2
2009

This is to certify that the
thesis entitled

THE EFFECT OF HIGHER EDUCATION ON
POLICE BEHAVIOR

presented by

JASON RYDBERG

has been accepted towards fulfillment
of the requirements for the

M.S. degree in CRIMINAL JUSTICE

William Terrill
Major Professor's Signature

4/17/09
Date

MSU is an Affirmative Action/Equal Opportunity Employer

THE EFFECT OF HIGHER EDUCATION ON POLICE BEHAVIOR

By

Jason M. Rydberg

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Criminal Justice

2009

ABSTRACT

THE EFFECT OF HIGHER EDUCATION ON POLICE BEHAVIOR

By

Jason M. Rydberg

In the past, police scholars have examined the impact of higher education on different measures of officer behavior. These previous studies were conducted in such a way that comparing findings was difficult, such as focusing on a single behavior per study. The research presented in this manuscript examines the effect of college education on three dimensions of police behavior (e.g., arrests, searches, and the use of force), so as to improve comparability. The results of the analysis indicate that higher education carries no influence over the probability of an arrest or search occurring in a police suspect encounter. College education does, however, significantly reduce the likelihood of force occurring in an encounter. More specifically, some exposure to college reduces the likelihood of verbal force, but a four-year degree is necessary to reduce the likelihood of physical force. Results may be due to the amount of discretion officer's exercise in pursuing these behaviors. Limitations in the previous literature to develop and test hypotheses regarding why higher education should be expected to influence police behavior are highlighted. Finally, recommendations for future inquiries revolving around theory development and incorporation of research from the field of education are presented along with implications for policy.

AKNOWLEDGEMENTS

First and foremost, I would like to thank the members of my thesis committee (Dr. Timothy Bynum, Dr. Christina DeJong, and Dr. William Terrill) for their guidance in preparing this manuscript. I would like to thank Dr. Terrill, in particular, for the numerous thoughtful revisions and taking the time to discuss the ideas in this thesis with me at length in order to draw out the best ways to present them. His direction during my masters studies as a whole has been immensely important to my time at Michigan State University. I would also like to thank Rebecca Stone for her constructive criticism and Eric Grommon for his incessant nagging, both of which undoubtedly improved the quality of this thesis well beyond what I thought myself capable of writing on my own.

In a broader sense, I would like to thank my parents for their commitment to my education and for their ever-present support. And I would also like to thank Dr. Sean Varano, for without his advice and friendship, I would probably still be working in an intellectually unfulfilling job, wondering whether to continue my education.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I: INTRODUCTION

Police scholars and practitioners have long called for the adoption of a college education requirement for police officers as a condition of employment (Carter & Sapp, 1990). Beginning with the professional movement in the early 1900s, the importance of education was seen as a means to a better style of policing. As the century progressed several high profile national commissions (e.g., Wickersham Commission and President's Commission on Law Enforcement and Administration of Justice) also heralded the benefits of police education. More recently, officer education has been linked to community policing, which is thought to require a greater aptitude for innovation and creativity in problem solving among line-level officers (Carter & Sapp, 1992).

Despite repeated calls for a college education requirement, few agencies have instituted such a policy. In fact, only one percent of local police departments in the United States require a four-year college degree (Hickman & Reaves, 2006). The discrepancy between the recommendations of national leadership and actual departmental requirements may be attributable to a paucity of evidence suggesting that education has a desirable impact on police behavior. While it seemed sensible to police reformers that a college education would result in a better police officer, the rationale for believing such a relationship existed was grounded primarily in rhetoric (Carter & Sapp, 1990). Indeed, numerous opponents of college education requirements question exactly which aspects of higher education enhance an officer's performance on the job (Bayley & Bittner, 1997; Bittner, 1970; Miller & Fry, 1976a; Shernock, 1992).

Since the 1970s a body of research has developed that attempts to empirically

examine the impact of college education on the police. The majority of this research has focused on the effect of education on officer attitudes, finding that college-educated officers hold beliefs that are less authoritarian (Dalley, 1975), rigid (Roberg, 1978), and punitive (Carlan & Byxbe, 2000; Guller, 1972) than their non-college educated colleagues. To a lesser extent, some research has focused on specific aspects of police behavior, examining the effect of education on an officer's propensity to arrest (Bozza, 1973; Fickenauer, 1975) and to use force (Paoline & Terrill, 2007; Worden, 1996). Unfortunately, many of these previous inquiries have been driven by weak methodologies and atheoretical frameworks.[1] The National Academics Panel on Police Policy and Performance, in particular, cited concern over poor methodologies such as inadequate samples, as well as the inability to control for potentially theoretically relevant variables (Skogan & Frydl, 2004). Moreover, while there is some evidence suggesting college educated officers behave differently than non-college educated officers, findings regarding the direction of education's impact on police behavior have been largely inconsistent. Prior work in this area has also been limited to studies focusing on but one

[1] Many of the works in this body of literature devote little effort to developing hypotheses regarding *why* or *how* education impacts police attitudes or behaviors. For example, Cunningham (2006) states that data show education to have a significant impact on an officer's disciplinary infractions because of "some unknown reason" (p. 22), but does not offer evidence for what that reason may be. Yet more studies cite the findings of previous literature as a reason for believing education should have an impact on officer behavior, when those earlier studies suffer from their own shortcomings. For example, Smith, Locke, and Fenester (1970) are commonly cited as evidence that officers with a college degree are less authoritarian than their non-college educated colleagues. Their study was actually the third in a series of examinations on the impact of education on the New York City Police Department. In the first of the three studies (Smith, Locke, & Walker, 1967), the authors determined that there was existing differences in authoritarianism between their college and non-college samples well before the officers had completed their college degrees. This signifies a time-order problem that was never remedied but continues to be cited as evidence of educations' impact on the police.

behavioral outcome at a time (e.g., arrest or force), thereby making it difficult to compare outcomes across studies (e.g., the role of education on arrest versus force).

The current inquiry will attempt to overcome some of the limitations associated with previous studies, particularly the latter one. Using observational data from two medium-sized cities, this research will examine the impact of officer education on three specific measures of behavior (i.e., arrests, searches, and the use of force). The analysis will allow for a comparison of education's impact on these behaviors, which has not been available in the literature to date. If officer education has a significant effect on more than one of these behaviors, these effects may be compared to determine where education's impact on police behavior is strongest.

This manuscript will first review the historical background of higher education in policing, from the first reform period in the early twentieth century until present day. Following this section, a literature review will cover previous empirical examinations of education's impact on police attitudes, and propensity to arrest, search, and use force. The thesis will continue with a deduced theoretical framework, research questions, and a discussion of the methodology. Univariate statistics, bivariate analyses, and multivariate analyses will then examine the impact of officer education on arrests, searches, and the use of force. Finally, the results of the analyses will be interpreted and discussed, along with directions for future research and implications for policy.

CHAPTER II: HISTORICAL BACKGROUND

The movement advocating a college-educated police force arose from efforts in the early 1900s to professionalize the American police. Though there have been competing definitions of professionalism between scholars and practitioners (Skolnick & Fyfe, 1993; Baro & Burlingame, 1999), reformers sought to attain it primarily through redefinition of the police mission, bureaucratization of police departments, and the improvement of personnel quality (Fogelson, 1977). From the origin of the professionalism movement, increasing the education level of officers was thought to be one such avenue of improvement (Sherman, 1978). By improving the education level of the police officer, reformers believed that not only would the officer become more effective in his/her day-to-day tasks and more proficient with technology, but the public image of the police as a whole would be heightened to that of a professional occupation (LeDoux, Tully, Chronister, & Gansneder, 1984).[2]

The status of the American police force in the early twentieth century

The commonly held image of the American police in the early 1900s was that of ineffectiveness and corruption, both criminal and political (Walker, 1977). The image was largely accurate for the time. Fogelson (1977) writes of media interviews in the 1930s where former officers depicted urban police as irresponsible drunks, dabbling in corrupt activities such as gambling and prostitution, and purposefully employing

---

[2] Bittner posits that the driving force behind the attempts of reformers to link higher education to policing "is to abolish permanently the idea that is all too prevalent in our society that if one does not want to take the trouble of becoming something worthwhile, he can always become a cop" (1970: 83).

excessive force to gain compliance from suspects.[3] Political interference from city ward bosses was partially to blame for the poor state of police character, as they held political influence over almost all ranks in the police hierarchy. Reformers of the period recognized that the removal of partisan politics from policing was necessary to improve the public image of the police (Walker, 1977), though they also recognized that reform could not stop at the moral character of officers.

Improvement of the police required attention towards the quality of personnel. Fogelson (1977) writes that police in the early part of the twentieth century were not only morally corrupt but also somewhat incompetent. Several sources mention an inquiry at the time of the First World War which indicated that 75 percent of police personnel could not pass an Army intelligence test (LeDoux et al., 1984; National Commission on Law Observance and Enforcement, 1931; Sherman, 1978).[4] Increasing the education of police recruits, among other options, was viewed as a vehicle to propel the police officer to a similar status as other professional occupations (Bittner, 1970; Fogelson, 1977). The first such organized attempts to tie the policing profession to academic achievement were lead by August Vollmer, the police chief in Berkley, California from 1905 to 1932 (Carte, 1973).

---

[3] The use of excessive force was frequently referred to as the "third degree" during this time (Fogelson, 1977).

[4] The army intelligence test being referred to was the Army Alpha intelligence test created by Yerkes (1921). Gould (1996) offers a scathing critique of Yerkes methods, questioning the test's reliability, and providing evidence that it does not actually measure intelligence, but rather familiarity with American culture. As such, this figure of "75 percent" should be approached with caution. It is unfortunate then, that the Wickersham Commission would later advocate using the Army Alpha to determine whether an applicant would be worthy of employment as a patrol officer (National Commission on Law Observance and Enforcement, 1931).

Vollmer is best-known for his effort to single-handedly professionalize the police force in Berkley (Walker, 1977). His contributions to the department were largely in the form of implementing the use of new technologies to aid the police in their work. Of particular importance to the current inquiry, Vollmer encouraged recruits to attend classes in police administration at the nearby University of California (Carte, 1973). In viewing the new advances in technology available to the policing practice, Vollmer posited that recruits would require skills that they could not learn while on the job. Advocating a college education was an effort then to provide would-be officers the background necessary to be a part of the prestigious, more technologically inclined police profession (Carte 1973).

The implementation of Vollmer's reforms created a publicly popular department referred to as Berkley's "college cops." In reality the Berkley police department was never made up of a majority of college graduates (Carte, 1973). This was not surprising given that the average American citizen at the time did not finish high school (Roberg & Bonn, 2004). Elsewhere in the country, survey data indicated that only "two out of three [officers] finished grade school" and "only one out of ten graduated from high school" (Fogelson, 1977:102). These data indicate that police recruits in the early 1900s were representative of the communities they served, in terms of education at least. In light of this, police reformers seeking to elevate the profession were willing to require more of recruits than the average citizen could offer. In the next decade these wishes would serve as the first calls for a college education requirement for the police.

Vollmer's efforts to link higher education and policing showed little impact

outside of Berkley before the 1930s. As he gained national recognition he was invited to aid other departments as a consultant, and spent a year in Los Angeles in the 1920s. He found that it was far more difficult to implement reform in a department that was many times larger than that of Berkley (Walker, 1977).

National commissions from the 1930s to the 1970s

Wickersham commission. Despite lack of success elsewhere, Vollmer's achievements in Berkley and his tenure as the president of the International Association of Chiefs of Police (IACP) in 1922 gained him enough national recognition to be selected as a key contributor to the 1929 National Commission on Law Observance and Enforcement (1931; Walker, 1977) to report on the state of the police. The commission would be better known as the Wickersham Commission, named after its chairman, then Attorney General George W. Wickersham (Fogelson, 1977). The final report of the Commission discussed many crime-related topics relevant to the time - prohibition and corruption in law enforcement receiving the most attention (Walker, 1977).

Most relevant to the current research, the Wickersham Commission believed that higher education played a potential role in improving the quality of police personnel. Coauthoring the report on the police, David Monroe with the University of Chicago optimistically wrote that he wished to see a college education become available to all police recruits. He believed that only under that circumstance would the police "ever hope to successfully cope with the crime situation" (National Commission on Law Observance and Enforcement, 1931: 85). The recommendations of the Commission would receive little follow-through from police agencies. Police administrators were

skeptical of the benefits of a college education for recruits (Decker & Huckabee, 2002), especially when it was likely that they never attended college themselves (Bittner, 1970; Fogelson, 1977). At the time of the Wickersham final report, the majority of police agencies in this period did not require even a high school education of their recruits (Roberg & Bonn, 2004). This most likely reflected the educational attainment of the average citizen at the time, and as the American population became more educated, ultimately the police force would as well.

The issue of college education for police recruits received very little attention between the 1930s and the 1960s. However, the lack of congruence between commission recommendations and the educational requirements of police agencies did not stop academic institutions from providing law enforcement-based education. During that time some of the first full-time college curriculums designed for police officers were being created. In 1935, Michigan State University became the first institution to offer a full-time five-year pre-service curriculum (LeDoux et al., 1984).[5] Besides a few select programs at some well-known universities, the majority of curriculums designed for police recruits existed in community colleges as two-year associate degree programs in police science. By 1957, survey data indicated that 77 degree granting programs in police-related science existed in the United States (Germann, 1957; Stephens, 1976).

Commissions of the 1960s and 1970s. The 1960s would see increased relevance for a college education for police recruits and the issue again received attention from

---

[5] The Michigan State University curriculum for police administration in 1935 included three years and a term of physical education courses such as wrestling and boxing, along with a heavy load of mathematics and science courses such as bacteriology, mammalian anatomy, and general chemistry. In the fourth year of the program the curriculum required that students begin an 18 month training period at the Michigan State Police barracks, where they received the same training as police recruits (Michigan State College, 1936).

national commissions. Following the relatively low crime rates in the 1950s, the 1960s brought with it a national wave of crime and civil unrest. Public attention on the growing crime rate called into question the competence and ability of the police to effectively cope (Sherman, 1978). Walker (1977), reflecting on that period, concluded that the previous era of police reform in the 1920s and 1930s was the cause of the more recent lack of adaptability. During that period, while educational reforms failed to gain traction, organizational reform from a service oriented approach to a legalistic, paramilitary approach had become widely adopted. This shift was posited to be the cause of the police becoming further separated from, and antagonistic towards, the communities in which they served. Future commissions would recognize that the problem was not the rising crime rates, but that the paramilitary shift in the police threatened democratic values (Jacobs & Magdovitz, 1977).

Beginning with the 1967 President's Commission on Law Enforcement and the Administration of Justice, numerous reports would be filed recommending that the police would need to reform their role in order to adapt to the changing American society. Among the numerous commissions a common perception was that in order for the police to effectively adapt to complex tasks in a complex society, educational standards must be raised (Carter & Sapp, 1990; Hawley, 1998).[6] Many of the commissions went as far as recommending that all police officers obtain a four-year college degree within the next decade (National Advisory Committee on Criminal Justice Standards and Goals, 1973).

---

[6] The other commissions being the 1969 National Commission on Causes and Prevention of Violence, the 1971 President's Commission on Campus Unrest, the 1973 American Bar Association Project on Standards for Criminal Justice, and the 1973 National Advisory Commission on Criminal Justice Standards and Goals (Sherman, 1978).

Unlike the recommendation of the Wickersham Commission some 30 years earlier, the educational recommendation made in the 1960s and 1970s would receive some follow-through by police agencies.

In order to allocate funding towards higher education for the police (and other criminal justice personnel), the 1968 Omnibus Crime Control Act created the Law Enforcement Education Program (LEEP). The LEEP provided federal funding to colleges and universities to create curriculums for police and funding to police departments to provide incentives for officers to return to school to obtain a degree (Carter & Sapp, 1990). Between 1968 and 1978 LEEP provided approximately $300 million towards the education of criminal justice officials, many of which were police (Sherman, 1978). The result was something of an explosion in the number of degree-granting programs designed for law enforcement personnel. To illustrate, in 1966 there were 184 colleges and universities offering such programs. By 1976 this figure had increased to 1,070 institutions, though the majority were being offered in community colleges, with classes being taught by fellow police officers (Sherman, 1978).

As a result of the availability of federal subsidies for their education, American police officers took advantage of the available funds and their average education level increased. In 1960, only three percent of officers held a four-year degree. By 1974 this figure had increased to nine percent of officers. The proportion of officers that had taken at least one college course increased substantially over the same period (National Planning Association, 1978). Despite increases in the education level of officers, police agencies had not increased their requirements by similar lengths. By 1975, only six

percent of departments required any college education of their recruits, and less than one percent required a four-year degree (National Planning Association, 1978). It would appear that police agencies were unwilling to increase their educational requirements to the extent recommended by national commissions in the 1960s and 1970s, similar to the reaction of agencies following the Wickersham report some 30 plus years earlier.

Higher education for police from the 1980s to Present

Following the criticism of the 1960s which accused the police of becoming too militaristic and disconnected from the communities they served, the 1980s would see reform that attempted to mend the gap between officers and citizens. Community policing, or problem-oriented policing, was a product of this era of police reform. The community policing approach attempted to change the focus of police effectiveness from quantities such as the number of arrests or stops made, to a focus on the ability of police to solve problems. This approach was considered as a strategy for the police to target the underlying issues causing crime in communities (Goldstein, 1979; Trojanowicz, 1994; Xu, Fiedler, & Flaming, 2005). Adapting such an approach was also thought to broaden the role of the police in the context of community issues. Officers would be required to establish rapport with citizens in order to more effectively identify sources of disorder and locate problems as identified by residents (Paoline, Myers, & Worden, 2000; Wilson & Kelling, 1982).

