in point, a Time/CNN poll found 92 percent of Black respondents but only 72 percent of White respondents thought the force used by LAPD officers against Rodney King was excessive (Lacayo, 1992). A similar racial divide was found in New York City among respondents to a New York Times poll of responses to the following statement: "Based upon current knowledge, the shooting of Amadou Diallo was tragic and there is absolutely no excuse for the way the police acted" (Barry & Connelly, 1999). While 89 percent of Black respondents agreed with this statement, the rate was only 61 percent among White poll takers (Barry & Connelly, 1999). An even larger racial gap was found when New Yorkers were asked if most NYPD officers used excessive force, with 33 percent of White and 72 percent of Black respondents, respectively, answering in the affirmative (Barry & Connelly, 1999). More recently, a U.S. Department of Justice investigation into the death of Michael Brown by Ferguson police officer Darren Wilson reported vastly different eyewitness accounts of the shooting (Bosman, Robertson, Eckholm, & Oppel, 2015).

Finally, the likelihood that a negative officer outcome that is witnessed by a citizen will actually be reported to the offending officer's employing agency varies among individual members of the public. Walker and Bumphus (1992) found only one-third of citizens who felt they had been subjected to misconduct reported the incident in an official complaint. In sum, differences in interpreting, reporting, and investigating complaints can result in variations between and within agencies that are unrelated to actual amounts of misconduct in those agencies. For all these reasons, West (1988)

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referred to citizen complaints as "one of the most badly abused police-based statistics" (p. 113). Future researchers could directly ask officers about their involvement in excessive force and other complaint-worthy events instead of relying on citizen reports. Despite the limitations, citizen complaints are heavily relied upon by police departments (e.g., Walker et al., 2001) and researchers (e.g, Brandl et al., 2001; Christopher Commission, 1991; Kolts Commission, 1992; Pate & Fridell, 1993) to identify negative police officer outcomes.

In summary, this study examined the effects of undesired event involvement on vehicle collision involvement among patrol officers in the PGPD. It was not without limitations. First, the study was limited to self-reported data collected from PGPD officers. Whether or not the findings would be similar based on official PGPD records is unknown. Future researchers may wish to explore these relationships with agency records or a mixed methods approach. Observational methods may paint a different picture of negative outcomes in the PGPD although they may not be feasible due to the relative infrequency of such events. A final point is that the survey was distributed to patrol officers and their supervisors in one police department. Generalizability of the findings beyond patrol officers in the PGPD must therefore be cautioned.

<div align="center">**Summary of Findings**</div>

Four regression models were used to test the impact of deadly force, citizen complaints, and vehicle pursuits on vehicle collision involvement during the same four year period in the Prince George's County Police Department. The effects of negative event involvement on collisions were assessed for all on-duty collisions and for a subgroup of on-duty collisions that were ultimately ruled by the PGPD to be preventable.

Separate models were also used to see if these effects varied when predicting any collision involvement as opposed to collision frequency from November, 2010 to November, 2014.

The findings detailed in Chapter Five are summarized in the following paragraphs. Table 6.1 reports the statistically significant ($p \leq .05$) effects with respect to all on-duty collisions and Table 6.2 provides the significant effects for the subgroup of at-fault collisions. Four comparisons are presented in each of these tables. The first comparison in each table provides the results of the binomial logistic regression models, which assessed the effects of negative events on collisions for officers in zero and one or more collisions. The next three comparisons are from the multinomial logistic regression models that examined these effects among officers in zero collisions and one collision, zero and multiple collisions, and one collision and multiple collisions. The directions of the statistically significant effects are reversed for the binomial models for consistency with the multinomial models and ease of interpretation. The implications of these findings for reducing collisions in the PGPD and other agencies are discussed at-length in the next section.

Any On-Duty Collisions

One out of four independent variables predicted on-duty collisions. A statistically significant, positive relationship was discovered between the number of complaints received by officers for all reasons other than excessive force and the number of on-duty vehicle collisions during the same four year timeframe (see Table 6.1). This finding provides support for versatility in negative officer behaviors and prior research that found a relationship between problematic NYPD officer behaviors (Kane & White, 2012). The

Table 6.1. Summary of significant effects on all on-duty collisions.

	All On-Duty Collisions			
	0 vs. 1+ [a]	*0 vs. 1* [b]	*0 vs. 2+* [b]	*1 vs. 2+* [b]
Independent Variables:				
Vehicle Pursuits	ns	ns	ns	ns
Deadly Force Events	ns	ns	ns	ns
Excessive Force Complaints	ns	ns	ns	ns
Other Complaints	(-)	(-)	ns	(+)
Control Variables:				
Male	ns	ns	ns	ns
Age	ns	ns	(+)	(+)
Race-Ethnicity				
African American	ns	(+)	ns	ns
Hispanic	ns	ns	ns	ns
Other	ns	ns	ns	ns
Educational Attainment				
High School	ns	ns	ns	ns
2 years or Less of College	ns	ns	ns	ns
Associate's Degree	ns	ns	ns	ns
In Committed Relationship	ns	ns	ns	ns
Have Children	ns	ns	ns	ns
Officer Rank	ns	ns	ns	ns
District				
2	ns	ns	ns	ns
3	ns	ns	ns	ns
4	ns	ns	ns	ns
5	(+)	ns	ns	ns
6	ns	ns	ns	ns
Prior Policing Experience	ns	ns	ns	ns
Prior Military Experience	ns	ns	ns	ns
Law Enforcement Hours	ns	ns	ns	ns
Other Employment Hours	(-)	ns	(-)	(-)
Daily Commute	ns	ns	ns	ns
Off-Duty Collisions	(-)	(-)	(-)	(-)
Productivity Links	ns	ns	ns	ns
Peer Productivity	ns	ns	ns	ns
Officer Productivity	ns	ns	ns	ns
Preferred Assignment	ns	ns	ns	ns
Routine Events Supervision	ns	ns	ns	ns
Rare Events Supervision	ns	ns	ns	ns
Driving Limitations	ns	(+)	ns	(-)
Other Limitations	ns	ns	ns	ns

Note. ns = statistically nonsignificant relationship ($p \leq .05$).
[a] Binomial logistic regression model.
[b] Multinomial logistic regression model.

positive relationship between other complaints and on-duty collisions suggests that attempts to decrease behaviors that lead to complaints may reduce on-duty collisions as well. However, the number of complaints for excessive force, the number of deadly force events, and the number of vehicle pursuits were not significantly associated with on-duty collision involvement. The nonsignificant effects of other negative outcomes on collisions could be spurious or unique to the PGPD.

It was originally hypothesized that a stronger effect on collisions would be found for certain types of citizen complaints than others. More specifically, it was expected that complaints for situations that were particularly risky, harmful, and/or forceful would have a strong, positive relationship with collisions while complaints for reasons such as profanity or failure to assist a citizen would have a weaker association with collisions. The primary justification for these hypothesized effects was that excessive force would be disproportionately found among the most productive, proactive, and risk-taking members of the PGPD. Simply put, officers who are in more interactions with suspects would be more likely to use force all else being equal. In turn, it was expected that more productive officers would also be exposed to increased driving-related risks including collisions. The fact that no relationship was found between collisions and complaints for excessive force but a significant effect was found between complaints for all other reasons on crashes was unexpected.

A somewhat complicated relationship was found between citizen complaints for reasons other than force and on-duty collision frequency. First, each other citizen complaint increased the likelihood of involvement in any on-duty vehicle collisions in the binomial model. Other citizen complaints also increased the probability of being in one

collision instead of zero collisions in the multinomial model. However, other complaint frequency was not significantly associated with involvement in zero versus multiple collisions. Furthermore, the relationship between other complaints and on-duty collisions was in the unexpected direction when comparing officers in one collision and multiple collisions. Second, each other complaint decreased the probability of zero collisions and increased the probability of one collision in the previous four years in a linear manner. Other complaints also increased the probability of multiple collisions until the third complaint, at which point each additional other complaint actually began to decrease the probability of two or more collisions in the past four years. The inconsistent effects of other complaints on collision frequency suggest that officers in multiple collisions may be qualitatively and quantitatively different than their peers in zero or even a single collision during the previous four years. The reasons for this are unknown and deserve further empirical examination. One potential explanation may be that officers with repeat collisions have received counseling from a supervisor, a written reprimand, driving training, or some other intervention that decreased their collision propensity. The finding from the multinomial regression model that citizen complaints for reasons other than excessive force decreased the probability of officer involvement in multiple collisions as opposed to a single collision in the previous four years must be interpreted within the context of these results. The conclusion is each citizen complaint received for a reason except force significantly increased the probability of any on-duty collision involvement although the impact of other complaints on the number of on-duty collisions is less clear.

Overall, two control variables were the most consistent predictors of PGPD officer involvement in on-duty vehicle collisions. Off-duty collision involvement was

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positively associated with on-duty collision involvement in all four comparisons presented in Table 6.1. Consistent with recent findings by Hansen et al. (2015) from eight California agencies, PGPD officers who are in off-duty collisions are also more likely to be in collisions while at work. This finding suggests an underlying propensity towards collision involvement among certain officers that transcends the law enforcement environment. It implies that collision-reduction programs targeting the general public will decrease collisions involving those who work in law enforcement.

Employment outside the PGPD was positively related to on-duty collision involvement in three out of four comparisons presented in the following table (all except zero collisions versus one collision). It appears that working outside the PGPD significantly increases the likelihood of collisions when the officers are back on duty. For instance, an additional 10 hours of work outside of the agency per week increases the probability of multiple on-duty collisions over a 4 year timeframe from 10 percent to over 20 percent among PGPD patrol officers and their supervisors when all other variables are at their mean values. This is noteworthy because the PGPD allows officers to work up to 20 hours per week in secondary employment (Spencer, 2010). These findings support prior research by Vila and colleagues who have reported links between secondary employment, officer fatigue, and on-duty collisions (e.g., Vila, 1996, 2000; Vila et al., 2000). It is also possible that second jobs are indicative of financial strain due to family illness, spousal unemployment, or some other stressful situation that may contribute to fatigue.

Among the remaining employment variables that included officer rank, PGPD district assignment, prior employment by another law enforcement agency or the military,

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number of hours worked at the PGPD per week, and daily commute to work and home, only assignment to District Five versus District One was a significant predictor and this relationship only held when examining any collision involvement (i.e. zero versus one or more collisions). Turning to the demographic control variables, age was a protective factor for involvement in multiple collisions. The negative relationship between age and on-duty collision frequency counters Wolfe et al. (2015), who found injury and fatality collisions were least prevalent among 20 to 29 year old officers in California. Also, Black officers were significantly more likely than White officers to be in zero collisions instead of one collision. There were no other significant effects of race/ethnicity on officer-involved collisions.

Nor were there any significant effects of gender, educational attainment, and informal social control (i.e. having children and/or being in a committed relationship) on collision involvement. Finally, of the eight scales that measured officer attitudes and behaviors regarding on-duty driving and other aspects of policing, only attitudes toward driving was a significant predictor of on-duty collisions and its effects were inconsistent (only statistically significant in two out of four comparisons in Table 6.1).

At-Fault Collisions

The only negative outcome that was significantly associated with at-fault collisions was citizen complaints for any reason except excessive force (see Table 6.2). Of course, deadly force, vehicle pursuits, and complaints regarding force did not demonstrate any predictive value with respect to any on-duty collisions either. Similar to the analyses of any on-duty collisions, each other complaint decreased the probability of zero collisions relative to one collision in the previous four year period. Other complaint

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Table 6.2. Summary of significant effects on at-fault collisions.

	At-Fault Collisions			
	0 vs. 1+ [a]	0 vs. 1 [b]	0 vs. 2+ [b]	1 vs. 2+ [b]
Independent Variables:				
Vehicle Pursuits	ns	ns	ns	ns
Deadly Force Events	ns	ns	ns	ns
Excessive Force Complaints	ns	ns	ns	ns
Other Complaints	ns	(-)	ns	ns
Control Variables:				
Male	ns	ns	ns	ns
Age	ns	ns	(+)	(+)
Race-Ethnicity				
African American	ns	ns	ns	ns
Hispanic	ns	ns	ns	ns
Other	ns	ns	ns	ns
Educational Attainment				
High School	ns	ns	ns	ns
2 years or Less of College	ns	ns	ns	ns
Associate's Degree	ns	ns	ns	ns
In Committed Relationship	ns	ns	(+)	ns
Have Children	ns	ns	ns	ns
Officer Rank	ns	ns	ns	ns
District				
2	ns	na	na	na
3	ns	na	na	na
4	ns	na	na	na
5	ns	na	na	na
6	ns	na	na	na
Prior Policing Experience	ns	na	na	na
Prior Military Experience	ns	ns	ns	ns
Law Enforcement Hours	ns	ns	ns	ns
Other Employment Hours	(-)	(-)	ns	ns
Daily Commute	ns	ns	ns	ns
Off-Duty Collisions	(-)	ns	ns	ns
Productivity Links	ns	ns	ns	ns
Peer Productivity	ns	ns	ns	ns
Officer Productivity	ns	ns	ns	ns
Preferred Assignment	ns	ns	ns	ns
Routine Events Supervision	ns	ns	ns	ns
Rare Events Supervision	ns	ns	ns	ns
Driving Limitations	ns	(+)	ns	ns
Other Limitations	ns	ns	ns	ns

Note. ns = statistically nonsignificant relationship ($p \leq .05$). na = excluded from model.
[a] Binomial logistic regression model.
[b] Multinomial logistic regression model.

frequency was not significantly related to at-fault collisions in the other three comparisons presented in Table 6.2.

Off-duty collisions and secondary employment both increased the likelihood of at-fault collisions. This was similar to the findings regarding all on-duty collisions, although their effects were not as consistent when considering at-fault collisions specifically. Each hour worked outside the PGPD decreased the chances of avoiding at-fault collisions entirely in the past four years. The significant, positive relationship between secondary employment and at-fault collisions was found when examining any at-fault collision involvement (i.e., zero versus one or more collisions) and when comparing officers in zero collisions with their peers in one collision. Every off-duty collision decreased the odds of being in one or more at-fault collisions during the past four years. However, no significant effects of off-duty collisions were found on at-fault collision frequency. Each off-duty collision significantly increases the probability of being in any on-duty collisions but does not have a significant impact on the number of on-duty collisions reported during the same four year period.

Only one other significant relationship with at-fault collisions was found among the employment variables. Higher scores on the driving limitations scale were associated with an increased likelihood of being in zero collisions relative to one collision in the past four years. However, this significant relationship was not in the expected direction because higher scores on the scale indicate less accepting attitudes toward agency driving policies and other limitations on the way police officers are allowed to drive. The effects of the driving limitations scale on all on-duty collisions were inconsistent. Overall, the impact of officer's attitudes toward driving limitations on collision involvement is

unclear. A better instrument than a four-item scale should be developed for measuring this concept.

Once again, age was a protective factor for being in multiple collisions when examining at-fault collisions only. In fact, age was the only statistically significant variable when comparing officers with one at-fault collision to their peers with multiple at-fault collisions. The only other demographic variable that emerged when analyzing at-fault collisions specifically was being in a committed relationship, which significantly increased the likelihood of zero instead of multiple collisions. Overall, officer demographics had little impact on at-fault collisions—similar to any on-duty collisions.

Implications for Policy and Practice

Three consistent findings have implications for agency policy and practice that are detailed over the next few paragraphs. Suggestions are provided for addressing other citizen complaints, secondary employment, and off-duty collisions involving PGPD officers—all of which are significant factors in on-duty collisions. These solutions include increased pre-employment screening, training, supervision and monitoring of negative officer outcomes, and re-training when deficiencies are found. The goal is to provide actionable idea for agency leaders, supervisors, and other stakeholders in their attempts to reduce on-duty officer collisions.

On-Duty Collisions and Other Citizen Complaints

The relationship between vehicle collisions and other negative on-duty officer outcomes was not as strong as hypothesized. Co-monitoring deadly force, vehicle pursuits, and excessive force complaints may not be among the most efficient means of reducing on-duty collisions in the PGPD. Still, the number of citizen complaints for

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reasons other than excessive force was significantly related to the probability of any on-duty collisions and any at-fault collisions specifically. The positive relationship between collisions and other complaints during the same timeframe suggests that reducing the types of behaviors that lead to citizen complaints for reasons except force may also reduce on-duty collisions.

Concerns regarding negative officer outcomes have led to increased accountability and transparency among law enforcement agencies in the United States over the past half-century. Improvements in the reception and handling of citizen complaints have been some of the ways that police agencies have demonstrated their commitment to the public. Early intervention systems have been increasingly used by agencies to monitor their employees and flag those who stand out from their peers in terms of negative outcomes. Citizen complaints are an important component of EIS. Among law enforcement agencies operating an EIS in the United States, the most common way of identifying negative outcomes is with citizen complaints (Walker et al., 2001).