In 1988 the Police Executive Research Forum (PERF) conducted a national survey examining the state of police education in America, which included a review of the literature to date and the surveying of a large number of police agencies. The research

population for the PERF survey included all local police departments serving populations of 50,000 residents or more, all state police/highway patrol agencies, all countywide police departments with 100 or more employees, and all county sheriff's departments with 100 or more employees, for a total of 699 agencies surveyed (Carter & Sapp, 1990). The results of the PERF study indicated that the adoption of a community policing model increased the responsibilities of patrol officers which required them to be better decision makers, more innovative, and more tolerant. The authors of the PERF report believed that these findings made college education for police officers more relevant than in the past (Carter & Sapp, 1990, 1992).

The PERF survey also reported changes in the education level of police officers. The most dramatic change from the past was seen in officers holding a four-year degree. Survey findings indicated that 23 percent of the 250,000 officers surveyed held four-year degrees, up from nine percent in 1974. The dramatic increase in the percent of officers with college degrees appeared to have happened despite little growth in the number of police agencies requiring a college degree. By 1988 only 14 percent of police departments surveyed required any college of their recruits, up from six percent in 1975. Of those 14 percent, less than one percent required a four year degree, while nine percent required a two-year degree. Police agencies surveyed did indicate, however, that recruits with college credits would hold a competitive advantage in selection (Carter & Sapp, 1990, 1992).

More recent data from the Law Enforcement Management and Administrative Statistics Survey (LEMAS) indicates that while police officers became more educated,

police departments lag behind in minimum education requirements. The 2000 LEMAS indicated that 83 percent of all departments required only a high school diploma of their recruits, while eight percent required a two-year degree and one percent required a four-year degree. For departments serving cities with one million or more residents, a third required some college of their recruits, while none required a degree of any kind. By 2003, the percentage of departments requiring degrees of their recruits remained stable, with nine percent requiring a two-year degree and one percent requiring a four-year degree (Hickman & Reaves, 2003, 2006).

These are the most recent data available to describe the state of higher education in policing. Since the Wickersham Commission first called for a college education requirement for the police in 1931, departments have been reluctant to follow this suggestion. In attempting to explain the disconnect, Bell (1979) and Hawley (1998) suggest that police administrators may be concerned about factors such as keeping officers representative of the communities they serve, or that instituting a minimum college requirement may be discriminatory towards women and minorities. Carter, Sapp, and Stephens (1988) posit that police agencies seeking to hire college educated recruits would have to make serious considerations of the available applicant pool. These considerations include how many college educated recruits would be available, how much additional salary would the department have to offer to remain competitive with private industry, and how much additional background investigation of recruits would have to be conducted, given that college students tend to be a more transient population. Another potential reason for the small proportion of departments requiring a college

degree may be the lack of evidence national commissions have presented to make the case that a college education requirement will produce a desirable outcome (Skogan & Frydl, 2004).

CHAPTER III: LITERATURE REVIEW

As illustrated in the preceding section, numerous national commissions recommended that police agencies require a four-year degree, however, national statistics indicate that few departments have followed suit (Hickman & Reaves, 2006). Lack of evidence for a desirable effect of education on police behavior has been cited as a major reason for the discrepancy between national recommendations and actual department requirements. As Carter and Sapp (1990) point out, the recommendations of the commissions were largely based on intuition and rhetoric, rather than empiricism. Higher education, they posit, was viewed as a solution to the problems of policing because it was logical that a young profession would require more rigorous academic preparation.[7] Reflecting on the lack of empirical basis for the arguments of previous commissions, the 1973 National Advisory Commission on Criminal Justice Standards and Goals concluded that they had not provided sufficient justification for a minimum education requirement for police recruits, and failed to link higher education to desirable objectives.

As noted, the previous endorsement for a college education requirement was grounded in perceived commonsense and emotion. These are, however, superficial methods for understanding complex relationships when compared to scientific inquiry. Since the early 1970s, a body of literature has formed which attempts to empirically examine education's effect on police officers. Research on this relationship has measured police performance across several different dimensions. Some studies focus only on

---

[7] Here Carter and Sapp (1990) were comparing the relatively young policing profession to older, more established professions such as law or medicine.

education's effect on the attitudes of officers.[8] Other studies have focused on performance-based measures. Given that the performance of police officers is multi-faceted, previous authors have employed a multitude of measures in their research. These include measuring performance through perceptions of quality or satisfaction (e.g. citizen complaints) (Brandl, Stroshine, & Frank, 2001), supervisor ratings (Smith & Aamodt, 1997), injuries on the job (Cohen & Chaiken, 1973), and personal job satisfaction (Dantzker, 1993). The current inquiry is most related to previous studies that focus on specific officer-suspect encounter outcomes such as conducting a search, pursuing an arrest, or using force.

The evidence available does not provide a clear picture of the nature of the relationship between education and police performance. It is possible to recognize common themes in the results (Carter & Sapp, 1990), yet these are undermined by poor methodologies such as small samples or inadequate definitions of performance (Sherman, 1980; Skogan & Frydl, 2004). The following section will review the available literature within the areas of officer attitudes, arrests, searches, and the use of force.

The Effect of Officer Education on Attitudes

Previous studies have assessed education's impact on the attitudes of officers.[9] These works posit that the attitudes officers hold in regards to their work shape their behavior on the job, though behavior sometimes is not measured directly after the fact (Worden, 1989). While studies focusing on officer attitudes are intuitively appealing

---

[8] Because the current inquiry is focused on education's effect on actual officer performance, attitude-focused literature will only be mentioned for the sake of completeness.

[9] See Table 2 in the Appendix for additional information on each study's samples, data, and direction of findings.

there is actually little evidence for a strong link between attitudes and behavior (Muir, 1977; Sherman, 1978; Worden, 1989). Nevertheless, researchers have still spent considerable effort examining the effect of education on officer attitudes.

Research hypotheses in the literature examining this relationship tend to posit that police officers with more education will hold attitudes that deviate from those typically associated with traditional police work, which primarily center on authority and rigidity (Muir, 1977; Skolnick, 1964). Using scales measuring authoritarianism, conservatism, and propensity to arrest, Dalley (1975) found that university educated senior officers were significantly less authoritarian, more liberal, and more flexible than senior officers without such an education.[10] He did not find a difference between recruits with and without a college education, leading him to conclude that a college education may hinder the formation of stereotypical authoritarian and conservative attitudes as they gain experience. Researchers performing analyses similar to Dalley (1975) have found that obtaining a college education may ease officer's authoritarian attitudes (Smith, Locke, & Fenester, 1970), diminish punativeness (Carlan & Byxbe, 2000), correlate with liberal or more open belief systems (Guller, 1972; Roberg, 1978), and foster greater emphasis placed on ethical conduct (Shernock, 1992).

These generally desirable findings are conflicted by contradictory findings in other inquiries. Using data from the Project on Policing Neighborhoods, Paoline and colleages (2000) found that college educated officers were significantly more likely to distrust citizens than non-college educated officers. Dantzker (1993) found that after

---

[10] Dalley (1975) created a "Role Interpretation Scale" in which the officer was asked to rank various criminal offenses in order of severity and discuss whether he/she would pursue formal arrest action.

several years of service, college educated patrol officers became more dissatisfied with their work than patrol officers with a high school diploma. Several previous studies found that education has either very weak or no impact on officer attitudes (Buckley, McGinnis, & Petrunik, 1992; Miller & Fry, 1976a, 1978; Weiner, 1976). Further, Worden (1990) found education to have a weak to modest effect on a variety of perceptions officers hold towards their role, however, he warned against overemphasizing education's effect on attitudes by selectively underscoring a small number of statistically significant findings.

Reviewing the literature indicates that the relationship between officer education and attitudes remains unresolved. Nearly all findings regarding the relationship between education and attitudes face the criticism that these studies assume a strong relationship between attitudes and subsequent performance when there is little evidence supporting such an assumption (Frank & Brandl, 1991; Worden, 1989). Until a strong case can be made that changing officer attitudes through education is an effective means of improving performance, research efforts should focus on measuring education's impacts on officer performance directly. The remainder of the literature review will focus on empirical works which have examined the direct impact of education on officer performance, as measured by several outcomes of police-suspect encounters (e.g., arrests, searches, and force).

The Effect of Officer Education on Arrests

Previous examinations of the relationship between officer education and the propensity to arrest have produced inconclusive results.[11] Researchers have posited that

---

[11] See Table 3 in the Appendix for additional information on each study's samples, data, and direction of findings.

education affects arrests in different ways. For example, Glasgow, Green, and Knowles (1973) hypothesize that officers with lower levels of education will make more arrests because of an assumed theoretical tie between higher education and dissatisfaction with police work. That is, a lesser educated officer will be more satisfied and thus produce arrests at a higher level than an officer with more education, and thus, an inherent dissatisfaction with his/her work. Contrary to their hypothesis, their sample of 24 officers from the Costa Mesa Police Department indicated that higher levels of education were associated with higher rates of arrest.

Bozza (1973), using the same sample of 24 officers as Glasgow and colleagues (1973), chose to alter the hypothesis to posit that young officers with high levels of education would be eager to prove themselves and thus arrest at higher levels than older officers with lower levels of education. Bozza found support for his hypothesis in that the young officers with more education made more arrests than the older officers with less education.[12]

The only studies mentioned thus far have found that higher levels of officer education were associated with higher rates of arrest. Fickenauer (1975) found the opposite. In his sample of 98 police officers he noted that officers with college education were significantly less likely to invoke the arrest process than officers without a college education. Smith and Klein (1983) constituted the only other study that was found which indicated that better educated officers made fewer arrests. In this study the authors note

---

[12] Bozza (1973) did not attempt to isolate the effect of education, instead comparing groups of young, higher educated officers to older, lesser educated officers. He concedes that the difference between the groups could be attributed to more experienced officers learning methods of solving problems without deferring to the arrest process.

that this was only the case when considering the education level of the department as an aggregate measure. Using data from the Police Services Study (PSS), the authors found that officers in departments with a higher average level of education made fewer arrests than officers in departments with a lower average level of education.[13] Smith and Klein (1983) believed that the finding may indicate an impact of education on the informal police culture at the department level. Their hypothesis followed that departments with higher average levels of education would foster informal rules viewing arrest as a less desirable means of achieving an end. Officers that frequently used arrest would then not find much support for their behavior among their fellow officers.

Smith and Klein (1983) also examined models which used a measure for the individual officer's education level, but found that it did not produce an effect on the officer's propensity to arrest. The effect of education appeared to be completely controlled for by the victim's request to arrest or not arrest and the suspect's demeanor.[14] Similarly, Worden (1989), Brandl and colleagues (2001), and Smith and Aamodt (1997) found no direct relationship between individual officer education and the propensity to arrest. Interestingly, Worden (1989) found that no officer background characteristics – age, race, gender, or experience – explained his/her propensity to arrest.

---

[13] Examining education's effect on the aggregate level is fairly rare in the literature, as most of the previous studies are at the individual level. Fyfe (1988) points out that findings at the aggregate level may be complicated by the fact that non-patrol officers are included in the calculation of the department's education level. Thus personnel in technical capacities (i.e. roles that more explicitly demand a college degree) may unduly influence the results of aggregate analyses.

[14] In this case, "no relationship" meant that Smith and Klein's (1983) regression analysis found that the partial regression coefficient for individual officer education level on arrests was literally 0.000 in all models.

In sum, the literature pertaining to the association between officer education and arrests does little to provide clarity and the relationship remains unresolved. The studies in this area are characterized by poor methods (Hudzik, 1978; Skogan & Frydl, 2004), competing theoretical frameworks, and contradictory findings. The small number of studies is surprising given the important part that arrest plays in the central role of the police (Bittner, 1970). Studies focusing on the effect of education on arrests have been outnumbered by studies examining education's effect on officer attitudes and other general measures of performance such as injuries (Cascio, 1977), supervisor evaluations (Finnegan, 1976; Roberg, 1978; Truxillo, Bennet, & Collins, 1998), and citizen complaints (Cascio, 1977; Cohen & Chaiken, 1972; Kappeler, Sapp, & Carter, 1992; Lersch & Kunzman, 2001; Wilson, 1999). The difference could be due in part to ambiguity regarding what is a desirable outcome regarding arrest. While few would argue that lowering citizen complaints is a desirable outcome, the same consensus may not be reached regarding lower rates of arrest, depending on the goals of the department. While some may see higher education for recruits as a path to increased productivity in arrests, others may see it as a path to improved community relations. In an era where police agencies may be attempting to improve rapport between officers and their communities, increasing rates of arrest may not be a desirable mechanism.

The Effect of Officer Education on Searches

The relationship between officer education and his/her propensity to search suspects has received no scholarly attention. Of the two major reviews of the causes of police behavior (Riksheim & Chermak, 1993; Sherman, 1980) that review the effect of

education on a variety of officer behaviors, neither examines the effect of education on searches. Despite the dearth of scholarly attention there has been no lack of research examining factors associated with police searches, especially in traffic stop encounters. There have been a number of studies concerned with the effect of citizen or suspect characteristics on officer decision-making in this area (see Schafer, Carter, & Katz-Bannister, 2004 for a review). However, only three works are identified which include characteristics of officers in their analyses (Decker & Rojeck, 2002; Paoline & Terrill, 2005; Smith & Petrocelli, 2001), none of which include officer education as an independent variable.

The Effect of Officer Education on the Use of Force

Though the relationship between officer education and the use of force has received more attention than arrests and searches, it would be an overstatement to call this body of research large.[15] These studies incorporate different measures of force, some focusing on particular types of force such as discharging weapons, while others examine any show of force.[16] As with previous studies examining arrests, the literature on the relationship between officer education and use of force has produced mixed results.

One benefit with the force literature is that there is general uniformity in the hypothesized effects. In a seminal piece, Muir (1977) posited that the mark of a good police officer was his/her ability to use coercive force skillfully (i.e., avoiding

---

[15] See Table 4 in the Appendix for additional information on each study's samples, data, and direction of findings.

[16] This body of literature exemplifies the wide range of definitions which are considered to be incidences of force. These definitions include differentiating between levels of force such as verbal commands, physical contact (Paoline & Terrill, 2007) and deadly force (McElvain & Kposowa, 2008), excessive and reasonable force, and excessive and unnecessary force (Worden, 1996).

unnecessary or unreasonable force while still being comfortable using reasonable force to obtain compliance). He hypothesized that good communication skills played a key role in the skillful use of force, and a college education made an officer a superior interpersonal communicator. Much research in this area follows this line of thought and this notion has received strong empirical support.[17] The result is that most of the literature on officer education and force employ a hypothesis which states that college educated officers will use force less frequently than non-college educated officers.

Theoretically, research hypotheses regarding officer education and force do not have to be in complete agreement. As noted, most authors posit that college educated officers will be less likely to use force as their exposure to a college environment instilled in them self control and a greater ability to reflect on the consequences of their actions (Sherman & Blumberg, 1981). Yet, it is plausible to posit that college-educated officers are more likely to use force because college creates a greater drive to exceed expectations while following the mission of the department (Bozza, 1973).[18] There is also evidence to support a third hypothesis, that college-educated officers will not use force differently from non-college educated officers. Sherman (1978) draws comparisons between the training recruits receive in academies and the practitioner-oriented classes many officers take at community colleges. He states that because the officers typically attend colleges that are so similar in curriculum to what is received in a training academy, there will be

---

[17] In a meta-analysis of research on the impact of college on students from the 1970s and 1980s, Pascarella & Terenzini (2005) found strong freshman-to-senior gains in verbal skills and speaking skills. The strongest gains, however, were in critical thinking, reflective judgment, and conceptual complexity.

[18] Though Bozza (1973) is primarily concerned with arrests, it is not difficult to apply the same concept to police use of force.

no appreciable difference in the use of force between college-educated and non-college-educated officers.

The majority of studies in this area have found support for the hypothesis that college-educated officers use force less often than officers with a high school diploma. Several studies in this area have directly observed officers using force. Using observational data from the Project on Policing Neighborhoods (POPN), Terrill and Mastrofski (2002) found that officers with more education were significantly less likely to be involved in suspect encounters where force was used. Paoline and Terrill (2007), while examining the effect of education on escalating types of force, learned that simple exposure to college significantly reduced incidences of verbal force, but not physical force. They found that in order to see a significant reduction in physical force, officers needed to have obtained a four-year degree. Also using POPN data, Paoline and Terrill (2004) examined gender differences in the use of force in police-suspect encounters. They found that college educated male officers were less likely to use verbal force, but not physical force. Education did not appear to have an appreciable impact on the use of verbal or physical force by female police officers.

Yet more studies have examined education's impact on an officer's propensity to discharge their weapon. Using data from 186 officer-involved shootings in Southern California, McElvain and Kposowa (2008), found that officers with a college degree were more than 41 percent less likely to discharge their firearms than officers with a high school diploma or some college but no degree. A similar finding was produced by Binder and colleagues (1982) in a report to the National Institute of Justice two decades earlier.

In a meta-analysis of studies examining the effect of education on officer performance, Aamodt (2004) found that better-educated officers use force less often, though he does not include a discussion of how force was measured.