The PGPD was required to expand and improve its EIS as part of a memorandum of agreement with the U.S. Department of Justice (2004b). The agreement was the result of two government investigations of the PGPD pursuant to the Violent Crime Control and Law Enforcement Act of 1994, 42 U.S.C. Section 14141, and the Omnibus Crime Control and Safe Streets Act of 1968, 42 U.S.C. Section 3789d (U.S. Department of Justice, 2004a, 2004b). One investigation began in 1999 regarding the deployment and supervision of canines and ended in a consent decree (U.S. Department of Justice, 2004a), while the second began in 2000 and was broader in scope—concerned with

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excessive force and supervision throughout the PGPD (U.S. Department of Justice, 2004b). Both investigations were based on allegations that PGPD officers had deprived citizens of their constitutional rights (U.S. Department of Justice, 2004b). As part of the less formal memorandum of agreement, the PGPD was required to include in its EIS "all complaints (and their dispositions)" (U.S. Department of Justice, 2004b, p. 19)[22]. The results of this study suggest that this complaint data may be useful in identifying officers in the PGPD with higher probabilities of on-duty collisions than their peers. The findings indicate that reducing citizen complaints via mechanisms such as improved screening, training, supervision, and discipline of officers may also reduce collisions.

On-Duty Collisions and Secondary Employment

The consistently positive relationship between secondary employment hours and on-duty collision involvement deserves further discussion. This variable was included in the current study as a control but its significant effects on collisions were more consistent than any other variable across the models presented in this study. This relationship suggests that secondary employment may be a fruitful area to examine in terms of decreasing on-duty collisions among PGPD officers. Reasonable restrictions concerning the number of hours that officers are permitted to work in secondary employment may be required to reduce costly on-duty collisions in the PGPD.

In the PGPD, secondary employment is popular enough among patrol officers that it has been suggested a culture has formed around off-duty work (Zapotosky, 2010). The mean number of secondary employment hours worked per week on average was 5.46 and

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[22] There were no specific requirements regarding on-duty motor vehicle collisions in the PGPD's memorandum of agreement with the United States Department of Justice (2004b).

the range was from 0 to 40 hours per week. The tradition of police officers holding

second jobs has a long history in the United States. The practice was often referred to as

"moonlighting" because the off-duty work often took place at night (Breads, 2012;

Bureau of Governmental Research, 2011). Today, outside, secondary, extra-duty, or off-

duty employment is a frequent practice among police officers in some agencies who are

hired part-time in the private sector. Off-duty police officers are commonly hired to

provide security at private businesses such as shopping malls and nightclubs, crowd

control at large events including festivals and concerts, and personal security for

individuals (Bureau of Governmental Research, 2011). Details are a specific form of

secondary employment where there is the potential for off-duty officers to exercise their

sworn law enforcement powers (Bureau of Governmental Research, 2011). Off-duty

officers in some details wear their police uniforms and drive their take-home patrol

vehicles. In jobs where officers work in a law enforcement capacity, private employment

provides a public good by increasing the numbers of officers in communities without the

use of taxpayer funds. Law enforcement agencies benefit from increased policing and

deterrence in their jurisdictions and officers benefit from a means of supplementing their

law enforcement agency salaries, which are quite low in many parts of the country.

The negative aspects of police officers working second jobs in the United States

have also been documented (see Bureau of Governmental Research, 2011). Officers work

in many second jobs including private security and some concerns are directly related to

the type of secondary employment. One arises when police officers use deadly force

while working for a private security business (Bureau of Governmental Research, 2011;

Joh, 2014). Although public police are granted exceptional powers as agents of

government, the authorized use of force and coercion while off-duty is questionable. A second issue specifically concerns the types of private businesses that off-duty officers work for. Second jobs with the potential for corruption or a conflict of interests are particularly troubling. Corruption may be in the form of preferential treatment for employers, direct payment for non-enforcement of certain laws, or threats of non-enforcement for those who do not offer off-duty details to officers in their areas (Bureau of Governmental Research, 2011). Secondary employment can also reflect negatively on their agencies when it involves profiting from vices such as working in bars or nightclubs (Bureau of Governmental Research, 2011). Secondary employment in liquor stores and establishments that serve alcohol has been banned in some police departments as well. Another way that secondary employment can negatively impact agencies is when officers use resources including vehicles. However, it has been suggested that agencies can offset these costs by requiring that officers pay them a portion of their off-duty salaries to offset these costs. The Bureau of Governmental Research (2011) remarked, "While there are departmental costs related to details, departments can price details to cover those costs" (Bureau of Governmental Research, 2011, p. 1). Secondary employment can also undermine chain of command if a subordinate is in charge of secondary employment for a superior officer (Bureau of Governmental Research, 2011). Finally, and most germane to this study, are the effects of secondary employment on officer fatigue while on duty.

In 2011, the U.S. Department of Justice Civil Rights Division released findings from an investigation into the New Orleans Police Department. Among several problematic areas with the NOPD, investigators specifically pointed to problems with secondary employment. In their report, the DOJ stated the following:

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There are few aspects of NOPD more broadly troubling than its Paid Detail system. NOPD's Detail system, as currently structured: 1) drastically undermines the quality of NOPD policing; 2) facilitates abuse and corruption by NOPD officers; 3) contributes to compromising officer fatigue; 4) contributes to inequitable policing by NOPD; and 5) acts as a financial drain on NOPD rather than fulfilling its potential as a source of revenue for the City and Department (Office of Civil Rights, 2012, p. xv).

In response to this report, the NOPD overhauled its paid detail system (City of New Orleans, 2013). All of these are important considerations regarding secondary employment of police officers. However, the most relevant of these concerns with respect to this study on vehicle collisions is item number three—the impact of second jobs on officer fatigue while serving in a law enforcement capacity.

Vila and colleagues have demonstrated that secondary employment increases officer fatigue on the job, which in-turn leads to a host of negative outcomes including vehicle collisions (Vila, 2000, 2009; Vila & Kenney, 2002). In fact, the effects of officer fatigue are often compared with the effects of alcohol Vila, 2000, 2009; Vila & Kenney, 2002). The implications of these findings are clear—reducing the number of hours worked in secondary employment.

Problems with secondary employment have also been reported in the PGPD. In November, 2010, three PGPD officers were arrested and charged with corruption (Flaherty, Klein, & Zapotosky, 2010). The federal indictment alleges that two of the officers were working off-duty for a liquor store owner and helping distribute untaxed alcohol and cigarettes in Maryland and Virginia (Flaherty et al., 2010). The third PGPD

officer was charged with conspiracy to distribute cocaine and use of firearms in drug trafficking (Flaherty et al., 2010). Less than one month later, the PGPD announced that it was forming a special panel comprised of five members of the PGPD and one community member to examine secondary employment in the agency (Noble, 2010). According to media accounts, the panel first focused on whether businesses should directly pay officers for services or if the PGPD should serve as an intermediary. The practice of agencies scheduling secondary work, receiving payment from private businesses, and paying their officers is used in several agencies including the nearby Baltimore Police Department (Noble, 2010). This policy was also implemented in the NOPD as a requirement of their consent decree with the USDOJ. However, the PGPD has not focused on the effects of secondary employment on collisions.

The PGPD has implemented several changes regarding secondary employment in the past five years. The Office of Secondary Employment was created in late-2010 and led by Major Morris (Spencer, 2010). So far, the Office of Secondary Employment has focused on security plans with outside employers (Prince George's County Police Department, 2011). Chief Magaw was quoted in the Washington Post as follows: "The office of secondary employment, the main focus of that is to vet out the different businesses that want officers to work there, to make sure that they're legitimate businesses that hold the same values as this community and this police department" (Zapotosky, 2010a). Major Morris has also stated that he would like increased training regarding off-duty work and a better system of monitoring where and when officers were working outside the PGPD (Zapotosky, 2010b). In fact, the PGPD regulations regarding secondary employment are less strict than comparable agencies in the area (Zapotosky,

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2010). The PGPD has also limited the number of secondary employment hours that officers may work to 20 per week (Spencer, 2010). It is unknown how this regulation compares to other agencies in the Washington, D.C. area. However, this study found that PGPD officers reported working up to 40 hours per week outside the agency—two times the maximum number of hours allowed (see Table 4.1). Several agency leaders have reported that they have not been able to closely monitor and enforce existing PGPD rules regarding outside employment including Major Morris, Fraternal Order of Police President Canales (Spencer, 2010), and Chief Magaw who said, "There's a lack of supervision here that we're looking into (Zapotosky, 2010a). The PGPD may begin with improved supervision and enforcement of the existing 20 hour limitation. Another option would be to further limit the number of secondary employment hours permitted per week.

A few comments are necessary regarding secondary employment of police officers in Maryland. First, agencies cannot ban secondary employment among officers but they can limit it. The Maryland Public Safety Code (Annotated in 2014) states in Section 3-103 (b) the following: "A law enforcement agency: (1) may not prohibit secondary employment by law enforcement officers; but (2) may adopt reasonable regulations that relate to secondary employment by law enforcement officers" (State of Maryland, 2014). Second, agencies can be held liable for actions resulting from employees' secondary employment in Maryland. In 2001, the Maryland Court of Appeals decided in *Lovelace v. Andersen* that both law enforcement agencies and private employers were liable for officers' off-duty actions.

One potential means of reducing on-duty vehicle collisions is changing agency policies to restrict the maximum number of hours that officers are allowed outside their

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primary law enforcement careers. Another avenue for agencies that already restrict

secondary employment is to demand stricter adherence to existing policies. These may be

controversial topics because secondary employment presents benefits to police officers

and law enforcement agencies. Against these benefits must be weighed the costs

associated with secondary employment. Overall, this study finds that the costs of

secondary employment in terms of on-duty vehicle collisions are significant in the PGPD.

On-Duty Collisions and Off-Duty Collisions

A significant positive relationship was also found between the number of off-duty

vehicle collisions and the number of on-duty vehicle collisions reported by PGPD patrol

officers during the same four year period. This positive relationship was the second most

consistent significant finding across the analyses presented in this study, which suggests

an underlying propensity towards collision involvement among some PGPD officers.

This relationship implies improvements in driving safety among the general public, for

instance among teen drivers, may translate to the law enforcement environment for those

who ultimately become police officers. On the other hand, it also suggests that officer

driving training may have the corollary benefit of reducing collisions among off-duty

officers. Similar to this study, a consistently strong, positive relationship between on- and

off-duty collisions was also found among patrol officers in eight California agencies by

Hansen et al. (2015).

It appears that officers who get in off-duty collisions are also at increased risk of

on-duty collisions and some PGPD patrol officers have issues with collision involvement

regardless of context. One potential avenue for reducing on-duty collisions is improving

agency screening of applicants and recruits for problematic driving records. This

screening by agencies should begin with a review of all applicants' driving records. In most states, individuals are allowed to obtain their driver's license at the age of 16 so applicants' driving records should span at least a 5 year period. Screening can also take place during police academy driving training. Some academies allow officers to retake areas of driving training courses that they failed—failures that may or may not be reported to their employing agencies after academy graduation. Preventing the employment of individuals who will become problematic officers will be more effective and less costly than later intervention. Those who have been identified as having pre-employment or academy driving issues and become police officers may need additional monitoring and training during their careers to ensure safe vehicle operations. The training and other costs to employing agencies must be weighed against potential human and financial costs that could result from unsafe driving and collisions.

Monitoring of unsafe driving behaviors must also take place throughout officers' careers. It is customary for law enforcement agencies to supervise and enforce policies regarding on-duty vehicle collisions; however, monitoring collisions that occur while officers are off-duty is a far less common practice. This is not to suggest that the idea of monitoring and addressing problematic off-duty behaviors is new. A comprehensive study of career-ending misconduct in the NYPD over a 2 decade period found that 20 percent of behaviors that resulted in termination took place while officers were off-duty (Fyfe & Kane, 2006; Kane & White, 2013). For several decades, law enforcement agencies have monitored and disciplined officers' off-duty firearm usage in particular. For instance, Fyfe (1980a) found 20 percent of police firearm discharges occurred off duty and one-half of these resulted in disciplinary or criminal charges for officers. Similar

results were found in Philadelphia as well (Fyfe, 1980b). Police departments have been advised to define off-duty misconduct in order to reduce risk of litigation as a result of those behaviors (Martinelli, 2007).

Monitoring of off-duty collisions could be accomplished by reviewing officers' driving records on an annual or semi-annual basis or by instituting an agency policy of mandatory reporting. Self-reported collision information may be collected and used in a timelier manner than records kept by a state department of motor vehicles that may suffer from a backlog in data entry. Of course, asking any employee to self-report information to their employer that may be used to discipline them later introduces motivation for self-preservation via noncompliance. On the other hand, official collision data will exclude minor and other unreported collisions. Collecting this information is only the beginning—it must also be used effectively in order to reduce on-duty collisions.

Monitoring problematic off-duty officer driving with official police records is difficult because officers may be less likely to issue a driving citation to a fellow officer than another member of the public in similar circumstances. In turn, driving records for off-duty police officers may provide an incomplete picture of negative event involvement. The practice of "professional courtesy" makes it difficult to identify problematic police drivers using official records. This practice may also give officers the impression that they operate under a different set of rules than the driving public. Several mechanisms have been used to reduce the issues that may arise when one officer investigates another officer. Some law enforcement organizations request the assistance of a neighboring or state agency when investigating crashes involving their officers. Cameras designed to capture driver and vehicle information when a speed limits are

exceeded or red-lights are disregarded may also remove some of the subjectivity in terms of officers ticketing other officers. Although agencies including the PGPD have a practice of waiving red light tickets that officers received during the course of duty, problematic off-duty driving should be recorded in a means identical to that for the general public. Citizen complaints are investigated outside of the chain of command in the PGPD so complaints may provide notice to agency leaders when officers are reported for operating their patrol vehicles off duty. On the other hand, it is doubtful citizens will be able to identify PGPD officers operating their personal vehicles.

Regardless of how they are collected, off-duty collision records should be included in agency early intervention systems, which can be used to flag officers with a concerning number of off-duty collisions over a period of time. This study suggests that even one off-duty collision greatly increases the probability of an on-duty collision during the same four year timeframe. For example, the probability of 1 on-duty collision was 43.2 percent for officers in 0 off-duty collisions but 67.3 percent for officers in 1 off-duty collision when all other covariates are held at their mean values. Officers targeted for intervention should be provided additional driver training.

Study Conclusion

There appears to be a relationship between on-duty collisions and receiving citizen complaints. However, this positive relationship was limited to complaints for reasons other than excessive force and was not entirely consistent throughout the study. Based on the results of this study, agency risk managers and other parties interested in reducing on-duty vehicle collisions involving officers in the Prince George's County

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Police Department would be well-advised to pay close attention to officers' secondary employment and off-duty crashes.

The positive relationship between secondary employment and on-duty vehicle collisions suggests that further reasonable limitations on the number of hours that officers are permitted to work outside the agency may be one means of reducing officer-involved collisions in the PGPD. Of course, concerns for officer financial wellbeing must be considered in addition to their safety behind the wheel. Closer monitoring of secondary employment hours may also be necessary. Increased monitoring of off-duty collisions is also suggested to reduce on-duty collisions involving PGPD patrol officers. Officers identified as having problematic off-duty driving records should be provided driving training. CalPOST found that driver training with driving simulators and emergency vehicle operation courses reduced collision involvement (Gustafson, 2009).

Mechanisms for reducing on-duty vehicle collisions in the PGPD involve changes to policies and procedures. These suggested solutions include further limiting the number of hours that officers are allowed to work outside the PGPD, closer supervision of secondary employment, and increased agency oversight of officers' off-duty driving—especially collision involvement. Agencies have often revised their policies to manage risks and liabilities (Alpert & Smith, 1994) and to improve officer safety (Alpert & Smith, 2008; Schultz, Hudak, & Alpert, 2009). Overall, agency moves towards more restrictive policies have been found to reduce officer involvement in negative outcomes including deadly force (Fyfe, 1979; Geller & Scott, 1992; Meyer, 1980; Sherman, 1983; Sprager & Giacopassi, 1992; Tannenbaum, 1994; Uelmen, 1973) and vehicle pursuits (Alpert, 1997; Alpert, Kenney, Dunham, & Smith, 2000; Crew, Kessler, & Fridell, 1994).

In sum, evidence presented herein suggests that more restrictive policies regarding secondary employment and off-duty driving may reduce collisions in the PGPD—the goal of this study.

This study began with the question of whether police officers exhibit specialization or generalization when committing criminal or deviant acts. Hirschi and Gottfredson's (1994) book *The Generality of Deviance* includes a chapter by Sorensen (1994) devoted to exploring how motor vehicle collisions are related to other negative outcomes including crime and deviance. Sorensen (1994) found considerable evidence for a relationship between involvement in crashes and other forms of deviance and crime but did not explore specialization with respect to officer-involved vehicle collisions specifically. The current study explored this topic by examining whether officer involvement in deadly force, citizen complaints for excessive force or other reasons, and vehicle pursuits increased the probability of on-duty vehicle collisions. The results of this research lend partial support to both positions. On one hand, receiving citizen complaints for reasons other than excessive force increases the probability of being in vehicle collisions. However, this relationship was not always statistically significant and the other three independent variables did not demonstrate any predictive value with respect to on-duty and at-fault vehicle collisions. More empirical evidence is needed to help develop a theory of negative police officer behaviors. Still, based on the work of Sorensen (1994) and findings from this study, it appears that collisions among police officers may be substantively different than those involving members of the general public.