Several studies in this group found that officers with college backgrounds were subject to fewer complaints of force. Cohen and Chaiken (1972) discovered that officers entering the New York City Police Department with some college experience received fewer citizen complaints of force than officers without such experience. With a sample of 940 officers in Dade County, Florida, Cascio (1977) found that white, college-educated officers submitted fewer use of force reports and were subject to fewer allegations of physical force.[19]

A small number of studies found that college-educated officers were more likely to use force as opposed to non-college educated officers. A report submitted by Milton and colleagues (1977) to the Police Foundation stated that officers involved in violent incidents typically held more years of education than the average of the department in which they served. Using PSS data, Worden (1996) found that college-educated officers were significantly more likely to use reasonable force in suspect encounters, however, the same was not found for incidents involving excessive force.

The final group of studies presented found that college-educated officers and non-college educated officers do not behave differently in regards to their use of force. Analyzing seven years of shooting data from the Kansas City, Missouri Police Department, Sherman and Blumberg (1981) found that officer education appeared to have no significant effect on discharging firearms when controlling for assignment, age,

---

[19] Cascio (1977) concedes that he did not control for age or length of service in reporting his findings.

and length of service.[20] Four years earlier, Inn and Wheeler (1977) produced similar results, finding that college education did not cause significant differences in shooting incidents among officers. Hayden (1981) found that individual officer characteristics, including education, did not predict the decision to use deadly force.

Sherman and Blumberg (1981) point out, "depending on where and how police use of force is measured...more educated police officers appear to use force less often, more often, or just as often as less educated officers" (p. 318). Since the early 1980s, findings have gravitated towards college-educated officers using force less often than their less educated counterparts. Nonetheless, the relationship between officer education and the use of force remains unresolved. As Fyfe (1988) remarks, results in the 1970s and 1980s may be suspect because officers with college educations were typically found operating computers or technical equipment within the police department, where substantially fewer incidences of force occur. Future research could determine if findings are indeed trending towards a negative relationship between education and force.

Previously Employed Theoretical Frameworks

As noted, much of the literature regarding the impact of education on officer behavior does little to provide an explanation as to why education should have any impact on officer behavior at all. Most studies do not question the mechanism by which college education results in differences in behavior between college educated and non-college educated officers. Instead, authors simply note correlations between education and particular attitudes or behaviors without entertaining a discussion of why education

---

[20] Sherman and Blumberg (1981) concede that their findings may be the result of a lack of older, more experienced, college-educated officers in their sample.

should theoretically be expected to have any impact on those attitudes or behaviors.[21] Exceptions to this norm have briefly discussed possible theories for education's effect on officer behavior (See Carter, Sapp, & Stephens, 1988), but few have followed through and tested those hypotheses.[22]

Roberg (1978) posits that college education impacts officer performance by shaping the officer's belief system. He believes that college educated officers will hold more open belief systems and thus have a greater appreciation for psychological and sociological intricacies in their communities. Roberg's results support this hypothesis.[23] Wilson (1975) entertains several hypotheses. Wilson muses that college educated officers would be expected to be less likely to use their firearms because college instills a more liberal, reflective outlook. However, similar to Bozza (1973), Wilson (1975) also considers that college may indoctrinate officers with a stronger sense of duty, resulting in more vigorous application of authority. As noted earlier, some authors (Sherman, 1978; Sherman and McLeod, 1979) have posited that college education should not be expected to have any affect on performance because the majority of officers attend courses which are quite similar to academy training. Miller and Fry (1976a) state that even if the officers

---

[21] For example, Cascio (1977) examines correlations between officer education and a variety of outcomes. In an attempt the address the criticism that the correlations may not be due to college education itself, but the possibility that college selects officers which are more motivated and intelligent, he performs a path analysis to control for the effects of motivation and intelligence. Upon finding that college education has a unique direct effect on officer performance, Cascio concludes that education should be considered as a selection criteria for police officers, but does not offer a discussion of how education could produce such an effect independent of intelligence or motivation.

[22] Worden (1990) provides an excellent attempt to examine a variety of hypothesized relationships between officer education and attitudes and performance, but produced inconclusive results.

[23] Roberg (1978) measured performance through supervisor ratings.

partake in a liberal arts education, the content has so little to do with actual police work, that one should still not expect college educated officers to behave differently than officers without such an education. Bittner (1970) comes to a similar conclusion:

> In particular, making the college degree a requirement for admission to police work should not be misunderstood: four years of a liberal arts education of any kind will not prepare a young man for police work. And it would be absolutely pernicious to encourage the belief, either in the minds of the new recruits or of existing personnel, that a B.A. in sociology or psychology equips a person to do peace keeping or crime control (p. 86).

Nevertheless, Bittner (1970) goes on to recommend requiring a college degree of new recruits in order to help the status of the police occupation as a whole.

Of the studies examining the impact of higher education on the police, virtually none draw on the literature from the field of education concerning the impact of college on students.[24] Indeed, it would seem that the previous literature does little to make a compelling case why one would expect college-educated police officers behave differently than their non-college educated colleagues.

Previous research in the field of education has done much to examine the impact that education has on status attainment for students, using outcomes such as income and occupational prestige (Knox, Lindsay, & Kolb, 1993; Meyer, 1977). More relevant to the current inquiry, within the education literature there is evidence that higher education affects more than a student's prospects for status attainment (Pascarella & Terenzini, 1991, 2005). Unfortunately for behavioral researchers, the focus of empirical research in

---

[24] The exceptions being Jacobs and Magdovitz (1977), Sherman and Blumberg (1981), and Weiner (1976).

education has centered on higher education's impact on the attitudes of students. Supportive of findings in the area of policing by Smith, Locke, and Fenester (1970), Dalley (1975), and Roberg (1978), educational research indicates that college seniors (as opposed to college freshmen) hold beliefs that are less authoritarian (Altemeyer, 1988), dogmatic, and more liberal (Feldman & Newcomb, 1973; Knox, Lindsay, & Kolb, 1993).

In Feldman and Newcomb's (1973) *The Impact of College on Students*, the authors mention little regarding education's impact on student behavior, especially behavior related to policing. Their analyses indicate that over the course of four-years living within a university setting, college seniors express more individualism and readiness to express impulses. Potentially related to officer interactions with citizens, college upperclassmen were more confident, assertive, and autonomous. These findings were repeatedly replicated in research between 1970 and 2000 (Pascarella & Terenzini, 2005).

Proposed Theoretical Framework

Despite the dearth of findings regarding education's impact on behaviors directly linked to policing, previous studies in this area are not completely without use. In reviewing literature from education and policing, a common theme emerges regarding education's impact on an individual's democratic values. Indeed, previous research has shown education to have a positive effect on values regarding humanitarianism, civil rights, social conscience, and political interest (Knox, Lindsay, & Kolb; Muir, 1977; Pascarella & Terenzini, 1991, 2005; Wilson, 1999). Historically, education has been viewed as playing a key role in the average American's understanding and participation

in democratic society. Thomas Jefferson was quoted as saying:

> I know of no safer depository of the ultimate powers of the society but the people themselves. And if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion by education (Padover, 1939: 89-90).

The notion that higher education has an impact on the democratic values of police officers was visited in a classic piece by Muir (1977). Muir posited that in order for one to become a good police officer, he or she had to grasp the nature of human suffering - forming what he termed to be the tragic perspective of humanity. By this, he meant that an officer had to be able to empathize with the individuals which he/she encountered on the street.[25] Muir hints that a college education may be a pathway to developing this perspective on humanity.

Relating this notion to the current inquiry, a police officer in modern American society holds great power to overcome human obstacles, and exercises much discretion in wielding that power (Bittner, 1970). Education may be hypothesized then to instill in police officers a certain appreciation for the discretion they hold through enhanced democratic values and the development of Muir's (1977) tragic perspective. College-educated officers would be hypothesized to hold a greater understanding of not only the democratic rights of the individuals they encounter, but also their own ability to circumvent or remove those rights through formal action (i.e., arresting, searching, or using force against the suspect). Through the experience of higher-education, college-

---

[25] Muir (1977) contrasts the tragic perspective with the cynical perspective, through which the officer sees themselves and the citizens they encounter as belonging to two entirely different types of people. Muir found that cynical officers use varying forms of an "us versus them" dichotomy to separate themselves from citizens.

educated officers would be expected to pursue these formal actions more cautiously, and thus would be less likely to use them than their non-college educated counterparts.

The Gap in the Literature

Upon examining the available literature, the National Academics Panel on Police Policy and Performance stated that there was insufficient evidence to conclude that higher education has a desirable effect on police performance (Skogan & Frydl, 2004). The panel commented that the literature is characterized by inconsistent findings and generally poor methodologies (Hudzik, 1978; Sherman, 1980). The Panel did, however, suggest "rigorous research on the effects of higher education on [officer] job performance" (Skogan & Frydl, 2004: 141). In this area of the literature there appears to be a need for further studies employing valid, reliable methodologies. Another important area where the current state of knowledge is lacking was best highlighted by Worden (1990). Worden points out that the majority of the previous literature examines a single outcome, and thus the results cannot be interpreted cumulatively. Though Worden was specifically referring to studies of the effect of education on officer attitudes, the same could be said of studies regarding specific police behaviors.

The Current Inquiry

The current research will attempt to bridge the gap in the literature by examining the effect of education on three specific measures of officer behavior (i.e. arrest, search, and force). In addition, if there is a significant effect present in more than one of the outcomes a comparison will be made to determine where the effect of education is the strongest. More directly, using data from the Project on Policing Neighborhoods, the present

analysis will proceed with two research questions:

1. What is the effect of an officer's education level on his/her propensity to arrest, search, and use force?
2. If there are significant effects in more than one outcome, where is the influence of education the strongest?[26]

The current analysis is open to the possibility that in regards to the first research question, no significant relationship, or a single significant relationship will be detected. If that is the case then the second research question cannot be pursued.

---

[26] As the analysis will use binary and multinomial logistic regression, odds will be compared to make this determination.

CHAPTER IV: METHODOLOGY

The data used for the present inquiry will come from the Project on Policing Neighborhoods (POPN). On the whole, the POPN data were collected to allow researchers to describe how policing occurs on a day-to-day basis. The data were collected in the cities of Indianapolis, Indiana in the summer of 1996, and St. Petersburg, Florida in the summer of 1997 (Paoline et al., 2000). Of particular interest to the current inquiry were the data depicting the systematic observation of officers in encounters with citizens and interviews with those same officers to gather background information (e.g., education level).

Study Sites

Indianapolis and St. Petersburg were selected for POPN based on several criteria. Both cities exhibited diverse social, economic, and demographic characteristics, were receptive to a hosting large-scale research projects for approximately one year each, and had implemented community policing initiatives (Paoline et al., 2000). Each city showed certain similarities and differences which were relevant to studying police behavior. While both cities experienced similar crime rates, St. Petersburg held a smaller population and employed fewer full-time sworn patrol officers, resulting in a higher workload than the officers in Indianapolis. Indianapolis did, however, show greater signs of economic distress whereas it outpaced St. Petersburg in relation to percentage of the population that was minority, percent unemployed, percent of residents living in high poverty areas, and percent of female-headed households (Terrill, 2001).

The police forces of each city were different in regards to several measures. As

noted, the police force in Indianapolis was larger than St. Petersburg, with 416 and 246 sworn full-time patrol officers, respectively. While both cities had implemented community policing initiatives, they differed in size and strategy. St. Petersburg had begun their initiative two years prior to Indianapolis, and committed 60 officers to community policing (23% of the police force) as opposed to 25 for community policing in Indianapolis (6%). St. Petersburg also chose to deploy their community policing officers geographically, instilling each officer with a sense of responsibility for the problems residents experience in the geographic area which they served (Terrill, 2001). Indianapolis used a "get tough" strategy for community policing emphasizing directed and aggressive proactive patrols, but also some of the elements more commonly associated with community policing such as personal interaction (Terrill and Mastrofski, 2002).

Of particular interest to this study, the departments in each city were not equal in traditional measures of professionalism (Shernock, 1992). Indianapolis required more hours of training for recruits (1,392) than St. Petersburg (1,280). More than one-third (36%) of Indianapolis patrol officers held a four-year college degree (Terrill, 2001). This 1996 figure indicates that the patrol officers in Indianapolis were more educated than the general populace of the city, of which 26 percent held a four-year college degree in 2000 (U.S. Census Bureau). In St. Petersburg, a quarter (26%) of patrol officers held a four-year degree (Terrill, 2001). Comparatively, 23 percent of St. Petersburg residents held a four-year degree in 2000 (U.S. Census Bureau).

Data

As noted, the current inquiry utilizes two aspects of the POPN data: systematic observation of officers in the field, and in-person interviews with those officers. The observational data account for the most important part of the current study, detailing a direct and disinterested account of what occurs on officer patrols (Mastrofski et al., 1995). The interviews provide data on officer background characteristics of interest (e.g., education level).

Observational data. The observation data were collected through a technique called systematic social observation (SSO) (Mastrofski et al.,1998) in the manner of observer-participant. As an observer-participant, the researcher makes no effort to keep a distance from the subject they are observing (in this case, police on patrol), but also make no effort to participate in the interactions between the observed officers and citizens (Babbie, 1995). Prior to beginning observations in the field the observers (students from Michigan State University and the State University of New York at Albany) took a semester-long course in SSO and participated in training rides with officers at local police departments (Terrill & Mastrofski, 2002).

Regarding the physical process of data collection, observers accompanied officers on patrol throughout a matched sample of shifts in sampled beats for each city. The observers were instructed to take notes on activities and encounters the officer made with citizens, detailing the persons involved and how the encounter transpired. An encounter was defined as "a face-to-face communication that took place between officers and citizens that took over one minute, involved more than three verbal exchanges between

officer and citizen, or involved significant physical contact between the officer and citizen" (Terrill, 2001: 50). Following each day of field observation, the observers would transcribe their notes according to POPN protocol. Officers received assurances of confidentiality and were allowed to read the notes of the researcher for which they were assigned, but not the notes of researchers assigned to other officers (Parks et al., 1999).

A sample of beats was selected for each city for the observations to take place. In Indianapolis, 12 of the 50 total beats were selected, and similarly 12 of the 48 beats in St. Petersburg were selected. Beats were selected based on the expectation of higher frequencies of officer and citizen encounters as POPN research directors wanted the sample data to include a large number of encounters. Selection criteria for beats were based on an index of socioeconomic conditions in neighborhoods. These conditions included: percent of families with children that are headed by a female parent, percent of adults employed, and percent of the population living below 50 percent of the poverty level (Parks et al., 1999). Being the more distressed of the two cities, the socioeconomic index scores for beats in Indianapolis ranged from 4 to 76, with the median being 36. In St. Petersburg the index values ranged from 4 to 103, with a median of 15. Beats were then selected from the 2nd, 3rd, and 4th quartiles of index scores in Indianapolis. St. Petersburg beats were then selected to match those of Indianapolis (Terrill, 2001).

The ride sampling procedure called for the sample to include observations over every shift in each beat, include both general duty and community policing officers, and include shifts on both slow and busy days. Given that the project directors wanted a large sample of encounters, busy days (Thursday through Saturday) were oversampled.

After all field observations had taken place, observers in Indianapolis had ridden-along with 194 different patrol officers and 48 supervisors over the course of 2,800 hours of observation and witnessed 6,485 encounters with citizens. Observers in St. Petersburg had ridden-along with 128 different patrol officers as well as 37 supervisors over the course of 2,900 hours, witnessing 5,500 encounters with citizens (Paoline et al., 2000).

Interview data. In-person interviews were conducted with the officers with whom the observers were riding. These interviews lasted approximately 25 minutes each and were conducted by personnel hired and trained for the interview data collection only. Questions on the surveys pertained to officer background characteristics, most importantly in the case of the present study – education, and the officer's perceptions and experiences of the beats on which they patrolled. The response rates were 95 percent and 97 percent in Indianapolis and St. Petersburg, respectively (Terrill, 2001).

Variable Descriptions

Dependent variables. The present analysis employs three dependent outcome measures (see Table 4.1). All three will be measured dichotomously, but an additional force variable will be a trichotomous measure in order to differentiate the effect of officer education on verbal force versus physical force. Because the outcomes are measured in such a way, the analysis will rely on stepwise logistic regression, and multinomial logistic regression for the verbal/physical force measure.

The goal of the analysis will be to determine how the primary independent and control variables explain variation in the following outcomes. The first, *arrest*, is defined as taking a person into custody for the purpose of charging him or her with a criminal

offense. The second, *search,* is defined as a search of the suspect, suspect's vehicle, or the area immediately surrounding the suspect which goes beyond plain view. The third, *force,* is defined as acts that threaten, or actually inflict physical harm on citizens.[27] An additional dependent variable for the use of force will distinguish between verbal and physical force.

Independent variable. The primary independent variable in the analysis is the education level of the officer. The officer's education will be captured using two dichotomous measures, one for some college exposure but no baccalaureate degree, and one for a four-year degree. The reference category will consist of encounters involving officers with a high school diploma or less. As Worden (1990) points out, measuring education in this way (as opposed to by years of formal education or credits accumulated) is desirable in that it has the potential to capture the nature of the curriculum that the officer was exposed to (e.g., a four-year institution versus some college experience versus no college experience). As a downside, the data do not allow researchers to capture indications of the quality of the education the officer received. Higher levels of education are hypothesized to reduce incidences of the three outcome measures.

Control variables. To maintain an appropriately specified model the analysis will also include variables which have exhibited theoretical relevance and/or have been found to be significant in previous research (Paoline & Terrill, 2007; Terrill & Mastrofski, 2002). As noted, there are three groupings of control variables. The first group captures

---

[27] There are certain limitations to be aware of when measuring these outcomes as dichotomous variables. In regards to searches, variation in discretionary and non-discretionary searches will be lost. Measuring the use of force in such a way ignores the severity of force (e.g. painful restraint techniques versus impact methods) (Terrill & Mastrofski, 2002). However, if the outcome variables are not all measured in such a way, their comparability would subsequently be reduced in the analysis.

characteristics of the officer. In addition to the officer's education, control variables in this group include a measure of the officer's experience. Higher levels of officer experience are hypothesized to reduce the likelihood of arrests, searches, and force. The other control variables at the officer level are age in years, and dichotomous measures for gender, and race. Older officers are hypothesized to be less likely to use searches, arrests, and force, while male officers are hypothesized to be more likely to engage in those behaviors. Previous research has shown inconsistent findings regarding the effect of officer race in police-suspect encounters (see Terrill, 2001).

The second grouping of control variables describes characteristics of the suspect in the encounters. Previous reviews of research (Riksheim & Chermak, 1993; Sherman, 1980) have shown situational factors, such as suspect characteristics, to be influential on police behavior. These variables include demographic measures such as age (categorical), race, gender, and socioeconomic status. It is important to note that as opposed to officer characteristics, which were available from interview data, the suspect characteristics were based on the researcher's observations. This grouping also includes information about the suspect's behavior in the encounter, including whether they showed resistance to the officer, if the suspect was in a conflict with another citizen during the encounter, if the suspect was carrying a weapon, his/her demeanor, if the suspect was using alcohol, and an index of evidence of a violation of the law.[28] The hypothesized effect for each of these variables is displayed in Table 1. With the exception of suspect socioeconomic status,

---

[28] This evidence scale is a summative index of evidence implicating the suspect as a violator of the law. It is weighted to appropriately capture the relative importance of some pieces of evidence over others. The value increased by (3) if the officer observed the suspect engage in illegal behavior, (2) if the officer heard the suspect confess, (1) for physical evidence on the scene, (1) for circumstantial evidence, and (1) for hearsay evidence from citizens on the scene, for a maximum possible score of 8.

which is hypothesized to decrease the likelihood of the outcome measures at higher levels, each variable in this group is hypothesized to increase the likelihood of arrests, searches, and force.

The third grouping of variables describes characteristics of the setting of the encounter. The group includes measures of the number of officers present on the scene, the number of citizens present, whether the officer initiated the encounter with the suspect, and whether the encounter took place in Indianapolis or St. Petersburg. While both the number of officers and the number of citizens on the scene may have an impact on the observed officer's behavior, the direction of the impact may be contingent on a number of factors such as whether the officer feels in control of the situation, or if the additional citizens are non-participating bystanders or are attempting to support the suspect in the encounter. Because of these reasons, the hypothesized effect of both these variables is unclear. As for the remaining variables, officers that are proactive in initiating the encounter are hypothesized to be more likely to arrest, search, and use force. Because of the less-aggressive, problem-solving approach of the St. Petersburg police department, their officers are hypothesized to be less likely to engage in the measured outcomes.

Data Analysis

As the dependent variables (e.g., arrest, search, and force) in the current analysis are measured categorically, the analysis will utilize two forms of logistic regression. Logistic regression is preferable when dependent variables are measured in such a way (Liao, 1994). Once full models have been run for all three dependent variables, the odds

ratios for officer education on the dependent measures can be compared to determine where education's effect is the strongest. This aspect of the analysis is contingent on a significant effect for education in more than one of the outcome measures.

Table 4.1. Variable Descriptions and Hypothesized Effects

Variable Name	Hypothesized Effect	Variable Coding
Dependent variables		
Arrest		1 = Suspect is arrested, 0 = Suspect is not arrested
Search		1 = Suspect, vehicle, or area is searched, 0 = Not searched
Force		1 = Officer used force, 0 = Officer did not use force
Force (verbal/physical distinction)		1 = Officer used verbal force against suspect, 2 = Officer used physical force against suspect, 0 = No force was used
Independent/Controls		
Officer Characteristics		
Some college, no degree	-	1 = Some college, no degree, 0 = All other
Four-year degree or higher	-	1 = Four-year degree or higher, 0 = All Other
Experience	-	Years of experience
Male	+	1 = Male, 0 = Female
Non-white	+/-	1 = Non-white, 0 = white
Suspect Characteristics		
Age	-	1 = 0 to 5 years, 2 = 6 to 12 years, 3 = 13 to 17 years, 4 = 18 to 20 years, 5 = 21 to 29 years, 6 = 30 to 44 years, 7 = 45 to 59 years, 8 = 60 or more years
Non-white	+	1 = Non-white, 0 = White
Male	+	1 = Male, 0 = Female
Socioeconomic Status	-	1 = chronic poverty, 2 = low, 3 = middle, 4 = above middle
Arrest*	+	1 = Suspect was arrested prior to use of force, 0 = Suspect not arrested
Resistance	+	1 = none, 2 = passive, 3 = verbal, 4 = defensive, 5 = active
Conflict with other citizen	+	1 = none, 2 = calm verbal, 3 = agitated verbal, 4 = threatened assault, 5 = assault
Weapon	+	1 = Suspect has weapon, 0 = Suspect not visibly armed
Evidence	+	Summative scale (0 to 8)
Demeanor	+	1 = Suspect disrespectful to police, 0 = All other
Drug or Alcohol	+	1 = Suspects behavior indicates drug or alcohol effects, 0 = All other
Encounter		
Number of Officers	+/-	Number of officers on the scene
Number of Citizens	+/-	Number of citizens observing the scene
Proactive Encounter	+	1 = Officer initiates encounter, 0 = All other
Observation site	+	1 = Indianapolis, 0 = St. Petersburg

*This variable is only used in the models in which force is the dependent variable.

Validity, Reliability, and Generalizability

As noted, the most important pieces of these data are comprised of systematic field observations. Compared with other methods, field research typically produces valid data. It allows researchers to capture events or phenomena that prove more difficult or elusive to survey research or official records. Field research does introduce a threat to validity with the presence of the observer. A commonly cited concern in observational research is reactivity on behalf of the observed (Mastrofski & Parks, 1990). In these instances, officers would alter their behavior due to the presence of the observer.[29] The POPN protocol provided two built-in measures of reactivity. With the first, ride level reactivity, the observer made an assessment of whether the officer reacted to their presence over the course of an entire shift. The second, activities and encounters with reactivity, was an indication of whether the observer felt the officer altered their behavior because of the observer's presence in the context of specific events or encounters during the ride (Spano, 2003). Observers noted that only 0.5 percent of all observations showed any indication that the officer altered their behavior due to the presence of the observer (Terrill, 2001). More in-depth analysis of reactivity by Spano (2003) indicates that beyond these built-in measures, signs of reactivity appear in officer's concerns for the observer's safety, especially if the observer was female. Project directors took several steps in order to minimize reactivity of the patrol officers to their observers. As noted

---

[29] In a seminal piece taking place some 40 years prior to the POPN observations, Westley (1970) wrote of reactivity concerns. He mentioned that officers initially responded to his presence negatively, "this proved to be both personally painful, in the sense thereafter he had to push himself on men who he felt disliked and were afraid of him, and practically disastrous, since if the men refused to talk to him the research would stop" (p. vii). The solution, he found was "to stay around for such long and continuous periods that it was not possible for the men to keep up the pretense" (p. viii) and the officers would eventually return to their daily routines.

earlier, officers were promised confidentiality and allowed to read the notes taken by their observers (Mastrofski et al., 1998).

The generalizability of the POPN observational data is somewhat limited due to the beat selection process. Because beats were selected as clusters of economically distressed areas, it may be difficult to generalize findings to officers working in the more economically prosperous areas of Indianapolis and St. Petersburg. When attempting to generalize findings to patrol officers in other departments around the nation, the POPN observational data has a particular advantage over previous studies of the same kind (Paoline et al., 2000). Previous observational studies have focused on large cities with substantially large patrol forces and bureaucratic structures, thus making them difficult to generalize to officers in medium-sized cities or rural areas. Indianapolis and St. Petersburg have the advantage of being more similar to more areas of the nation than the larger cities that were subjects of previous inquiry (Terrill, 2001).

CHAPTER V: RESULTS

The following section contains the statistical analyses and findings for the current inquiry. First, descriptive statistics present the distribution of the dependent variables (e.g., arrest, search, and force) and the three groupings of independent variables (e.g., officer, suspect, and encounter). Bivariate distributions of the dependent measures by officer education level are then shown. The final portion of this section presents and describes the multivariate analyses, consisting of binary logistic regression for the dichotomous dependent measures and multinomial logistic regression for the dependent variable distinguishing between verbal and physical force.

Descriptive Statistics

Table 5.1 displays descriptive statistics for the three dependent variables in the present analysis. As noted, the dependent variables are measured dichotomously, while there is also an additional force variable measured in three categories. For the dichotomous measures, their means may be interpreted as the proportion of cases which fall in the measured category. As such, 15 percent of encounters involve the suspect being arrested, 23 percent of encounters involve the suspect being searched by the primary observed officer, and 58 percent of the encounters involve the officer using force against a suspect. Distinguishing between verbal and physical force, verbal force is the highest level of force used in 37 percent of the encounters, and physical force is the highest level in the remaining 21 percent of encounters.[30]

---

[30] The variable that distinguishes between verbal and physical force captures the highest level of force used in the encounter. For example, in the 1,246 encounters coded as verbal force, the officer did not use any force higher than verbal commands or threats. In the 699 encounters coded as physical force, the officer

Table 5.1: Descriptive Statistics for Dependent Variables (N=3,356)

Variable	Range	Mean	Standard Deviation
Arrest*	0 to 1	0.15	0.36
Search†	0 to 1	0.23	0.42
Force	0 to 1	0.58	0.49
Force (verbal/physical distinction)	0 to 2	0.79	0.76
(0) No force, n = 1,411 (42%)			
(1) Verbal force, n = 1,246 (37%)			
(2) Physical Force, n = 699 (21%)			

*Two missing cases (n = 3,354)

†Three missing cases (n = 3,353)

The next three tables show the univariate statistics for the officer, suspect, and encounter level variable groupings. Beginning with Table 5.2 (i.e., officer level), encounters involving officers with a high school diploma or less comprise a minority of the police-suspect encounters. Roughly 44 percent of the encounters involve officers with some exposure to college, but have not obtained a baccalaureate degree.[31] The remaining 42 percent of encounters involve officers having obtained a four-year degree or higher.[32]

Regarding the other officer level variables, the average encounter involves an officer with approximately seven years experience. With a standard deviation of 5.9 years, however, officer experience levels show substantial variation. The majority of

---

may also have used verbal force, but as physical force is considered a higher level of force than verbal threats or commands, these cases are recorded as being physical force encounters.

[31] This category also includes encounters involving officers with 2-year associate's degrees. Overall, this subset comprised only 5 percent of encounters. As such, it was combined with the "some college, but no degree" category.

[32] The majority of encounters in this category involved officers with a baccalaureate degree (n = 1,224, 87%). One hundred and seventy-eight (13%) encounters in this category involved officers with some exposure to graduate school, and only 8 (0.06%) encounters were with an officer holding a graduate degree.

encounters involve male officers (84.7%) and just one-fifth (20.8%) of the encounters involve a non-white officer.[33]

Table 5.2: Descriptive Statistics for Officer Level Independent Variables (N = 3,356)

Variable	Range	Mean	Standard Deviation
Education			
Some college, no BA/BS	0 to 1	0.44	0.50
Four-year degree or higher	0 to 1	0.42	0.49
Experience	1 to 32	7.73	5.97
Male	0 to 1	0.85	0.36
Non-white	0 to 1	0.21	0.41

Below, Table 5.3 displays descriptive statistics for the suspect level variables. Regarding individual characteristics, the average suspect in the sample is between the ages of 21 and 29 years old, non-white, male, and lower class. Regarding race in particular, 63 percent of encounters involve a non-white suspect. As a point of contrast, Census 2000 data indicated that the non-white populations of Indianapolis and St. Petersburg were 31 percent and 29 percent, respectively (U.S. Census Bureau).[34] The decision to arrest, prior to using force against the suspect, occurred in 11 percent of the encounters. Regarding suspect behavior on average, suspects show no resistance towards officers, are not in conflict with other citizens on the scene, are unarmed, and are not disrespectful. Approximately one-fifth (21%) of encounters involve suspects showing signs of intoxication. With respect to the evidence measure, 50 percent of encounters provide at least some evidence of law violation.

---

[33] Appendix B contains a table showing the joint distribution between officer education level and officer sex and race.

[34] As a cautionary note, though these figures show that a disproportionate number of non-white suspects were represented in police-citizen encounters, beats were selected on the basis of socioeconomic factors. More specifically, areas in high socioeconomic distress were over-sampled in order to ensure a high frequency of encounters.

Table 5.3: Descriptive Statistics for Suspect Level Independent Variables (N = 3,356)

Variable	Range	Mean	Standard Deviation
Age	1 to 8	5.24	1.35
Non-white	0 to 1	0.63	0.48
Male	0 to 1	0.72	0.49
Socioeconomic Status	1 to 4	2.36	0.56
Arrest*	0 to 1	0.11	0.31
Resistance	1 to 5	1.21	0.66
Conflict with other Citizen	1 to 5	1.13	0.57
Weapon	0 to 1	0.02	0.12
Evidence	0 to 7	1.32	1.70
Evidence prior to Arrest†	0 to 7	1.27	1.53
Demeanor	0 to 1	0.10	0.30
Drug or Alcohol	0 to 1	0.21	0.41

*This variable is not used in the models in which arrest is the dependent variable.

†This variable was specially coded to measure the amount of evidence available prior to making an arrest. It is only used when arrest is the dependent variable.

Table 5.4 (i.e., encounter level) provides the descriptive statistics for the final set of control variables. The average encounter involves approximately two officers and four citizens, though there are several outlier encounters which included much larger numbers of officers and bystanders.[35] Slightly less than half (45%) of the encounters are proactively initiated by officers, and just more than half (56%) of the encounters take place in Indianapolis, with the remaining 44 percent occurring in St. Petersburg.

Table 5.4: Descriptive Statistics for Encounter Level Independent Variables (N = 3,356)

Variable	Range	Mean	Standard Deviation
Number of Officers	1 to 26	2.21	1.61
Number of Citizens	1 to 100	4.20	5.63
Proactive Encounter	0 to 1	0.45	0.50
Observation site	0 to 1	0.56	0.50

[35] These outliers represent a very small number of encounters in which there was a very large grouping of either citizens or officers. In the citizen's case, there was an encounter at a party where the estimated number of guests was around 100. The removal of the highest values from both these variables changes their mean values very little (a change of 0.01 and 0.06, for officers and citizens, respectively), and with no theoretical justification for removing these encounters from the sample they were left as is.

Bivariate Analysis

The bivariate portion of the analysis presents joint distribution tables and utilizes the chi-square test of independence to examine the relationships between officer education and the three dependent variables (e.g., arrest, search, and force). The chi-square test of independence tests the null hypothesis that officer education and the dependent measures are independently distributed (Bachman & Paternoster, 2004). If the test yields a significant value, the null hypothesis may be rejected and one could then state that the two variables are in some way related. Included with each contingency table is the gamma (γ) statistic, which is the preferred measure of association when using ordinally measured variables. As a proportional reduction in error measure, gamma is an indication of the degree to which error in predicting the dependent variable is reduced by knowledge of the independent variable (Bachman & Paternoster, 2004).

Table 5.5 presents the joint distribution of officer education level and arrests. The table shows that these two variables are independently distributed ($\chi^2 = 1.66, p = .437$), indicating that they are not related, and the gamma statistic demonstrates that officer education level is not a useful variable for reducing error in predicting arrests ($\gamma = .04$). Across all levels of education, the proportion of encounters involving arrest varies very little, from 15 percent for some college exposure to 16 percent for a four-year degree. At the simple bivariate level, these results support previous findings of a null relationship between officer education and arrests (Brandl et al., 2001; Smith & Aamodt, 1997; Smith & Klein, 1983; Worden, 1989). Later, multivariate analysis will examine if the presence of additional independent variables reveals a relationship between education and arrests.

Table 5.5: Bivariate Distribution of Arrests by Officer Education (N = 3,354)*

	High school or less n (%)	Some college, no BA/BS n (%)	Four-year degree or higher n (%)
Suspect not arrested	412 (85%)	1,248 (86%)	1,180 (84%)
Suspect arrested	74 (15%)	211 (15%)	228 (16%)
Total	487	1,459	1,408

$\chi^2 = 1.66, p = .437; \gamma = .04$

*Two missing cases

The joint distribution of officer education and searches is displayed in Table 5.6. As with officer education and arrests, the results indicate that education and searches are independently distributed ($\chi^2 = 0.69, p = .710$). Furthermore, officer education is not a useful measure for reducing error in predicting whether the suspect will be searched ($\gamma = .02$). As the present analysis is the first to examine the distribution of officer searches by education level, it cannot be stated whether this result is in support of previous literature, there simply is no prior point of comparison. At this level of analysis officer education and searches appear to be unrelated. In the next section of this inquiry, multivariate analysis will indicate if education becomes a better indicator of searches when additional variables are included in the analysis.