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APPENDIX A: PGPD DISTRICT MAP
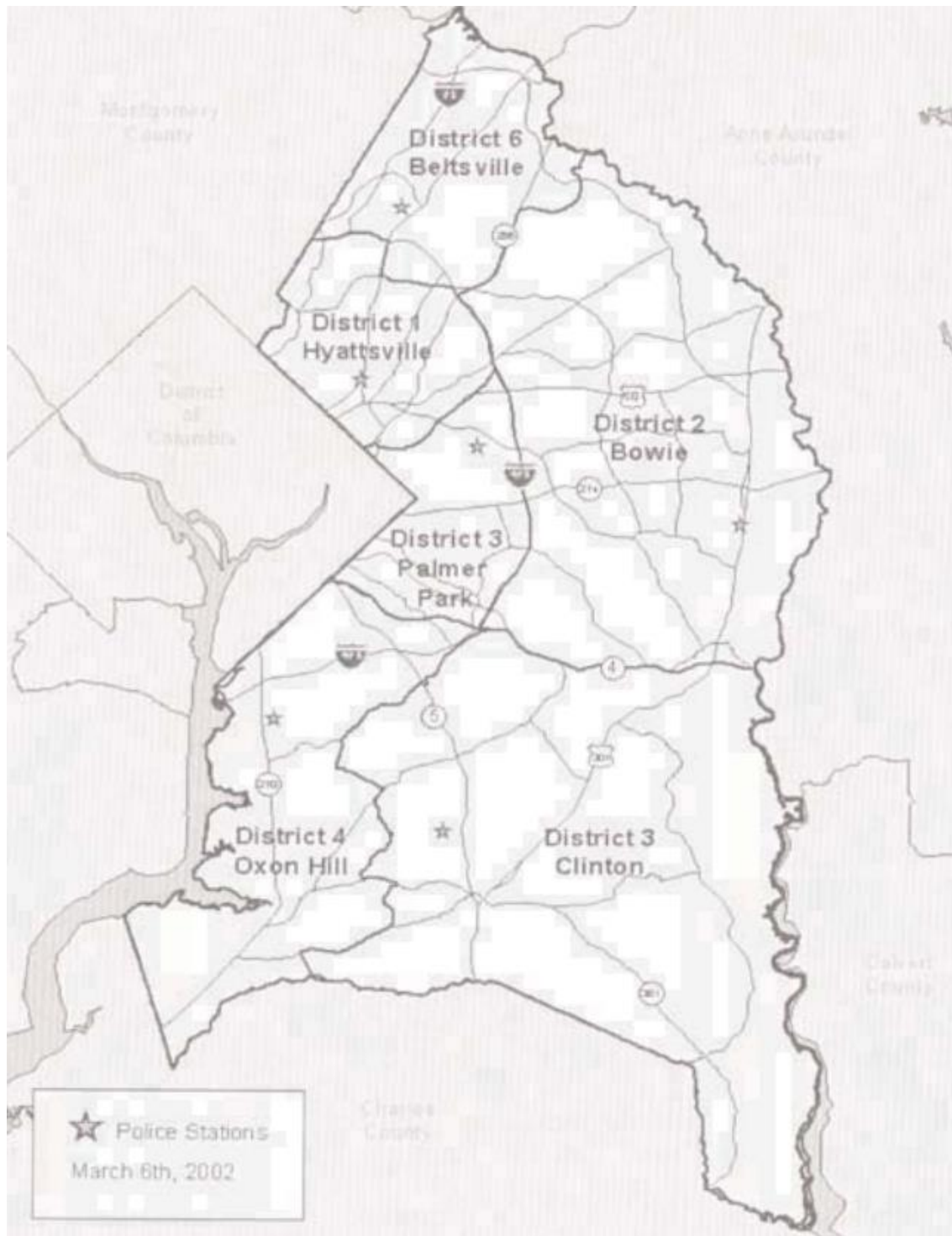
APPENDIX B: SURVEY COVER LETTER

UNIVERSITY OF
SOUTH CAROLINA
DEPARTMENT OF CRIMINOLOGY AND CRIMINAL JUSTICE

The Prince George's County Police Department (PGPD) has partnered with the Department of Criminology and Criminal Justice at the University of South Carolina (USC) to study officer-involved vehicle collisions. Despite the relevance of this issue to the safety of law enforcement officers, very little research has been conducted on the topic. As a result, little is known about the frequency of these events, the injuries and fatalities that result, and factors related to their occurrence and harmful outcomes.

Your agency has agreed to participate in this study with the goal of reducing injuries, fatalities, and other collision-related costs in the department. As part of our efforts, we are conducting the enclosed survey of PGPD personnel on driving, collisions, and other officer safety issues. We are respectfully asking for 15 to 20 minutes of your time to complete and return the enclosed survey.

Key to the quality of our research on this important issue is receiving honest responses from you. As a result, the survey responses are anonymous. We included typical background questions and ask about your driving experiences and other officer safety-related issues. We do not ask for your name or identification number on the survey and your individual responses will not be reported. You can skip any questions that you are not comfortable answering.

If you complete the enclosed hard copy survey you can return it to us with the attached prepaid envelope. Otherwise, you can follow the information below to respond online through a secure website. Either method comes directly to USC and does not pass through anyone in your agency. In addition to anonymity, individual responses will not be provided to anyone inside the PGPD.

For your convenience, we have created an online survey completion option as an alternative to the enclosed hard copy survey. To complete the online survey simply go to the following website that is secure, was created by USC for PGPD officers only, and is password protected:
- http://pgpdsafedriving.questionpro.com
- Password for website = PGPD2014

Although participation is voluntary, our receipt of your completed survey is very important. Our goal is to increase officer safety in the PGPD and your responses are vital. We respectfully ask that you return the survey within two weeks of receiving it. If you have any questions about the survey or overall research project, please feel free to contact Mr. Andy Hansen (803-777-2737, hansenja@email.sc.edu) at the University of South Carolina.

Thank you in advance for your time and consideration,

Sincerely,

Andy Hansen

Andy Hansen

APPENDIX C: SURVEY SUPPORT LETTER

FRATERNAL ORDER OF POLICE

Prince George's County Lodge 89, Inc.

P.O. Box 510
Lothian, MD 20711
(301) 952-0882

Dean M. Jones
President
October 14, 2014

Prince George's County Police Patrol Officers

Re: Request for Participation in SAFE Driving Campaign Research

Dear Brothers and Sisters:

The Prince George's County Police Department has partnered with the Department of Criminology and Criminal Justice at the University of South Carolina to study officer involved vehicle collisions.

As you know, we as an organization have suffered the loss of 3 Officers since 2010 to fatal motor vehicle collisions.

The Fraternal Order of Police Lodge 89, along with the Prince George's County Police Department, is requesting your support and participation in this important research study that we believe will save officers lives.

Participation in this research project is entirely voluntary on your part. Your participation and input is extremely valuable to the success of this study.

I want to encourage you to participate and ensure you that your personal and departmental information you provide will be completely confidential.

Thank you in advance for your help and cooperation. If you have any questions, please feel free to contact me at 301-952-0882 or via email at dean.jones@fop89.org.

Sincerely,

Dean M. Jones
President, FOP Lodge 89

Representing the Professional Police Officers of Prince George's County, Maryland

APPENDIX D: SURVEY INSTRUMENT

The purpose of this survey is to capture the driving experiences of Prince George's County Police Department officers. The survey should take approximately 15 to 20 minutes to complete. We appreciate your honest and candid responses. All information collected is anonymous. No individual will be linked to their responses provided. Thank you in advance for your time.

SECTION A: Officer Information

1. Are you a full-time sworn officer in the PGPD? ☐ Yes ☐ No

2. Did you work as a sworn police officer for any other department before you came to work for the PGPD? ☐ Yes ☐ No

3. Age: _____ years

4. Gender: ☐ Female ☐ Male

5. Race/Ethnicity (select all that apply): ☐ African American ☐ Caucasian ☐ Hispanic ☐ Other

6. Law enforcement experience: _____ years

7. Highest level of education (check one):
   ☐ High School
   ☐ Less than two years of college
   ☐ Associate's Degree
   ☐ Bachelor's Degree
   ☐ Graduate Degree (Master's Degree, Juris Doctor, Ph.D.)

8. Are you in a committed relationship (for example, married or in a long-term relationship)? ☐ Yes ☐ No

9. Do you have children? ☐ Yes ☐ No

10. Have you served in the military? ☐ Yes ☐ No

11. What is your current rank? ☐ Officer ☐ Corporal ☐ Sergeant ☐ Lieutenant

12. What district are you currently assigned to? ☐ I ☐ II ☐ III ☐ IV ☐ V ☐ VI

13. In an average week, how many hours do you work for PGPD (include regularly scheduled shift hours, overtime, etc.)? _____

14. In an average week, how many hours of secondary employment (off-duty work) do you work? _____

15. Approximately how long is your round trip daily commute to work? _____ minutes

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SECTION B: Driving-Related Experiences

16. Have you been in any on- or off-duty traffic collisions in the past 4 years (since November 2010)? ☐ Yes   ☐ No
    (If no, skip to question 17)

    16a. While driving off-duty (in personal or department vehicle)? ☐ Yes   ☐ No

        16a1. How many off-duty vehicle collisions in the past 4 years? _____

    16b. While driving on-duty? ☐ Yes   ☐ No   **(If no, skip to question 17)**

        16b1. How many total on-duty vehicle collisions in the past 4 years? _____

            16b2. How many at-fault on-duty vehicle collisions in the past 4 years? _____

            16b3. Did you receive disciplinary actions for your involvement in any of these collisions (for example, a reprimand, suspension, etc.)? ☐ Yes   ☐ No

              16b4. If you received discipline, do you feel these actions (all, if more than one) were fair? ☐ Yes   ☐ No

17. In the past 4 years, have you been disciplined by your agency (current or former) for any other driving issue (for example, speeding, not wearing a seatbelt, etc.)? ☐ Yes   ☐ No   **(If no, skip to question 18)**

    17a. Do you feel these actions (all, if more than one) were fair? ☐ Yes   ☐ No

SECTION C: Perspectives on Driving

		Disagree Strongly	Disagree	Agree	Agree Strongly
18.	The PGPD takes a tough stance on improper driving behaviors.	☐	☐	☐	☐
19.	Police officers are *not* permitted to drive as is often necessary in policing.	☐	☐	☐	☐
20.	It is sometimes acceptable to drive outside of policy to catch someone who physically assaulted an officer.	☐	☐	☐	☐
21.	Most vehicle collisions could be stopped by developing more effective methods of supervision.	☐	☐	☐	☐
22.	It is sometimes acceptable to drive outside of policy during routine patrol.	☐	☐	☐	☐
23.	Always following the driving policies is *not* compatible with getting the job done.	☐	☐	☐	☐
24.	An officer who handles many non-crime calls for service will get in many vehicle collisions.	☐	☐	☐	☐
25.	Officers in the PGPD violate driving policies more often than necessary.	☐	☐	☐	☐
26.	Investigations of officer-involved vehicle collisions are usually biased in favor of the police.	☐	☐	☐	☐
27.	Police department rules about driving should *not* be any stricter than required by law.	☐	☐	☐	☐
28.	An officer who reports another officer's improper driving is likely to be given the "cold shoulder" by his or her fellow officers.	☐	☐	☐	☐
29.	The PGPD rules for proper driving have been made clear to me.	☐	☐	☐	☐
30.	Internal affairs units are *not* effective means for preventing vehicle collisions.	☐	☐	☐	☐
31.	Whistle blowing for driving policy violations is *not* worth the effort.	☐	☐	☐	☐
32.	Good first-line supervisors can help prevent vehicle collisions.	☐	☐	☐	☐
33.	An officer who makes many arrests will get in many vehicle collisions.	☐	☐	☐	☐

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		Disagree Strongly	Disagree	Agree	Agree Strongly
34.	Police officers always report serious criminal violations involving driving by fellow officers.	☐	☐	☐	☐
35.	The PGPD recognizes and rewards proper driving by officers.	☐	☐	☐	☐
36.	Traffic review boards are *not* effective means for preventing vehicle collisions.	☐	☐	☐	☐
37.	If a police chief takes a strong position against unsafe driving, he or she can make a big difference in preventing vehicle collisions.	☐	☐	☐	☐
38.	It is *not* unusual for a police officer to turn a blind eye to improper driving-related conduct by other officers.	☐	☐	☐	☐

SECTION D: Supervision

39. How likely are supervisors to enforce policies related to:	Very Unlikely	Unlikely	Likely	Very Likely	N/A (no such policy in the PGPD)
a. Seatbelt use	☐	☐	☐	☐	☐
b. Collision reporting	☐	☐	☐	☐	☐
c. Speeding in violation of policy	☐	☐	☐	☐	☐
d. Emergency driving	☐	☐	☐	☐	☐
e. Pursuit driving	☐	☐	☐	☐	☐
f. Excessive force	☐	☐	☐	☐	☐
g. Misconduct	☐	☐	☐	☐	☐

SECTION E: Productivity and Workload

District Productivity/Workload	Much Lower	Lower	About the Same	Higher	Much Higher
40. How would you rate the number of violent crime arrests made by your district compared to neighboring districts?	☐	☐	☐	☐	☐
41. How would you rate the number of non-violent crime arrests made by your district compared to neighboring districts?	☐	☐	☐	☐	☐
42. How would you rate the number of calls for service handled by your districts compared to neighboring districts?	☐	☐	☐	☐	☐
43. How would you rate your district's overall level of productivity compared to neighboring districts?	☐	☐	☐	☐	☐

Officer Productivity/Workload	Much Lower	Lower	About the Same	Higher	Much Higher
44. How would you rate the number of violent crime arrests you make compared to other PGPD officers?	☐	☐	☐	☐	☐
45. How would you rate the number of non-violent crime arrests you make compared to other PGPD officers?	☐	☐	☐	☐	☐
46. How would you rate the number of calls for service you handle compared to other PGPD officers?	☐	☐	☐	☐	☐
47. How would you rate your overall level of productivity compared to other PGPD officers?	☐	☐	☐	☐	☐

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Officer Productivity/Workload Continued

48. Have you been in a vehicle pursuit in the past 4 years (since November 2010)? ☐ Yes ☐ No   (If no, skip to question 49)

    48a. How many vehicle pursuits have you been in over the past 4 years? _____

    48b. Did you receive disciplinary actions for any of these pursuits (for example, a reprimand, suspension, etc.)?
        ☐ Yes ☐ No

        48b1. If you received discipline, do you feel these actions (all, if more than one) were fair? ☐ Yes ☐ No

49. Have you been in a deadly force incident (used force likely to cause death or serious injury, including the use of a firearm) in the past 4 years? ☐ Yes ☐ No   (If no, skip to question 50)

    49a. How many deadly force incidents have you been in over the past 4 years? _____

    49b. Did you receive disciplinary actions for any of these incidents (for example, a reprimand, suspension, etc.)?
        ☐ Yes ☐ No

        49b1. If you received discipline, do you feel these actions (all, if more than one) were fair? ☐ Yes ☐ No

50. Have any excessive force complaints been filed against you in the past 4 years? ☐ Yes ☐ No   (If no, skip to question 51)

    50a. How many excessive force complaints were filed against you over the past 4 years? _____

        50b. How many of these complaints were sustained? _____

        50c. Did you receive disciplinary actions for these complaints (for example, a reprimand, suspension, etc.)?
        ☐ Yes ☐ No

            50c1. If you received discipline, do you feel these actions (all, if more than one) were fair?
            ☐ Yes ☐ No

51. Have any other complaints been filed against you in the past 4 years? ☐ Yes ☐ No   (If no, skip to question 52)

    51a. How many other complaints were filed against you over the past 4 years? _____

        51b. How many of these complaints were sustained? _____

        51c. Did you receive disciplinary actions for these complaints (for example, a reprimand, suspension, etc.)?
        ☐ Yes ☐ No

            51c1. If you received discipline, do you feel these actions (all, if more than one) were fair?
            ☐ Yes ☐ No

52. If given the choice, would you prefer to work in an area with a high level of violent crime? ☐ Yes ☐ No

53. If given the choice, would you prefer to work in an area with a high level of calls for service? ☐ Yes ☐ No

54. If given the choice, would you prefer to work on a particularly busy shift? ☐ Yes ☐ No

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SECTION F: Perspectives on Policing