Table 5.6: Bivariate Distribution of Searches by Officer Education (N = 3,353)*

	High school or less n (%)	Some college, no BA/BS n (%)	Four-year degree or higher n (%)
Suspect not searched	374 (77%)	1,127 (77%)	1,070 (76%)
Suspect searched	113 (23%)	331 (23%)	338 (24%)
Total	487	1,458	1,408

$\chi^2 = 0.69, p = .710; \gamma = .02$

*Three missing cases

The next two tables examine the joint distribution of officer education level with the use of force. First, Table 5.7 uses a dichotomous measure for force. Opposed to the previous dependent variables (e.g., arrest and search), officer education level and the use

of force are not independently distributed ($\chi^2 = 22.71, p < .001$). However, the gamma statistic shows the relationship between the variables to be a weak one ($\gamma = -.09$), with the knowledge of officer education level reducing the error in predicting force by only nine percent. The distribution of encounters in the table indicates that officers with only a high school background use more force than officers with either some college exposure or a four-year degree. Interestingly, the proportion of officers who use force is slightly larger for the group with completed degrees (57%) compared to those with only some exposure to college (56%).

Table 5.7: Bivariate Distribution of Force by Officer Education (N = 3,356)

	High school or less n (%)	Some college, no degree n (%)	Four-year degree or higher n (%)
No force used	157 (32%)	644 (44%)	610 (43%)
Force used	330 (68%)	815 (56%)	800 (57%)
Total	487	1,459	1,410

$\chi^2 = 22.71, p < .001; \gamma = -.09$

The final bivariate table (Table 5.8) displays the joint distribution of officer education level and force, but distinguishes between verbal and physical force. Unlike arrests and searches, officer education level and the levels of force do not appear to be independently distributed ($\chi^2 = 27.44, p < .001$). The largest difference across the categories lies with verbal force, as 47 percent of verbal force incidents are in encounters involving officers with a high school diploma or less, compared to 36 percent and 35 percent for some college exposure and four-year degree, respectively. As a point worth mentioning, the proportion of officers using physical force is nearly identical across all education categories. Encounters involving officers in the collegiate categories more often involve no use of force compared to officers with a high school background. Like

arrests and searches, however, officer education level does not produce a strong measure of association with the use of force ($\gamma = -.05$). The reason for this may be that while officer education does predict some of the variation in the use of force, it is by no means the only valid predictor. The next section of the paper will examine impact of officer education on the use of verbal and physical force when addition variables are controlled for by using a multinomial logistic regression.

Table 5.8: Bivariate Distribution of Verbal/Physical Force by Officer Education (N = 3,356)

	High school or less n (%)	Some college, no degree n (%)	Four-year degree or higher n (%)
No force used	157 (32%)	644 (44%)	610 (43%)
Verbal force	227 (47%)	520 (36%)	499 (35%)
Physical force	103 (21%)	295 (20%)	301 (21%)
Total	487	1,459	1,410

$\chi^2 = 27.44, p < .001; \gamma = -.05$

Multivariate Analysis

The present inquiry utilizes binary logistic regression and multinomial logistic regression for the purpose of multivariate analysis. Because the dependent variables are measured dichotomously and categorically, certain implications carry to the specification of models, particularly underscoring the preference for logistic regression as opposed to linear regression (Hanushek & Jackson, 1977; McKelvey & Zavoina, 1975) As noted, the dependent variables in the present analysis capture whether a particular event occurred or did not occur in a police-suspect encounter (e.g., whether a suspect was arrested, or not arrested). The mean of these dependent variables not only represent the proportion of cases which fall in the measured categories (e.g., the proportion of encounters involving arrests), but may be interpreted as the probability that an encounter will result in one of these outcomes (DeMaris, 1995). The purpose of the analysis presented here is to model

the probability of arrests, searches, and force as a function of officer education and a number of control variables.

Much has been written regarding the inability of linear regression to produce meaningful results when using a dichotomous dependent variable (Hanushek & Jackson, 1977; Long, 1997; McKelvey & Zavoina, 1975). The difficulties that face linear regression in such a scenario are due to the fact that it is ill-suited to model using a variable with a floor of zero and a ceiling of one (Pampel, 2000). When using a continuous dependent variable the regression line may extend beyond zero and one to infinity, depending on the strength of the slope. Because of this, linear regression with a dichotomous dependent variable may produce nonsensical probabilities both less than zero and greater than one (DeMaris, 1995). Linear regression also faces difficulty in that measuring the dependent variable as a dichotomy violates two of its assumptions, normality and homoskedasticity. The assumption of normality becomes violated when only two residuals are possible for any independent variable, given that there are only two possible values for the dependent variable (Pampel, 2000). The assumption of homoskedasticity, or constant error variance, is violated by a dichotomous dependent variable as the error term will vary depending on the value of the independent variable. At very low or very high values for the independent variable, the error term will be small, given that the dependent variable may only have values of zero or one. At middle values, however, the error term will be much larger. Thus, dichotomous dependent variables are innately heteroskedastic (Berk, 2004; DeMaris, 1995; Pampel, 2000).

Logistic regression models correct for the difficulties that linear regression

encounters with dichotomous dependent variables in several ways. First, due to the innate characteristics of dependent variables measured in such a way, logistic regression relaxes the linear assumptions of normality and homoskedasticity (Grommon, 2005; Winship & Mare, 1984). Second, logistic regression performs a transformation on the dependent variable to linearize the non-linear relationships between the dichotomous dependent variable and the independent predictors (DeMaris, 1995). This transformation involves converting probabilities into odds and then taking the natural logarithm of the odds to obtain logged odds. Logged odds eliminate the difficulties of regression with dichotomous dependent variables by removing the floor of zero and the ceiling of one (Pampel, 2000).

As opposed to linear regression, which expresses coefficients as representing the amount of change in the dependent variable given a one unit change in the independent variable (Allen, 1997), logistic regression coefficients carry a similarly structured yet distinct interpretation. Logistic regression coefficients represent the change in the logged odds of an event based on a one unit change in the independent variable (Pampel, 2000). In the tables below these coefficients are displayed as 'b' along with their standard errors (SE).

Another helpful interpretation of logistic regression coefficients involves taking the antilogarithm of the logged odds to display the impact of the independent variable directly on the odds of an event occurring. In the tables below these are shown under the columns for exponentiated coefficients (Exp(b)).[36] For these values, odds equal to one

---

[36] These values are also known as odds ratios. The "ratio" title may be more appropriate because the values appearing in the tables below are not specifically the odds of a college degree-holding officer

indicate that the independent variable has no impact on the odds of the event in the dependent variable occurring. Odds lower than one mean that a one unit change in the independent variable decreases the odds of an event, and odds greater than one represent an increase (Liao, 1994). These odds also offer a simple interpretation. For example, an exponentiated coefficient of 1.34 for suspect sex in the arrest model indicates that a suspect's being a male increases the odds of being arrested. More specifically, 134 males are arrested for every 100 females. Another way of interpreting the same figure is to say that the odds of a male being arrested is 1.34 times higher than the odds of a female suspect being arrested (Liao, 1994).

In order for partial logistic regression coefficients to be interpreted in any meaningful fashion, the model as a whole must show that it can explain the dependent variable significantly better than a null model, which only contains the intercept (Liao, 1994). In logistic regression this is done using log likelihood values, similar to linear regression using the *F* statistic. The model significance is determined by comparing the log likelihood value of the null model to the log likelihood of the model being evaluated. The greater the difference between the null value and the tested value the less likely that all coefficients are equal to zero in the population (DeMaris, 1995; Liao, 1994). A test of significance using a chi-square distribution indicates if the difference between the null and tested log likelihoods is due to chance (Pampel, 2000). This value is presented in the tables below as the model chi-square.

Each model in the tables below also includes a pseudo-variance explained measure, or pseudo-R^2. The Cox and Snell (1989) R^2, and other measures like it, is called

---

arresting a suspect. Rather, the value that appears is the ratio of the odds of a degree holding officer arresting a suspect to the odds of a high school educated officer arresting a suspect.

a pseudo-variance explained measure because it is calculated via log likelihood values, which do not capture variance in the same way that the sum of squared deviations does in linear regression (Pampel, 2000). These pseudo-measures are nonetheless capable of providing an indication of explained variance based upon model specification.

The analysis is presented in a stepwise manner, beginning with officer characteristics and subsequently adding the suspect and encounter level variables. Presenting the analysis in this way allows one to examine how each group of variables contributes to the model, culminating in the Full Model (represented as Model 3 in Table 5.9). This method of presentation is preferred for the present analysis because unlike an exploratory study seeking to find what variables, if any, are related to arrests, the present analysis has a primary independent variable of interest – officer education. By sequentially adding in groups of variables, a researcher is capable of monitoring how the impact of education changes as more variables are considered. The incomplete models are thus presented as a matter of interest. The relationship between officer education and the dependent variables in the full models represent the ultimate findings of the present analysis.

Arrest modeling. Table 5.9 displays the logistic regression of arrests on characteristics of officers, suspects, and encounters. The model containing only officer characteristics is presented in Model 1 in Table 5.9. This modeling indicates that, relative to encounters involving high school educated officers, encounters involving officers with some college or a four-year degree (b = -0.10, p =.537 and b = 0.01, p = .927, respectively) are not any more or less likely to result in an arrest. In fact, the influence of

this group of variables is so weak that they do not explain arrests significantly better than a null model containing only the intercept (Model $\chi^2 = 2.84, p = .725$).

When suspect characteristics are included (Model 2 in Table 5.9), multiple variables are found to significantly affect the odds of an arrest taking place. Characteristics of suspects themselves – age, sex, race and socioeconomic status – all influence the odds of arrest in model 2. More specifically, suspects who are younger, male, non-white, and of low socioeconomic status are more likely to be arrested in an encounter with an officer. Also, offering higher levels of resistance, being intoxicated, and greater amounts of evidence present all increase the odds of an arrest taking place.

Model 3 represents the Full Model, when variables from all three groups are considered. Here, higher education, whether it is just some college (b = -0.14, $p = .431$) or a four-year degree (b = -0.02, $p = .919$), is not a significant predictor of arrests relative to officers with no college education. All other officer characteristics also show no significant influence on the odds of an arrest taking place. This finding replicates that of Worden (1989) who, using PSS data, found that no officer characteristics influence arrest behavior. Concerning suspect characteristics, some interesting differences between Model 2 and the Full Model are apparent. Introducing the encounter level variables causes some physical characteristics of suspects – age, sex, and race – to no longer significantly predict the likelihood of an arrest. Also, suspect demeanor (e.g., whether the suspect was disrespectful to the officer) now significantly increases the odds of an arrest taking place. As with Model 2, resistance on the part of the suspect, being intoxicated, and the amount of evidence present prior to the arrest all significantly increase the odds

of an arrest, while belonging to a higher socioeconomic status significantly lowers the likelihood of being arrested. All four encounter level variables appear to significantly influence the odds of an arrest. More specifically, encounters involving higher numbers of officers on scene and being in Indianapolis are more likely to result in a suspect being arrested, relative to encounters with fewer officers, and those that take place in St. Petersburg. Finally, encounters with more citizens present and were initiated by the officer are less likely to result in an arrest, relative to encounters involving fewer citizens and those encounters that the officer responds to reactively.

Table 5.9: Binary Logistic Regression of *Arrests* on Officer, Suspect, and Encounter Characteristics (N = 3,354)

Variable	Model 1. Officer		Model 2. Officer & Suspect		Model 3. Full Model	
	b (SE)	Exp(b)	b (SE)	Exp(b)	b (SE)	Exp(b)
Intercept	-1.65 (.20)	0.19	-2.10 (.42)	0.12	-3.53 (.50)	0.03
Officer Characteristics						
Education						
Some college	-0.10 (.15)	0.91	-0.11 (.17)	0.90	-0.14 (.18)	0.87
Four-year degree	0.10 (.15)	1.01	-0.01 (.17)	0.99	-0.08 (.18)	0.98
Experience	-0.01 (.01)	0.99	0.00 (.01)	1.00	0.01 (.01)	1.01
Male	0.06 (.14)	1.06	-0.10 (.16)	0.93	-0.13 (.16)	0.88
Non-white	-0.06 (.12)	0.95	-0.06 (.14)	0.95	-0.10 (.15)	0.91
Suspect Characteristics						
Age			-0.11 (.04)	0.89**	-0.04 (.05)	0.96
Non-white			0.31 (.12)	1.36*	0.21 (.13)	1.23
Male			0.29 (.13)	1.34*	0.21 (.14)	1.24
Socioeconomic Status			-0.50 (.10)	0.61***	-0.46 (.11)	0.63***
Resistance			0.48 (.07)	1.62***	0.35 (.08)	1.42***
Conflict			-0.06 (.09)	0.95	-0.08 (.10)	0.92
Weapon			-0.03 (.42)	1.05	0.03 (.44)	0.97
Evidence			0.58 (.03)	1.78***	0.65 (.04)	1.91***
Demeanor			0.32 (.17)	1.38	0.49 (.18)	1.63**
Drug or Alcohol			0.72 (.13)	2.05***	0.59 (.13)	1.80***
Encounter Setting						
Number of Officers					0.46 (.04)	1.59***
Number of Citizens					-0.03 (.01)	0.97**
Proactive Encounter					-0.39 (.13)	0.68**
Observation site					0.58 (.13)	1.80***
N	3,354		3,354		3,354	
-2 Log Likelihood	2,870.23		2,266.78		2,047.84	
Model χ^2	2.84		606.29***		825.23***	
df	5		15		19	
Cox & Snell R^2	.001		.165		.218	

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

Search modeling. The binary logistic regression models for searches are presented in Table 5.10. Unlike the models for arrests, all three models were significantly better at explaining searches than a model containing only the intercept. Model 1 displays the logistic regression of officer characteristics alone on searches. As with arrests, officer education does not appear to influence the odds of a search taking place in an encounter.

However, unlike the models for arrests, some officer characteristics appear to have a significant effect on searches. Specifically, officers who are more experienced (b = -0.02, $p < .01$) and non-white (b = -0.34, $p < .01$) are less likely to search suspects than less experienced officers and white officers, respectively.

When suspect characteristics are included in Model 2, the effects of officer experience and race retain their significance, and multiple suspect characteristics prove to significantly influence the odds of a search taking place. As with arrests, suspects who are younger, male, non-white, and of low socioeconomic status are more likely to be searched. The strongest predictor of being searched in this model is being arrested (b = 1.78, $p < .001$). Other factors found to increase the likelihood of being searched are carrying a visible weapon and being intoxicated. Surprisingly, suspects involved in higher states of conflict with other citizens on the scene are less likely to be searched, and the amount of evidence available does not seem to be a significant predictor as well.

When the encounter level variables are included in the Full Model, only a small amount of pseudo-explained variance is gained, however, the difference between the models is significant ($\chi^2 = 33.98$, df = 4, $p < .01$).[37] When all other variables are considered, some exposure to college (b = 0.06, $p = .652$) and holding a four-year degree (b = -0.04, $p = .777$) do not significantly influence the odds of an encounter involving a search relative to encounters with non-college educated officers. Regarding the other officer characteristics, introducing encounter level variables mediates the relationship between officer experience and searching, but officer race maintains its influence,

---

[37] This chi-square value is calculated by subtracting the model chi-square and degrees of freedom of the smaller model from the full model (DeMaris, 1995).

indicating that non-white officers are less likely to search suspects. Considering suspect characteristics, the encounter level variables control the relationships between suspect race and citizen conflict with searches. All other significant relationships found between suspect variables and searches in Model 2 retain their significance in the Full Model. For the encounter level variables themselves, only the encounter site did not significantly impact the odds of a search taking place. More citizens being present decreases the odds of a search taking place, encounters with more officers present and proactive encounters are more likely to result in a search of the suspect.

Table 5.10: Binary Logistic Regression of *Searches* on Officer, Suspect, and Encounter Characteristics (N = 3,353)

Variable	Model 1. Officer		Model 2. Officer & Suspect		Model 3. Full Model	
	b (SE)	Exp(b)	b (SE)	Exp(b)	b (SE)	Exp(b)
Intercept	-1.10 (.17)	0.34	-0.74 (.37)	0.48	-1.23 (.39)	0.29
Officer Characteristics						
Education						
Some college	-0.07 (.13)	0.94	0.03 (.14)	1.03	0.06 (.14)	1.07
Four-year degree	-0.09 (.13)	0.92	-0.04 (.14)	0.96	0.04 (.14)	0.96
Experience	-0.02 (.01)	0.98**	-0.02 (.01)	0.98*	-0.01 (.01)	0.99
Male	0.23 (.12)	1.25	0.17 (.13)	1.19	0.13 (.13)	1.14
Non-white	-0.34 (.11)	0.71**	-0.34 (.12)	0.72**	-0.33 (.12)	0.72**
Suspect Characteristics						
Age			-0.13 (.03)	0.88***	-0.14 (.04)	0.87***
Non-white			0.24 (.10)	1.28*	0.17 (.10)	1.19
Male			0.75 (.11)	2.12***	0.71 (.12)	2.04***
Socioeconomic Status			-0.31 (.08)	0.73***	-0.31 (.08)	0.74***
Resistance			0.01 (.07)	1.01	0.04 (.07)	0.96
Arrested			1.78 (.13)	5.95***	1.71 (.13)	5.52***
Conflict			-0.19 (.09)	0.83*	-0.11 (.09)	0.90
Weapon			0.98 (.31)	2.65**	0.97 (.31)	2.64**
Evidence			0.04 (.03)	1.05	0.03 (.03)	1.03
Demeanor			-0.25 (.16)	0.78	-0.16 (.17)	0.86
Drug or Alcohol			0.61 (.11)	1.83***	0.64 (.11)	1.90***
Encounter Setting						
Number of Officers					0.23 (.03)	1.26***
Number of Citizens					-0.05 (.01)	0.95***
Proactive Encounter					0.38 (.10)	1.46***
Observation site					0.08 (.10)	1.08
N	3,353		3,353		3,353	
-2 Log Likelihood	3,816.52		3,193.77		3,119.79	
Model χ^2	23.80***		448.54***		522.52***	
df	5		16		20	
Cox & Snell R^2	.007		.125		.144	

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

Force modeling. The results of the binary logistic regression for the use of force are shown in Table 5.11. Consistent with the bivariate analysis, officer education level appears to be significantly related to the probability of an officer using force in an encounter. Model 1 displays the regression of officer characteristics on the use of force. Here it appears that officers with some college exposure and completed degrees are

significantly less likely to use force in an encounter ($b = -0.61$, $p < .001$, and $b = -0.66$, $p < .001$, respectively). This is a stark contrast to the previous models for arrests and searches as until this point officer education did not appear to be related to the current inquiry's dimensions of police behavior. Of the other officer characteristics, more experienced officers are less likely to use force, and non-white officers are significantly more likely to use force in an encounter.