		Very Uninportant	Somewhat Uninportant	Somewhat Important	Very Important
55.	Would you say that, for you personally, getting promoted is....	☐	☐	☐	☐
56.	Would you say that, for you personally, moving from district patrol to a specialized unit, such as criminal investigations, is....	☐	☐	☐	☐
		Disagree Strongly	**Disagree**	**Agree**	**Agree Strongly**
57.	Enforcing the law is by far a patrol officer's most important responsibility.	☐	☐	☐	☐
58.	Police officers have reason to be distrustful of most citizens.	☐	☐	☐	☐
59.	A good patrol officer is one who patrols aggressively by stopping cars, checking out people, running license checks, and so forth.	☐	☐	☐	☐
60.	The relationship between the police and the citizens in Prince George's County is good.	☐	☐	☐	☐
61.	In order to do their jobs, patrol officers must sometimes overlook department policies.	☐	☐	☐	☐
62.	Assisting citizens is just as important as enforcing the law.	☐	☐	☐	☐
63.	Most people do *not* respect the police.	☐	☐	☐	☐
64.	An officer who makes many arrests will get many citizen complaints.	☐	☐	☐	☐
65.	The code of silence is an essential part of the mutual trust necessary to good policing.	☐	☐	☐	☐
66.	The PGPD concentrates on what we do wrong rather than what we do right.	☐	☐	☐	☐
67.	An officer who makes many arrests will get in many deadly force events.	☐	☐	☐	☐
68.	It is okay for police officers to use more aggressive tactics than they otherwise would use if the community has asked them to do so.	☐	☐	☐	☐
69.	In order to do their jobs, patrol officers must sometimes overlook laws and legal guidelines.	☐	☐	☐	☐
70.	An officer who makes many arrests will get in many vehicle pursuits.	☐	☐	☐	☐

Who can I contact for more information? If you have any questions about the anonymity and protection of information from this survey, you can contact Mr. Andy Hansen (803-777-2737, hansenja@email.sc.edu) or the Chair of the Human Subjects Institutional Review Board through the University of South Carolina Research Compliance Office (803-777-7095).

Thank you for taking the time to complete this survey.

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APPENDIX E: COMPLETE CASE ANALYSES

Table E.1. Logistic regression of undesired events on on-duty collision involvement.

	Any On-Duty Collisions (1 = yes)	
	b (SE)	OR
Independent Variables:		
Vehicle Pursuit Frequency	0.078 (0.069)	1.081
Deadly Force Event Frequency	- 0.312 (0.546)	0.732
Excessive Force Complaint Frequency	0.075 (0.251)	1.078
Other Complaint Frequency	0.403 (0.147)**	1.496
Control Variables:		
Male	- 0.044 (0.423)	0.957
Age	- 0.035 (0.033)	0.966
Race-Ethnicity		
African American	- 0.872 (0.438)*	0.418
Hispanic	- 1.010 (0.667)	0.364
Other	- 0.694 (0.579)	0.500
Educational Attainment		
High School	0.755 (0.593)	2.128
2 years or Less of College	0.270 (0.406)	1.310
Associate's Degree	- 0.282 (0.631)	0.755
In Committed Relationship	- 0.312 (0.414)	0.732
Have Children	0.465 (0.426)	1.592
Officer Rank	0.391 (0.498)	1.478
District		
2	- 0.265 (0.649)	0.767
3	1.107 (0.619)	3.024
4	- 0.535 (0.568)	0.586
5	- 1.373 (0.806)	0.253
6	0.367 (0.831)	1.444
Prior Law Enforcement Experience	- 0.066 (0.567)	0.936
Prior Military Experience	0.389 (0.410)	1.476
Law Enforcement Hours (Weekly)	- 0.046 (0.020)*	0.955
Other Employment Hours (Weekly)	0.068 (0.026)**	1.070
Commute Daily (in Minutes)	0.005 (0.005)	1.006
Off-Duty Collision Frequency	1.287 (0.359)***	3.623
Productivity Link Scale	- 0.009 (0.090)	0.991
Peer Productivity Scale	0.004 (0.084)	1.004
Officer Productivity Scale	- 0.007 (0.069)	0.993
Preferred Assignment Scale	- 0.142 (0.151)	0.868
Routine Events Supervision Scale	0.061 (0.111)	1.063
Rare Events Supervision Scale	0.080 (0.076)	1.083
Driving Limitations Scale	- 0.018 (0.092)	0.982
Other Limitations Scale	0.087 (0.123)	1.090
Constant	0.014 (2.797)	1.014

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

Table E.2. Multinomial regression of undesired events on on-duty collision frequency.

	Zero vs. One	
	b (SE)	OR
Independent Variables:		
Vehicle Pursuits	- 0.019 (0.102)	0.980
Deadly Force Events	0.337 (0.555)	1.400
Excessive Force Complaints	- 0.088 (0.287)	0.916
Other Complaints	- 0.500 (0.162)**	0.607
Control Variables:		
Male	- 0.223 (0.727)	0.780
Age	- 0.007 (0.038)	0.993
Race-Ethnicity		
African American	1.121 (0.547)*	3.067
Hispanic	0.886 (0.838)	2.426
Other	0.325 (0.694)	1.384
Educational Attainment		
High School	- 0.215 (0.786)	0.808
2 years or Less of College	- 0.194 (0.489)	0.823
Associate's Degree	0.679 (0.806)	1.972
In Committed Relationship	- 0.041 (0.547)	0.960
Have Children	- 0.321 (0.525)	0.726
Officer Rank	0.160 (0.551)	1.174
District		
2	0.160 (0.784)	1.174
3	- 0.601 (0.769)	0.548
4	0.729 (0.680)	2.073
5	1.279 (0.965)	3.591
6	- 0.306 (1.005)	0.737
Prior Policing Experience	0.795 (0.809)	2.215
Prior Military Experience	- 0.179 (0.496)	0.836
Law Enforcement Hours	0.065 (0.028)*	1.067
Other Employment Hours	- 0.048 (0.030)	0.953
Daily Commute	- 0.008 (0.006)	0.992
Off-Duty Collisions	- 1.202 (0.409)**	0.301
Productivity Links	0.073 (0.106)	1.076
Peer Productivity	- 0.056 (0.100)	0.945
Officer Productivity	- 0.023 (0.080)	0.978
Preferred Assignment	0.060 (0.183)	1.061
Routine Event Supervision	- 0.012 (0.102)	0.988
Rare Events Supervision	- 0.005 (0.085)	0.995
Driving Limitations	0.122 (0.117)	1.130
Other Limitations	- 0.218 (0.155)	0.804
Constant	- 0.064 (3.547)	0.938

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \le .001$ **$p \le .01$ *$p \le .05$ (two-tailed test).

Table E.3. Multinomial regression of undesired events on on-duty collision frequency.

	Zero vs. Two or More		One vs. Two or More	
	b (SE)	OR	*b* (SE)	OR
Independent Variables:				
Vehicle Pursuits	- 0.158 (0.085)	0.854	- 0.139 (0.109)	0.871
Deadly Force Events	0.641 (0.619)	1.898	0.304 (0.495)	1.356
Excessive Force Complaints	- 0.113 (0.313)	0.893	- 0.025 (0.317)	0.975
Other Complaints	- 0.227 (0.168)	0.797	0.273 (0.141)*	1.314
Control Variables:				
Male	0.381 (0.771)	1.464	0.604 (0.861)	1.830
Age	0.104 (0.054)*	1.110	0.112 (0.059)	1.118
Race-Ethnicity				
African American	0.561 (0.611)	1.752	- 0.560 (0.702)	0.571
Hispanic	1.066 (0.870)	2.903	0.180 (1.037)	1.197
Other	1.102 (0.789)	3.011	0.777 (0.868)	2.175
Educational Attainment				
High School	- 1.139 (0.817)	0.320	- 0.925 (0.967)	0.397
2 years or Less of College	- 0.345 (0.531)	0.708	- 0.151 (0.598)	0.860
Associate's Degree	- 0.584 (0.575)	1.063	- 0.618 (0.997)	0.539
In Committed Relationship	0.061 (0.827)	1.682	0.561 (0.648)	1.753
Have Children	- 0.418 (0.570)	0.659	- 0.097 (0.648)	0.908
Officer Rank	- 1.319 (0.555)	0.268	- 1.479 (0.771)	0.228
District				
2	0.751 (0.869)	2.120	0.591 (0.973)	1.806
3	- 1.971 (0.790)**	0.139	- 1.370 (0.866)	0.254
4	0.526 (0.768)	1.693	- 0.203 (0.853)	0.817
5	1.575 (1.089)	4.829	0.296 (1.250)	1.345
6	- 0.351 (1.097)	0.704	- 0.046 (1.215)	0.955
Prior Policing Experience	- 0.512 (0.708)	0.599	- 1.307 (0.887)	0.271
Prior Military Experience	- 0.809 (0.546)	0.445	- 0.630 (0.613)	0.533
Law Enforcement Hours	0.029 (0.025)	1.030	- 0.036 (0.030)	0.965
Other Employment Hours	- 0.102 (0.033)**	0.903	- 0.053 (0.035)	0.948
Daily Commute	- 0.004 (0.007)	0.996	0.004 (0.007)	1.004
Off-Duty Collisions	- 1.296 (0.431)**	0.274	- 0.095 (0.399)	0.910
Productivity Links	- 0.060 (0.117)	0.942	- 0.133 (0.128)	0.876
Peer Productivity	0.109 (0.110)	1.115	0.166 (0.119)	1.180
Officer Productivity	0.006 (0.097)	1.006	0.028 (0.106)	1.029
Preferred Assignment	0.267 (0.206)	1.306	0.207 (0.233)	1.230
Routine Event Supervision	- 0.157 (0.161)	0.855	- 0.146 (0.178)	0.865
Rare Events Supervision	- 0.317 (0.144)	0.728	- 0.313 (0.148)	0.732
Driving Limitations	- 0.160 (0.121)	0.853	- 0.282 (0.143)*	0.754
Other Limitations	0.028 (0.155)	1.028	0.246 (0.179)	1.278
Constant	4.601 (3.854)	99.594	4.665 (4.354)	106.203

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***p ≤ .001 **p ≤ .01 *p ≤ .05 (two-tailed test).

Table E.4. Logistic regression of undesired events on at-fault collision involvement.

	Any At-Fault Collisions (1 = yes)	
	b (SE)	OR
Independent Variables:		
Vehicle Pursuit Frequency	0.037 (0.037)	1.038
Deadly Force Event Frequency	0.599 (0.526)	1.820
Excessive Force Complaint Frequency	- 0.349 (0.272)	0.705
Other Complaint Frequency	0.198 (0.115)	1.219
Control Variables:		
Male	- 0.523 (0.584)	0.593
Age	- 0.010 (0.036)	0.990
Race-Ethnicity		
African American	- 0.512 (0.471)	0.599
Hispanic	- 1.884 (0.982)	0.152
Other	- 0.094 (0.586)	0.910
Educational Attainment		
High School	0.737 (0.645)	2.090
2 years or Less of College	- 0.329 (0.443)	0.720
Associate's Degree	0.056 (0.648)	1.058
In Committed Relationship	- 0.461 (0.440)	0.631
Have Children	0.298 (0.468)	1.347
Officer Rank	0.649 (0.563)	1.913
District		
2	- 0.269 (0.722)	0.764
3	1.448 (0.632)*	4.255
4	- 0.131 (0.627)	0.877
5	- 0.619 (0.830)	0.538
6	0.365 (0.838)	1.441
Prior Law Enforcement Experience	- 0.716 (0.608)	0.489
Prior Military Experience	0.252 (0.453)	1.286
Law Enforcement Hours (Weekly)	- 0.006 (0.018)	0.994
Other Employment Hours (Weekly)	0.054 (0.025)*	1.056
Commute Daily (in Minutes)	0.002 (0.005)	1.002
Off-Duty Collision Frequency	0.583 (0.302)*	1.792
Productivity Link Scale	- 0.078 (0.099)	0.925
Peer Productivity Scale	0.001 (0.089)	1.001
Officer Productivity Scale	- 0.039 (0.073)	0.962
Preferred Assignment Scale	0.013 (0.169)	1.013
Routine Events Supervision Scale	0.193 (0.130)	1.213
Rare Events Supervision Scale	0.102 (0.091)	1.107
Driving Limitations Scale	- 0.039 (0.105)	0.962
Other Limitations Scale	0.145 (0.132)	1.157
Constant	- 3.554 (2.987)	0.029

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

Table E.5. Multinomial regression of undesired events on at-fault collision frequency.

	Zero vs. One	
	b (SE)	OR
Independent Variables:		
Vehicle Pursuits	- 0.045 (0.036)	0.956
Deadly Force Events	- 0.569 (0.461)	0.566
Excessive Force Complaints	0.210 (0.259)	1.234
Other Complaints	- 0.208 (0.110)	0.812
Control Variables:		
Male	0.688 (0.591)	1.989
Age	- 0.019 (0.036)	0.981
Educational Attainment		
High School	- 0.488 (0.586)	0.614
2 years or Less of College	0.391 (0.450)	1.479
Associate's Degree	- 0.084 (0.614)	0.920
In Committed Relationship	0.001 (0.469)	1.001
Have Children	- 0.108 (0.453)	0.897
Officer Rank	- 1.006 (0.582)	0.366
Prior Military Experience	- 0.269 (0.436)	0.764
Law Enforcement Hours	0.016 (0.019)	1.016
Other Employment Hours	- 0.043 (0.025)	0.958
Daily Commute	- 0.003 (0.005)	0.997
Off-Duty Collisions	- 0.441 (0.308)	0.644
Productivity Links	0.051 (0.103)	1.052
Peer Productivity	- 0.127 (0.062)*	1.068
Officer Productivity	0.076 (0.074)	1.079
Preferred Assignment	- 0.094 (0.173)	0.911
Routine Event Supervision	- 0.306 (0.130)*	0.737
Rare Events Supervision	0.004 (0.089)	1.004
Driving Limitations	0.066 (0.098)	1.068
Other Limitations	- 0.158 (0.133)	0.854
Constant	5.874 (2.782)	355.757

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).

Table E.6. Multinomial regression of undesired events on at-fault collision frequency.

	Zero vs. Two or More		One vs. Two or More	
	b (SE)	OR	b (SE)	OR
Independent Variables:				
Vehicle Pursuits	0.101 (0.232)	1.106	0.146 (0.234)	1.157
Deadly Force Events	- 0.597 (0.712)	0.550	- 0.028 (0.615)	0.973
Excessive Force Complaints	0.518 (0.549)	1.679	0.308 (0.764)	1.361
Other Complaints	0.146 (0.367)	1.157	0.354 (0.375)	1.425
Control Variables:				
Male	- 0.250 (1.423)	0.779	- 0.938 (1.476)	0.391
Age	0.243 (0.126)*	1.275	0.262 (0.129)*	1.300
Educational Attainment				
High School	0.355 (1.392)	1.426	0.842 (1.445)	2.322
2 years or Less of College	0.714 (1.037)	2.042	0.323 (1.101)	1.381
Associate's Degree	- 1.183 (1.432)	0.833	- 0.099 (1.499)	0.906
In Committed Relationship	1.860 (0.898)*	6.425	1.859 (0.964)	6.419
Have Children	- 0.728 (1.086)	0.483	- 0.619 (1.141)	0.538
Officer Rank	2.057 (1.383)	7.822	3.063 (1.451)	21.381
Prior Military Experience	- 0.437 (1.086)	0.646	- 0.167 (1.142)	0.846
Law Enforcement Hours	- 0.009 (0.044)	0.991	- 0.025 (0.046)	0.975
Other Employment Hours	- 0.069 (0.058)	0.933	- 0.026 (0.061)	0.974
Daily Commute	- 0.009 (0.011)	0.992	- 0.011 (0.010)	0.994
Off-Duty Collisions	- 0.684 (0.546)	0.505	- 0.244 (0.561)	0.784
Productivity Links	- 0.030 (0.173)	0.970	- 0.081 (0.189)	0.922
Peer Productivity	0.156 (0.147)	1.169	0.283 (0.156)	1.327
Officer Productivity	0.019 (0.181)	1.019	- 0.057 (0.190)	0.945
Preferred Assignment	0.104 (0.410)	1.110	0.198 (0.434)	1.219
Routine Event Supervision	0.235 (0.226)	1.265	0.541 (0.250)	1.717
Rare Events Supervision	- 0.384 (0.312)	0.681	- 0.388 (0.320)	0.679
Driving Limitations	- 0.355 (0.261)	0.701	- 0.421 (0.273)	0.656
Other Limitations	0.089 (0.270)	1.093	0.247 (0.284)	1.280
Constant	- 0.923 (7.919)	0.398	- 6.797 (8.198)	0.001

Note. Entries are unstandardized partial regression coefficients (*b*), standard errors (SE), and odds ratios (OR). ***$p \leq .001$ **$p \leq .01$ *$p \leq .05$ (two-tailed test).