Model 2, presented in Table 5.11, controls for the effects of suspect characteristics. Introducing these variables does not mediate the influence of officer education level on the probability of force occurring. Interestingly, essentially all suspect level variables are significantly related to the use of force, with the exception of suspect demeanor. Regarding the direction of those effects, suspects who are younger, non-white, male and of a low socioeconomic status are more likely to be subject to force by the officer in each encounter. Suspects who are resisting, in conflict with bystanders, have a weapon within reach, intoxicated, presenting much evidence, and arrested are also more likely to be recipients force.

The introduction of encounter level variables in Model 3 changes very few of the relationships from the previous models. When all other variables are held constant, officer education level is still significantly related to the use of force. Specifically, officers with some college exposure and four-year degrees are significantly less likely to use force in an encounter ($b = -0.49$, $p < .001$ and $b = -0.68$, $p < .001$, respectively) relative to non-college educated officers. While more experienced officers are also less likely to use force, the introduction of encounter level variables controlled for the

relationship between officer race and the use of force. All significant relationships between suspect characteristics and the use of force retained their significance in the full model. Regarding the encounter level variables themselves, encounters initiated by the officer are more likely to involve force, as are encounters which take place in Indianapolis, compared to encounters in St. Petersburg.

Table 5.11: Binary Logistic Regression of *Force* on Officer, Suspect, and Encounter Characteristics (N = 3,356)

Variable	Model 1. Officer		Model 2. Officer & Suspect		Model 3. Full Model	
	b (SE)	Exp(b)	b (SE)	Exp(b)	b (SE)	Exp(b)
Intercept	0.97 (.15)	2.64	0.11 (.32)	1.12	-.30 (.34)	0.74
Officer Characteristics						
Education						
Some college	-0.61 (.11)	0.55***	-0.61 (.12)	0.54***	-0.49 (.12)	0.61***
Four-year degree	-0.66 (.12)	0.52***	-0.67 (.13)	0.51***	-0.68 (.13)	0.51***
Experience	-0.03 (.01)	0.97***	-0.03 (.01)	0.97***	-0.03 (.01)	0.97***
Male	0.13 (.10)	1.13	0.11 (.11)	1.11	0.11(.11)	1.11
Non-white	0.20 (.09)	1.22*	0.21 (.10)	1.23*	0.14 (.10)	1.15
Suspect Characteristics						
Age			-0.15 (.03)	0.86***	-0.14 (.03)	0.87***
Non-white			0.27 (.08)	1.32***	0.22 (.09)	1.25**
Male			0.35 (.08)	1.41***	0.33 (.09)	1.39***
Socioeconomic Status			-0.23 (.07)	0.80***	-0.25 (.07)	0.78***
Resistance			0.77 (.11)	2.16***	0.77 (.11)	2.16***
Arrested			1.05 (.15)	2.90***	1.08 (.16)	2.95***
Conflict			0.41 (.09)	1.51***	0.46 (.09)	1.59***
Weapon			1.38 (.42)	3.98***	1.36 (.43)	3.91***
Evidence			0.16 (.02)	1.18***	0.16 (.02)	1.17***
Demeanor			-0.11 (.15)	0.90	-0.03 (.15)	0.97
Drug or Alcohol			0.51 (.10)	1.66***	0.57 (.10)	1.76***
Encounter Setting						
Number of Officers					-0.01 (.03)	1.00
Number of Citizens					-0.00 (.01)	1.00
Proactive Encounter					0.36 (.08)	1.43***
Observation site					0.43 (.08)	1.53***
N	3,356		3,356		3,356	
-2 Log Likelihood	4,509.37		4,060.38		4,008.07	
Model χ^2	57.70***		506.69***		559.01***	
df	5		16		20	
Cox & Snell R^2	.017		.140		.153	

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

Verbal versus physical force modeling. The force modeling presented in Table 5.11 utilized a dichotomous dependent measure. Measuring force in such a way potentially ignores differences between verbal force and physical force. In the bivariate analysis section, a contingency table (Table 5.8) demonstrated that verbal force is distributed differently across education categories when compared to physical force. Examining how this difference manifests in a multivariate analysis is certainly warranted.

The following tables (Tables 5.12-14) use a dependent variable which distinguishes between verbal and physical force. Unlike the multivariate analyses for the previous variables which utilized binary logistic regression, the analysis for this use of force variable requires a different form of logistic regression. As the force categories are discrete and cannot be naturally ordered, multinomial logistic regression is the preferred approach (Liao, 1994; Long, 1997). Multinomial logistic regression, or polytomous logistic regression, is a natural extension of the binary logistic regression model (DeMaris, 1992). While a binary logistic regression of the use of force would compare the likelihood of force with that of no force, a multinomial logistic regression using the three force categories from the current analysis compares the likelihood of verbal force to no force, and physical force to no force (Liao, 1994).[38] As such, each table presents the addition a group of variables – officer, suspect, and encounter – and includes two sets of coefficients and odds; one for comparing verbal force to no force, and another for comparing physical force to no force.

---

[38] A multinomial logistic regression model will always make k-1 comparisons, where k is equal to the number of categories in the dependent variable (Liao, 1994).

The interpretation of odds ratios may become somewhat confusing in a multinomial logistic regression model (DeMaris, 1992). The models may be interpreted as comparing the probability of verbal force and physical force occurring in an encounter relative to no force. For example, the exponentiated beta coefficient for suspect race and physical force in the Full Model below is 1.50. This means that the odds of a non-white suspect being the recipient of physical force instead of no force is 1.5 times the odds of a white suspect being on the receiving end of physical force instead of no force (Liao, 1994).

Table 5.12 below displays the first step of the multinomial logistic regression with just officer characteristics. Unlike the models for arrests and searches, officer characteristics appear to influence the odds of both verbal and physical force. Encounters involving officers with some college exposure ($b = -0.67$, $p < .001$) and four-year degrees ($b = -0.72$, $p < .001$) are significantly less likely to involve verbal force relative to non-college educated officers. This model also indicates that some college exposure ($b = -0.48$, $p < .001$) and holding a degree ($b = -0.54$, $p < .001$) significantly reduce the likelihood of physical force in an encounter, compared to high school educated officers. Higher levels of officer experience appear to reduce the odds of both verbal and physical force. While non-white officers are more likely to use verbal force instead of no force in an encounter, the same finding is not apparent for physical force.

Table 5.13 presents the second model of the force analysis, with suspect characteristics included. The introduction of suspect characteristics does not fully control for the relationships between officer characteristics and both verbal force and physical

force. Among the suspect variables, however, there are some interesting distinctions between predictors of verbal and physical force. Suspect sex does not influence the odds of verbal force in an encounter, but male suspects are significantly more likely to receive physical force from officers. Encounters where suspects are arrested are significantly less likely to involve verbal force, but significantly more likely to involve physical force. Also, suspects in conflict with other citizens on the scene are significantly more likely to receive verbal force from officers, but not more or less likely to receive physical force. Otherwise, there are many similarities at this level between predictors of verbal and physical force. Suspects that are younger, non-white, holding a low socioeconomic status, resisting of the officers requests, intoxicated, visibly armed, and have much evidence present are significantly more likely to receive both verbal and physical force.

The Full Model for the use of force is presented in Table 5.14. With all other officer, suspect, and encounter variables being controlled for, both college education variables appear to significantly reduce the odds of verbal force in an encounter (b = -0.56, < .001 and b = -0.73, < .001, for some college exposure and four-year degree, respectively) relative to non-college educated officers. Regarding physical force, simple exposure to college does not result in a significant effect, however, encounters involving officers with a four-year degree are significantly less likely to involve physical force (b = -0.53, $p < .01$). The introduction of encounter level variables changed little else among officer and suspect variables. As opposed to the second force model, suspects in conflict with other citizens are significantly more likely to be subjected to physical force instead of no force. Among the encounter level variables, encounters with higher numbers of

police present are more likely to involve physical force, and less likely to involve verbal force. Encounters initiated by the officer and those that take place in Indianapolis are more likely to involve both verbal and physical force instead of no force at all.

Table 5.12: Multinomial Logistic Regression of *Force* on Officer Characteristics (N = 3,356)

Variable	Model 1. Officer Characteristics			
	Verbal Force v. No Force		Physical Force v. No Force	
	b (SE)	Exp(b)	b (SE)	Exp(b)
Intercept	0.56 (.16)	--	-0.14 (.20)	--
Officer				
Education				
Some college	-0.67 (.12)	0.51***	-0.48 (.15)	0.62***
4-yr Degree	-0.72 (.13)	0.50***	-0.54 (.15)	0.59***
Experience	-0.03 (.01)	0.97***	-0.05 (.01)	0.96***
Male	0.06 (.11)	1.07	0.25 (.14)	1.28
Non-white	0.27 (.10)	1.31**	0.04 (.12)	1.05
N	3,356			
-2 Log Likelihood	1,043.53			
Model χ^2	72.21***			
df	10			
Cox & Snell R^2	.021			

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

Table 5.13: Multinomial Logistic Regression of *Force* on Officer and Suspect Characteristics (N = 3,356)

Variable	Model 2. Officer and Suspect			
	Verbal Force v. No Force		Physical Force v. No Force	
	b (SE)	Exp(b)	b (SE)	Exp(b)
Intercept	-0.35 (.34)	--	-0.87 (.47)	--
Officer				
Education				
Some college	-0.68 (.13)	0.51***	-0.39 (.18)	0.68*
4-yr Degree	-0.72 (.13)	0.49***	-0.54 (.18)	0.59**
Experience	-0.02 (.01)	0.98***	-0.05 (.01)	0.96***
Male	0.07 (.11)	1.07	0.22 (.16)	1.25
Non-white	0.24 (.10)	1.27*	0.10 (.14)	1.10
Suspect				
Age	-0.10 (.03)	0.91**	-0.29 (.04)	0.75***
Non-white	0.20 (.09)	1.22*	0.48 (.12)	1.62***
Male	0.16 (.09)	1.18	0.97 (.14)	2.64***
Socioeconomic Status	-0.18 (.07)	0.84*	-0.37 (.10)	0.69***
Resistance	0.76 (.11)	2.22***	0.82 (.12)	2.26***
Arrested	-1.60 (.30)	0.20***	2.52 (.17)	12.48***
Conflict	0.46 (.09)	1.59***	0.23 (.12)	1.25
Weapon	0.97 (.46)	2.65*	2.10 (.47)	8.00***
Evidence	0.17 (.03)	1.19***	0.12 (.03)	1.13***
Demeanor	-0.03 (.16)	0.97	-0.29 (.21)	0.75
Drug/Alcohol	0.34 (.12)	1.40**	0.94 (.14)	2.55***
N	3,356			
-2 Log Likelihood	5,454 .69			
Model χ^2	1,214.66***			
df	32			
Cox & Snell R^2	.303			

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

Table 5.14: Multinomial Logistic Regression of *Force* on Officer, Suspect, and Encounter Characteristics (N = 3,356)

Variable	Model 3. Full Model			
	Verbal Force v. No Force		Physical Force v. No Force	
	b (SE)	Exp(b)	b (SE)	Exp(b)
Intercept	-0.35 (.37)	--	-1.82 (.50)	--
Officer				
Education				
Some college	-0.56 (.13)	0.57***	-0.31 (.18)	0.73
4-yr Degree	-0.73 (.13)	0.48***	-0.53 (.18)	0.59**
Experience	-0.02 (.01)	0.98**	-0.04 (.01)	0.96***
Male	0.07 (.12)	1.07	0.19 (.16)	1.22
Non-white	0.16 (.10)	1.19	0.05 (.14)	1.05
Suspect				
Age	-0.10 (.13)	0.90***	-0.27 (.04)	0.76***
Non-white	0.17 (.09)	1.19*	0.41 (.13)	1.50***
Male	0.16 (.09)	1.17	0.91 (.15)	2.49***
Socioeconomic Status	-0.22 (.08)	0.80**	-0.37 (.10)	0.69***
Resistance	0.77 (.11)	2.15***	0.77 (.12)	2.17***
Arrested	-1.47 (.30)	0.23***	2.47 (.17)	11.84***
Conflict	0.51 (.09)	1.67***	0.30 (.12)	1.35*
Weapon	0.97 (.46)	2.63*	2.11 (.47)	8.21***
Evidence	0.17 (.03)	1.19***	0.12 (.03)	1.12***
Demeanor	0.05 (.16)	1.06	-0.19 (.22)	0.83
Drug/Alcohol	0.42 (.11)	1.52***	0.98 (.14)	2.66***
Encounter				
Number of Officers	-0.16 (.04)	0.85***	0.20 (.04)	1.22***
Number of Citizens	-0.00 (.01)	0.10	-0.01 (.01)	0.99
Proactive Encounter	0.28 (.09)	1.14**	0.46 (.12)	1.58***
Observation Site	0.44 (.09)	1.55***	0.38 (.12)	1.46**
N	3,356			
-2 Log Likelihood	5,692.77			
Model χ^2	1,347.90***			
df	40			
Cox & Snell R^2	.331			

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

Summary of multivariate modeling. The preceding analysis examined the impact of college education on three measures of officer behavior (e.g., arrest, search, and the use of force) while controlling for a number of variables that have been found to be theoretically relevant or significant in past research. The results indicate that college education has no significant influence on the odds of an arrest or a search taking place in

a police-suspect encounter. While encounters involving a college educated officer were significantly less likely to involve verbal force, in order to see a similar result for physical force, officers needed to have obtained at least a four-year degree.

Multivariate Diagnostics. Collinearity statistics were assessed for all multivariate models to search for potentially confounding interrelationships among the independent variables. No problematic variance inflation factors (VIF) were present in any model, as most ranged between 1.0 and 1.3. The highest VIFs in any models were for the education variables, which were approximately 2.4 and 2.5 for some college and four-year degree, respectively. This is not unexpected given that these are two dummy-coded variables measuring the same concept. The tolerance values for these variables were approximately .400, and no tolerance value outside of the education variables fell below .700 in any model. From these figures it was concluded that multicollinearity did not undermine any of the findings from the analysis above.

CHAPTER VI: DISCUSSION

The purpose of the research presented here was to examine the impact of higher education on particular outcomes in police-suspect encounters. Previous examinations of this nature sought to analyze the effect of higher education on but a single outcome per study, impeding the comparability of education's potentially differential impact on a variety of officer behavioral outcomes. For the current inquiry the dependent measures - arrests, searches, and force - were modeled as functions of officer education level and other controlling factors. This analysis allowed for a comparison of higher education's impact on these measures to be made across more than 3,000 police-suspect encounters in two cities over two summers. The results both conflicted and supported individual findings from previous examinations, but also provided new findings in relationships that had not been analyzed before.

Overview of Findings

In general, the impact of higher education on officer arrests, searches, and force ranged from negligible to modest. Officer education level yielded no influence over the probability of an arrest taking place in an encounter. This was true when the characteristics of suspects and encounters were held constant, but also when individual officer characteristics were considered alone. This finding supports previous indications of a null relationship between officer education and arrests (Brandl et al., 2001; Smith & Aamodt, 1997; Smith & Klein, 1983; Worden, 1989). Indeed, only a minority of studies from the mid-1970s indicated a discernable relationship between officer education and arrest behavior. Two of these studies used a very small sample of officers (Bozza, 1973;

Glasgow et al., 1973) and one did not actually measure arrests per se, but rather officer attitudes towards the use of arrests (Fickenauer, 1975).

Suspect and encounter characteristics appeared to provide the best predictors of arrests. These factors included the amount of evidence present, the suspect's socioeconomic status, whether the suspect resisted the officer, was disrespectful, or intoxicated, as well as the number of officers and citizens present at the scene. It is interesting to note that while certain suspect characteristics (e.g., age, race, sex) were found to be significantly related to arrests in the model containing only officer and suspect characteristics, the introduction of encounter characteristics controlled for these relationships. Also, suspect demeanor (e.g., disrespect) was found to be significantly related to the probability of arrest in the full model, contradicting findings from Klinger (1996).[39]

Schafer and colleagues (2004) hypothesized that officer education could be related to search decision making, but were unable to include such a variable in their analysis. No previous inquiry had examined the effect of officer education level on his/her propensity to search suspects in police-suspect encounters. The results of the preceding analysis indicate that at both the bivariate and multivariate levels, higher education does not affect whether a search will take place in a given police-suspect encounter. Suspect and encounter characteristics again proved to be the best indicators of

---

[39] The demeanor variable was measured as a dichotomy. This finding contradicts that of Klinger (1996), who, using a sample of officers from Dade County, Florida, found that measuring suspect demeanor as a dichotomy was not significantly related to arrest when controlling for the type of crime and conflict with other citizens on the scene. Instead, Klinger had to measure demeanor as the incidence of extreme hostility to produce a significant finding. While the present analysis did not include the type of crime supposedly committed by the suspect as a controlling factor, the summative evidence scale may approximate such an effect.

search behavior. These included the suspect's age, sex, and socioeconomic status, and whether they were visibly intoxicated. The results from the present inquiry do not indicate that officer education is a significant factor concerning the probability of a search taking place; however, non-white officers were significantly less likely to search a suspect.

The use of force was the only dependent measure on which officer education showed a significant impact. It was found that some exposure to college was sufficient to reduce the likelihood of verbal force being used in an encounter. However, for a similar effect to be produced for physical force, the officer in the encounter needed to be holding at least a four-year degree.[40] In addition to holding a four-year degree, officer experience was also found to reduce the likelihood of verbal and physical force taking place in an encounter. Suspect characteristics appeared to be the strongest predictors of both verbal and physical force. Interestingly, the suspect being arrested significantly reduced the likelihood of the officer using verbal force, but was the strongest predictor of the officer resorting to physical force in an encounter.[41]

Further Questions for Consideration

The results of the analysis performed here indicate that higher education does not impact all facets of police behavior equally. The education level of officers did not

---

[40] These findings are not surprising given that the analysis utilized the same data and a similar set of variables as an analysis by Paoline and Terrill (2007). However, the point of including officer use of force in the analysis was to compare it to arrests and searches in terms of how higher education may or may not impact these decisions.

[41] This finding may be due to the fact that the verbal/physical force variable captured the highest level of force used. Arresting a suspect is much more likely to involve physical restraint, and thus it is not unlikely that arrests become a significant predictor of physical force during an encounter. The correlation coefficient between arrest prior to use of force and a dummy variable for physical force cases was 0.505.

generate any meaningful impact on their propensity to arrest or search a suspect, but did produce an effect on an officers' likelihood of using force in an encounter. Had higher education been found to significantly impact the odds of either arrest or search, it would be here that some determination could be made as to where education bears its strongest effect on these dimensions of police behavior. However, given the results of the analysis, higher education shows its strongest and only effect on an officer's propensity to use force.

The findings as a whole beg the question of *why* higher education has a differential impact on these dimensions of police behavior. The analysis itself is not capable of providing a satisfactory answer to this question. This is partially due to the lack of empirically tested hypotheses regarding higher education and policing which could be used to interpret the results. But also, because of the constraints of foresight and practicality, the analysis above simply did not ask why higher education may or may not influence officer behavior.[42] Some speculative interpretation of the analysis may be useful, and this interpretation will hopefully be subjected to empirical analysis in future research.

The nature or distinctive roles that these three behaviors play within the police suspect-encounter may be one reason why higher education offers a differential impact. Arrests are an end to the encounter, representing the point at which the police have brought an individual into the formal criminal justice system. Force, on the other hand, represents a means for officers to achieve an end. Searches occupy a middle ground

---

[42] It was only after research had begun that the lack of knowledge in the area of how or why higher education affects police became apparent. The available data contained very little information which could be used to answer this question.

between arrests and force in that they can represent an end to the encounter if no evidence is uncovered, or may be used as a means to obtain evidence towards an end (e.g, the arrest of the suspect). This distinction carries implications towards the exercise of discretion in resorting to these behaviors. An example focusing on the decision to arrest as an end may be useful. Previous research has indicated that officers exercise discretion in pursuing arrests (e.g., Terrill & Paoline, 2007). It may be possible that, relative to force, arrests present fewer situations in which the officer has a large amount of discretion to wield. In certain encounters, it follows that an officer may be presented with a situation where even if his/her college education was somewhat responsible for a decision to 'give a guy a break' and not pursue an arrest, that discretion may be mediated by the practicality of such a decision (e.g., the suspect was involved in a serious offense).[43] In these encounters, the officer's discretion to arrest would be constrained. What is left is a smaller number of encounters in which the officer maintains full discretion to arrest.[44]

---

[43] While this example posited that college educated officers may be less likely to pursue an arrest in an encounter with a suspect, an equally meaningful example could be drawn from positing that such officers are actually more likely to pursue an arrest. Several scholars (Bozza, 1973, Sherman & Blumberg, 1981, Wilson, 1975) have hypothesized that higher education may inoculate officers with a greater motivation to exceed expectations. As such, officers may be presented with fewer opportunities, relative to force, to zealously pursue an arrest because of practical reasons (e.g., lack of evidence).

[44] Though this example is focused specifically on arrests, the same point on limited discretion could be applied to searches. Engel (2008) demonstrated that between 60 and 88 percent of searches are non-discretionary (e.g., inventory searches, searches incident to arrest, searches based on warrants, or consent searches). The current inquiry did not differentiate between the discretionary and non-discretionary searches, which may be one possible explanation for the null relationship between officer education and searches.

Unlike arrests, the use of force is not an end to the encounter, but primarily a very different phenomenon. Force may be used throughout encounters as a means to controlling the behavior of suspects (Muir, 1977). In any given encounter, police officers are permitted to use force if they feel it would be appropriate (Bittner, 1970). The police are thus afforded great discretion in the application of force to suspects as it is not legally required or prohibited in any encounter. On this point, Klockars (1996) states, "the police need not invoke 'the law' to use force, though they may decide to use force to invoke 'the law'" (p. 12). This carries implications with respect to the potential role higher education may play in relation to police use of force behavior.

In one sense, as opposed to the decision to arrest or search, there is more room for officer education to have an impact on discretion with respect to force. This means that officer education *can* have an impact on the use of force, because of the amount of discretion officers wield in using it. Though officers are afforded more discretion in using force than for pursuing arrests or searches, to imply that there are not certain factors which make force more or less desirable in an encounter would be untrue. If an encounter involves a suspect who is highly resisting of the officer's requests, or is intoxicated, or becoming violent with bystanders, the officer's discretion to use force becomes constrained by practicality. Such encounters may require some kind of force on the part of the officer in order to gain compliance from the suspect. The question which follows is after these factors are considered, *does* higher education have an impact on the use of force. The current inquiry controlled for these influences and still found that higher education influenced the likelihood of force occurring.

The relevant question that remains unresolved is how higher education influences the officer's propensity to use force. This question not only concerns the direction of the impact (a factor the current inquiry was able to examine), but also the means by which college education affects this propensity (a factor the current inquiry was unable to examine). In the past, inquiries have approached explanations for why or how higher education influences officer behavior in three different ways.

With the first approach, several studies have proceeded atheoretically (e.g., Cascio, 1977; Cunningham, 2006; Fickenauer, 1975). These studies have not directly discussed why higher education would impact officer decision making but instead only focus on the question of *does* higher education influence officer behavior. Studies following the second approach identify some underlying hypotheses, but fail to test them directly (e.g., Paoline & Terrill, 2007; Sherman & Blumberg, 1981).[45] It cannot be said then that these studies contribute to the empirical status of any hypotheses they present. The final group of previous inquiries includes those that have tested various hypotheses. Unfortunately, this literature has produced inconclusive results (Dantzker, 1993; Paoline et al., 2000; Shernock, 1992; Worden, 1990). These studies have operated under a broad theoretical framework positing that higher education influences officer behavior by shaping attitudes and values (Worden, 1990). Given the tenuous relationship between attitudes and behavior in the previous literature (Frank & Brandl, 1991; Muir, 1977; Worden, 1989), it is not difficult to see why research on higher education and officer behavior is often lacking a theoretical explanation.

---

[45] Carter and colleagues (1988: 16-18) compiled a list of these hypotheses, most of which revolve around differences in attitudes.

Limitations of the Current Inquiry

Several limitations in the present analysis are worth mentioning. First, the manner in which this analysis attempted to capture police behavior – by dichotomizing particular outcomes – has the potential to ignore a wide variety of intermediate decisions which may have been relevant. Because the analysis was concerned only with whether the behaviors of interest (e.g., arrests or searches) were present during the encounter, the results may significantly underestimate the influence of higher education on officer behavior. Future researchers may find it beneficial to expand the quantification of police behavior beyond simply marking the presence or absence of an act.

Second, similar to previous studies of education and officer behavior, the present inquiry was not capable of testing specific hypotheses regarding the mechanism by which higher education influences officer behavior. Because the focus of POPN was not specifically on higher education, officer education level was captured using a single eight-category variable.[46] Future research endeavors will undoubtedly have to collect education parameters beyond a single categorical variable. For instance, research on education should include a multitude of measures to better capture officer exposure and involvement in higher education. Potential measures may include whether the degree was earned prior to, or during police employment, as well as whether college major, extracurricular activities, and grade point average matters in some way (See Hudzok, 1978 for more examples and a discussion).

---

[46] Undoubtedly this is a limitation which many inquiries face, not to be limited to education. In writing a literature review concerning the impact of higher education on police behavior, the author is typically searching for a single regression coefficient within a study that did not focus on officer education, but only included a single measure of education as a control variable. The same could be applied to studies of use of force, for example.

Third, while a qualitative analysis would provide richer detail as to how higher education may influence officer decision making, such an approach was ultimately dismissed for two reasons: lack of an explicit theoretical framework within the prior literature and insufficient detail found within the narrative accounts of the POPN data. More directly, the paucity of literature on possible explanations fails to offer a sufficient guide as to what to look for within narrative accounts (e.g., certain cues or patterns that may lead one to better understand the role of higher education). Further, the level of detail included in POPN observer debriefing sessions was generally sparse, if provided at all. Hence, with little theoretical guidance and limited narrative descriptions, the ability to conduct any type of meaningful qualitative analysis was essentially eliminated.

Directions for Future Research

The potential for research in the area of higher education and policing is both abundant and exciting. The research to date has mostly centered on whether higher education has an impact on a variety of officer behaviors, and if so, the direction of the impact. As was demonstrated, the relationship between higher education and officer behavior remains unresolved. The development of hypotheses regarding how and why higher education influences officer behavior may be helpful in guiding future analyses.

It is important then for future research not to ignore the need for hypotheses regarding how and why higher education influences officer behavior. Analyses which produce findings regarding the direction of education's impact on officer behavior will be useful in deciphering unresolved relationships, and those findings will certainly benefit from empirically derived, stable explanations. In the past, hypotheses have been

presented as a means for interpreting results, but have not been tested themselves. Given this fact, findings regarding higher education's impact on officer behavior have been interpreted through any number of hypotheses, each with little empirical support. Rather than interpreting results through the *best* explanation, researchers have simply picked explanations *compatible* with their findings. Research on higher education and police behavior may gain new relevance if previously proposed hypotheses are revisited and rigorously tested, discarding unsupported hypotheses and moving forward with stronger explanations.

In order to demonstrate an approach to examining hypotheses presented in the previous literature, a hypothesis from Carter and colleagues (1988) list of assumed educational benefits may be used as an example. According to these researchers, one advantage to hiring college educated officers as opposed to non-college educated officers is that higher education "[permits] the individual to learn more about the history of the country, the democratic process and appreciation for constitutional rights, values and the democratic form of government" (1988: 16). This particular hypothesis may be reduced to posit that higher education positively influences an officer's appreciation of and commitment to democratic values. It would be possible to test this hypothesis by creating a scale which measures such appreciation and commitment. One could then test whether college and non-college educated officers differ significantly in their attitudes; and if so, whether such attitudes help explain differences in behavior. If it is found that it does, this finding would begin to chip away at the questions of how and why higher education influences officer behavior as it would provide evidence that higher education impacts

officer behavior by positively influencing democratic values.

Aside from testing hypotheses which have been forwarded by police scholars, research in the field of education has produced a large amount of empirical studies regarding education's impact on students in general (e.g., Feldman & Newcomb, 1973; Pascarella & Terenzini, 1991, 2005). Very little has been done to relate this research to criminal justice actors. What could be gained through a careful examination of education research are new insights on research methodology in order to isolate the effects of education on behaviors, and a better understanding of the salient effects of higher education. As an example, previous research in education illustrates that some salient effects of college on students are improvements in critical thinking, reflective judgment, and communication skills (Pascarella & Terenzini, 1991, 2005). Police scholars may consider examining the extent to which college educated officers differ from non-college educated officers in these respects. If it is found that they do differ significantly, researchers may examine whether differences in these skills explain any variation in officer behavior or decision-making. As with the example above, findings from such an inquiry would begin to build a better explanation for how and why higher education influences officer behavior. An examination of higher education and officer communication skills would be especially relevant to the literature on police use of force, as Muir (1977) posited that communication skills play an important role in the skillful use of force. This is a falsifiable hypothesis that may be tested and such an examination could shed light on how and why higher education influences the use of force. Also, armed with information approximating the areas where one may expect to see higher education have

an influence on officer behavior, researchers may wish to examine the extent to which police training or culture degrades, mediates, or amplifies those effects. The potential for research in this area is bountiful.

Implications for Policy

In any examination of the impact of higher education on police behavior, the most prudent policy implication regards whether police departments should include a college degree as a prerequisite for employment. The findings of the present analysis alone do not warrant a reversal of the statement of the National Academics Panel on Police Policy and Performance (Skogan & Frydl, 2004) when they found that there was insufficient evidence to recommend a college education requirement for employment as a police officer. The results of the analysis here do little to change the state of the available evidence. This is not particularly good news for proponents of higher education (although it does not represent bad news either). There is simply not enough quality evidence to determine whether higher education has a desirable effect on police performance.

As noted, this is an area of policy which can benefit immensely from future lines of research. It may be possible in the future to address whether the effect of college diminishes over time, as such studies would attest to the potential value of providing incentives for officers to return to school later in their careers. Research may also identify characteristics of higher education which produce outcomes most beneficial to the police, such as college major, the impact of the quality of the institution, or enhanced critical thinking, reflective judgment, and communication skills. Police administrators would benefit from a better picture of what their department could expect to receive should they

decide to require a college degree of their recruits. While there is much potential for evidence of a beneficial effect of higher education to be found, scholars and practitioners also need to remain open to the notion that higher education may be unrelated to some dimensions of police performance.

In closing, research in the area of higher education and policing has the potential to produce valuable knowledge regarding the nature of education, but also the improvement of police performance. It should not be expected that a college education requirement will provide amelioration of all the intricacies of police discretion. The enterprise of using scientific inquiry to improve the practice of policing, however small an improvement it may be, should not be discounted.

Appendix A: Samples, Data, and Direction of Findings in the Available Literature

Table A.1: Samples, Data, and Direction of Findings in Officer Education and Attitudes

Authors	Sample	Data Type	Direction of Finding*
Smith, Locke, & Walker (1967)	226 officers in the New York City Police Department (NYPD), 104 of which were enrolled in a nearby college	Rokeach (1960) and Piven (1961) Scales	+
Smith, Locke, & Fenester (1970)	78 officers in the NYPD, 39 of which had completed baccalaureate degrees	Rokeach (1960) and Piven (1961) Scales	+
Guller (1972)	63 officers with the NYPD, 32 of which were college seniors and 31 of which were college freshmen at the John Jay College of Criminal Justice	Rokeach Scale (1960)	+
Dalley (1975)	139 officers from the Royal Canadian Mountain Police	Adorno Authoritarian Scale (1950), Kerlinger Social Attitude Scale (1970), and Role Interpretation Scale	+
Miller and Fry (1976a, 1978)	136 sworn officers from a California county	Miller and Fry Professionalism Scale (1976b)	null¥
Weiner (1976)	115 police science students who were also police officers and 396 officers in a nearby department	Multi-scale attitudinal survey	null
Roberg (1978)	118 nonsupervisory patrol offivers in Lincoln, Nebraska	Rokeach Scale (1960), supervisor ratings	+
Worden (1990)	Surveys of officers and citizens in Rochester, St. Louis, and Tampa-St. Petersburg	Attitudinal Likert scales	null
Buckley, McGinnis, and Petrunik (1992)	156 Canadian regional police constables	Career attitude survey	-
Shernock (1992)	177 patrol officers from 11 municipal departments in New England and New York	Attitudinal questionnaire	-

Table A.1 Continued: Samples, Data, and Direction of Findings in Officer Education and Attitudes

Dantzker (1993)	535 patrol officers from municipal departments in Illinois, Texas, and California	Job satisfaction survey	-
Carlan and Byxbe (2000)	235 college students who were aspiring police officers and 428 non-criminal justice majors	Vignettes to measure punativeness	+
Paoline, Myers, and Worden (2000)	Interviews with 398 officers in Indianapolis, Indiana (Summer 1996) and 246 officers in St. Petersburg, Florida (Summer 1997)	Officer's conceptions of the police role	-

*Note: "+" = college educated officers possess more desirable attitudes, "-" = college educated officers possess less desirable attitudes, "null" = college education has no significant effect on officer attitudes.
$An important point to make is that this direction represents an overall picture of the study findings. Miller and Fry (1976) measured many different types of attitudes and their results "ranged from slightly positive, to nonexistent, to slightly negative" (p. 192).

Table A.2: Samples, Data, and Direction of Findings in Officer Education and Arrests

Authors	Sample	Data Type	Direction of Finding*
Glasgow, Green, & Knowles (1973)	24 officers with the Costa Mesa, California Police Department	Arrest records	+
Bozza (1973)	24 officers with the Costa Mesa, California Police Department	Arrest records	+
Fickenauer (1975)	98 police recruits from training academies in New Jersey	Vignettes measuring discretion in invoking formal action	-
Smith & Klein (1983)	24 municipal departments in Rochester, St. Louis, and Tampa-St. Petersburg and 950 observed encounters between police and suspects	Independent observations of officer encounters with suspects	- / null¥
Worden (1989)	Observation of 900 patrol shifts by officers in 60 neighborhoods in Rochester, St. Louis, and Tampa-St. Petersburg during the summer of 1977	Independent observations of officer encounters with suspects	null
Smith & Aamodt (1997)	299 municipal officers from 12 departments in Virginia	Arrest records	null
Brandl, Stroshine, & Frank (2001)	800 officers from a large mid-western municipal police department	Arrest records	null

*Note: "+" = college educated officers more likely to arrest, "-" = college educated officers less likely to arrest, "null" = college education has no significant effect on propensity to arrest.

¥Smith & Klein (1983) produced a negative relationship between education and arrests when education was measured as the entire department's average education. They produced a null relationship when education was measured as an individual officer's years of education.

Table A.3: Samples, Data, and Direction of Findings in Officer Education and Use of Force

Authors	Sample	Data Type	Direction of Finding*
Cohen and Chaiken (1972)	1,608 officers in the NYPD who were appointed in 1957 and still active in 1968	Citizen complaints of force	-
Cascio (1977)	940 officers in the Dade County Public Safety Department	Citizen complains of excessive force	-
Inn and Wheeler (1977)	347 officers in a large metropolitan police department	Letters of explanation for shooting incidents	null
Milton, Halleck, Lardner, and Abrecht (1977)	Seven urban police departments selected by population, administration style, and rates of officer-involved shootings	Officer involvement in violent incidents	+
Hayden (1981)	50 officers from a large northeastern city	Vignettes measuring discretion in deadly force	null
Sherman and Blumberg (1981)	473 officers in the Kansas City Police Department	Investigation reports on discharging firearms	null
Binder, Scharf, and Galvin (1982)	Report submitted to the National Institute of Justice	Police shooting records	-
Worden (1996)	1,528 encounters between officers and suspects in 60 neighborhoods in Rochester and Tampa-St. Petersburg	Independent observations of officer encounters with suspects	+
Terrill and Mastrofski (2002)	3,116 encounters between police and suspects in Indianapolis (Summer 1996) and St. Petersburg (Summer 1997)	Independent observations of officer encounters with suspects	-
Aamodt (2004)	Meta-analysis of 10 studies on officer education and use of force	Unclear[¥]	-
Paoline and Terrill (2004)	3,356 encounters between police and suspects Indianapolis (Summer 1996) and St. Petersburg (Summer 1997)	Independent observations of officer encounters with suspects	- / null[€]

Table A.3 Continued: Samples, Data, and Direction of Findings in Officer Education and Use of Force

Paoline and Terrill (2007)	3,356 encounters between police and suspects Indianapolis (Summer 1996) and St. Petersburg (Summer 1997)	Independent observations of officer encounters with suspects	-
McElvain and Kposowa (2008)	186 officer-involved shootings in the Riverside County Sheriff's Department, California	Police shooting records	-

*Note: "+" = college educated officers more likely to use force, "-" = college educated officers less likely to use force, "null" = college education has no significant effect on propensity to use force.

¥Studies were included in the meta-analysis as long as the effect of education on use of force could be converted into an effect size, but Aamodt (2004) did not divulge what types of force were examined in these studies.

€Paoline and Terrill (2004) found that college educated male officers used less verbal force, but not physical force. Education did not have a significant impact on use of force by female officers.

Appendix B: Additional Bivarite Tables

Table B.1: Distribution of Officer Characteristics by Education Level (N = 3,356)

	High school or less n, %	Some college, no degree n, %	Four-year degree or higher n, %
Officer Sex			
Female	82 (17%)	288 (20%)	143 (10%)
Male	405 (83%)	1,171 (80%)	1,267 (90%)
Officer Race			
White	383 (79%)	1,116 (77%)	1,160 (82%)
Non-white	104 (21%)	343 (24%)	250 (18%)

REFERENCES

Aamodt, M.G. (2004). *Research in Law Enforcement Selection.* Boca Raton, FL: BrownWalker Press.

Adorno, T.W. (1950). *The Authoritarian Personality.* New York: Harper and Row.

Allen, M.P. (1997). *Understanding Regression Analysis.* New York: Plenum.

Altemeyer, B. (1988). *Enemies of Freedom: Understanding Right-Wing Authoritarianism.* San Francisco, CA: Jossey-Bass Publishers.

Babbie, E. (1995). *The Practice of Social Research, Seventh Edition.* New York, NY: Wadswoth.

Bachman, R., & Paternoster, R. (2004). *Statistical Methods for Criminology and Criminal Justice.* New York: McGraw Hill.

Baro, A. L., & Burlingame, D. (1999). Law enforcement and higher education: Is there an impasse? *Journal of Criminal Justice Education, 10,* 57-73.

Bayley, D. H., & Bittner, E. (1997). Learning the skills of policing. In R. G. Dunham & G. Alpert (Eds.), *Critical issues in policing: Contemporary readings* (3rd ed., pp. 114-137). Prospect Heights, IL: Waveland.

Bell, D. J. (1979). The police role and higher education. *Journal of Police Science and Administration 7(4),* 467-475.

Berk, R.A. (2004). *Regression Analysis: A Constructive Critique.* Thousand Oaks, CA: Sage.

Binder, A., Scharf, P., & Galvin, R. (1982). Use of deadly force by police officers. Final Report Submitted to the National Institute of Justice, Grant 79-NI-AX-0134.

Bittner, E. (1970). *The Functions of Police in Modern Society.* Washington, DC: U.S. Government Printing Office.

Bozza, C. M. (1973). Motivations guiding policemen in the arrest process. *Journal of Police Science and Administration, 1,* 468-475.

Brandl, S.G., Stroshine, M.S., & Frank, J. (2001). Who are the complaint prone officers? An examination of the relationship between police officers' attributes, arrest activity, assignment, and citizens' complaints of excessive force. *Journal of Criminal Justice 29,* 521-529.

Breci, M. G., & Simons, R. L. (1987). An examination of organizational and individual factors that influence police response to domestic disturbances. *Journal of Police Science and Administration, 15,* 93-104.

Brown, L.P. (1974). The police and higher education: The challenge of the time. *Criminology 12,* 114-124.

Buckley, L.B., McGinnis, J.H., & Petrunik, M.G. (1992). Police perceptions of education as an entitlement to promotion: An equity theory perspective. *American Journal of Police 12(2),* 77-100.

Carlan, P.E. (2007). The criminal justice degree and policing: conceptual development or occupational primer? *Policing: An International Journal of Police Strategies & Management 30(4),* 608-619.

Carlan, P. E., & Byxbe, F. R. (2000). The promise of humanistic policing: Is higher education living up to societal expectation? *American Journal of Criminal Justice, 24,* 235-245.

Carte, G. E. (1973). August Vollmer and the origins of police professionalism. *Journal of Police Science and Administration, 1,* 274-281.

Carter, D.L., & Sapp, A.D. (1990). The evolution of higher education in law enforcement: Preliminary findings from a national study. *Journal of Criminal Justice Education 1(1),* 59-85.

Carter, D. L., & Sapp, A. D. (1992). College education and policing: Coming of Age. *FBI Law Enforcement Bulletin, January,* 8-14.

Carter, D.L., Sapp, A.D., & Stephens, D.W. (1988). Higher education as a bona fide occupational qualification (BFOQ) for police: A blueprint. *American Journal of Police 7,* 1-28.

Cascio,W. F. (1977). Formal education and police officer performance. *Journal of Police Science and Administration, 5,* 89-96.

Cohen, B., & Chaiken, J. M. (1973). *Police Background Characteristics and performance.* Lexington, MA: Lexington Books.

Cox, D.R. & Snell, E.J. (1989). *Analysis of Binary Data (2nd ed.).* London: Chapman and Hall.

Cunningham, S. (August, 2006). The Florida research. *Police Chief 73,* 20-22.

Dalley, A. F. (1975). University and non-university graduated policemen: A study of

police attitudes. *Journal of Police Science and Administration, 3,* 458-468.

Dantzker, M. L. (1993). An issue for policing – educational level and job satisfaction: A research note. *American Journal of Police, 12,* 101-118.

Decker, L. K., & Huckabee, R. G. (2002). Raising the age and education requirements for police officers: Will too many women and minority candidates be excluded? *Policing: An International Journal of Police Strategies & Management, 25,* 789-802.

Decker, S. H., & Rojek, J. (2002). Saint Louis Metropolitan Police Department traffic stop patterns. St. Louis: University of Missouri- St. Louis.

DeMaris, A. (1992). *Logit Modeling: Practical Applications.* Thousand Oaks, CA: Sage.

DeMaris, A. (1995). A tutorial in logistic regression. *Journal of Marriage and the Family 57,* 956-968.

Engel, R.S. (2008). A critique of the outcome test in racial profiling research. *Justice Quarterly 25,* 1-36.

Feldman, K.A., & Newcomb, T.M. (1973). *The Impact of College on Students, Volume I: An Analysis of Four Decades of Research.* San Francisco, CA: Jossey-Bass Publishers.

Fickenauer, J.O. (1975). Higher education and police discretion. *Journal of Police Science and Administration 3(4),* 450-457.

Frank, J., & Brandl, S. (1991). The police attitude-behavior relationship: Methodological and conceptual considerations. *American Journal of Police, 10,* 83-103.

Fogelson, R.M. (1977). *Big City Police.* Cambridge, MA: Harvard University Press.

Fyfe, J.J. (1988), "Police use of deadly force: research and reform", *Justice Quarterly, 5(2),* 165-205.

Germann, A.C. (1957). Law enforcement education and training in the United States. *Police Chief, 24(10),* 22-28.

Glasgow, G., Green, R., & Knowles, L. (1973). Arrest performance among patrolmen in relation to job satisfaction and personal variables. *Police Chief,* 28-34.

Goldstein, H. (1979). Improving policing: A problem-oriented approach. *Crime & Delinquency, 25,* 236-258.

Gould, S.J. (1996). *The Mismeasure of Man.* New York: Norton.

Grommon, E.L. (2005). *The Effect of Socialization and Onset Behavior: An Examination into Youthful Firearm Offending Patterns in Michigan.* Masters Thesis: Michigan State University.

Guller, I.B. (1972), "Higher education and policemen: attitudinal differences between freshman and senior police college students", Journal of Criminal Law, Criminology, and Police Science, Vol. 63, pp. 396-401.

Hanushek, E.A. & Jackson, J.E. (1977). *Statistical Methods for Social Scientists.* New York: Academic Press.

Hawley, T. J. (1998). The collegiate shield: Was the movement purely academic? *Police Quarterly 1(3),* 35-59.

Hayden, G. A. (1981). Police discretion in the use of deadly force: An empirical study of the information usage in deadly force decisionmaking. *Journal of Police Science and Administration, 9,* 102-107.

Hickman, M. J., & Reaves, B. A. (2003a). *Local police departments 2000.* Washington, DC: Bureau of Justice Statistics.

Hickman, M. J., & Reaves, B. A. (2006). *Local police departments 2003.* Washington, DC: Bureau of Justice Statistics.

Hudzik, J. K. (1978). College education for police: Problems in measuring component and extraneous variables. *Journal of Criminal Justice, 6,* 69-81.

Inn, A. & Wheeler, A.C. (1977) Individual differences, situational constraints, and police shooting incidents. *Journal of Applied Social Psychology 7(1),* 19-26.

Jacobs, J.B., & Magdovitz, S.B. (1977). At LEEP's end?: A review of the Law Enforcement Education Program. *Journal of Police Science and Administration 5(1),* 1-18.

Kappeler, V. E., Sapp, A. D., & Carter, D. L. (1992). Police officer higher education, citizen complaints and departmental rule violations. *American Journal of Police, 11,* 37-54.

Kerlinger, F.W. (1970). A social attitude scale: Evidence on reliability and validity. *Psychological Reports 26,* 379-383.

Klinger, D.A. (1996). More on demeanor and arrest in Dade County. *Criminology 34(1),* 61-82.

Klockars, C.B. (1996). A theory of excessive force and its control. In W. A. Geller & H. Toch (Eds.), *Police violence: Understanding and controlling police abuse of force* (pp. 11-29). New Haven, CT: Yale University Press.

Knox, W.E., Lindsay, P., & Kolb, M.N. (1993). *Does College Make a Difference?: Long-term Changes in Activities and Attitudes.* Westport, CT: Greenwood Press.

LeDoux, J., Tully, E., Chronister, J.L, & Gansneder, B.M. (1984). Higher education for law enforcement: Half a century of growth. *The Police Chief 51,* 22-24.

Lersch, K. M. & Kunzman, L. L. (2001). Misconduct allegations and higher education in a southern sheriffs' department. *American Journal of Criminal Justice, 25,* 161-172.

Liao, T. F. (1994). *Interpreting Probability Models: Logit, Probit, and other Generalized Linear Models.* Thousand Oaks, CA: Sage.

Long, J.S. (1997). *Regression Models for Categorical and Limited Dependent Variables: Analysis and Interpretation.* Thousand Oaks, CA: Sage.

Mastrofski, S.A., Parks, R.B., Reiss, A.J. Jr., & Worden, R.E. (1995). Community policing at the street level: A study of the police and the community. *Proposal submitted to the National Institute of Justice.* Washington, D.C.

Mastrofski, S.D., Parks, R.B., Reiss, A.J., Worden, R.E., DeJong, C., Snipes, J.B., Terrill, W. (1998). *Systematic observation of public police: Applying field research methods to policy issues.* Washington, D.C.: National Institute of Justice. NCJ 172859.

McKelvey, R.D., & Zavoina, W. (1975). A statistical model for the analysis of ordinal level dependent variables. *Journal of Mathematical Sociology 4,* 103-120.

McElvain, J.P., & Kposowa, A.J. (2008). Police officer characteristics and the likelihood of using deadly force. *Criminal Justice and Behavior 35(4),* 505-521.

Meyer, J.W. (1977). The effects of education as an institution. *American Journal of Sociology 83,* 55-77.

Michigan State College. (1936). *Bulletin of Michigan State College of agriculture and applied science, Catalog number for 1935-1936, Announcements for 1936-37, 30(9).*

Miller, J., & Fry, L. (1976a). Reexamining assumptions about education and professionalism in law enforcement. *Journal of Police Science and*

Administration, 4, 187-196.

Miller, J., & Fry, L. (1976b). Measuring professionalism in law enforcement. *Criminology 14*, 401-412.

Miller, J., & Fry, L. (1978). Some evidence on the impact of higher education for law enforcement personnel. *The Police Chief, 45,* 30-33.

Milton, C.M., Halleck, J.W., Lardner, J., & Abrecht, G.L. (1977). *Police Use of Deadly Force.* Washington, D.C.: Police Foundation.

Muir, W. K., Jr. (1977). *Police: Streetcorner Politicians.* Chicago: University of Chicago Press.

National Advisory Committee on Criminal Justice Standards and Goals (1973). *A National Strategy to Reduce Crime.* Washington, D.C.: U.S. Government Printing Office.

National Commission on Law Observance and Enforcement (1931). *Report on Police.* Washington, D.C: U.S. Government Printing Office.

National Planning Association. (1978). *A nationwide survey of law enforcement criminal justice personnel needs and resources.* Washington, D.C.: United States Government Printing Office.

Padover, S.K. (1939). *Thomas Jefferson on Democracy.* New York, NY: New American Library.

Pampel, F.C. (2000). *Logistic Regression: A Primer.* Thousand Oaks, CA: Sage.

Paoline, E. A., III, Myers, S. M., & Worden, R. E. (2000). Police culture, individualism, and community policing: Evidence from two police departments. *Justice Quarterly, 17,* 575-605.

Paoline, E.A., III, & Terrill, W. (2004). Women police officers and the use of coercion. *Women & Criminal Justice 15(3/4),* 97-117.

Paoline, E.A., III, & Terrill, W. (2005). The impact of police culture on traffic stop searches. *Policing, An International Journal of Police Strategies & Management 28(3),* 455-472.

Paoline, E. A., III, & Terrill, W. (2007). Police education, experience, and the use of force. *Criminal Justice and Behavior, 34,* 179-196.

Parks, R.B., Mastrofski, S.D., DeJong, C., Gray, M.K. (1999). How officers spend their

time with the community. *Justice Quarterly 16(3),* 483-518.

Pascarella, E.T., & Terenzini, P.T. (1991). *How College Affects Students: Insights from Twenty Years of Research.* San Francisco: Jossey-Bass.

Pascarella, E.T., & Terenzini, P.T. (2005). *How College Affects Students (Vol. II): A Third Decade of Research.* San Francisco: Jossey-Bass.

Piven, H. (1961). *Professionalism and Organizational Structure.* Unpublished doctoral dissertation, Columbia University School of Social Work.

Riksheim, E. C., & Chermak, S. M. (1993). Causes of police behavior revisited. *Journal of Criminal Justice, 21,* 353-382.

Roberg, R. R. (1978). An analysis of the relationships among higher education, belief systems, and job performance of patrol officers. *Journal of Police Science and Administration, 6,* 336-344.

Roberg, R., & Bonn, S. (2004). Higher education and policing: Where are we now? *Policing: An International Journal of Police Strategies & Management, 27,* 469-486.

Rokeach, M. (1960). *The Open and Closed Mind: Investigations into the Nature of Belief Systems and Personality Systems.* New York: Basic Books.

Schaefer, J.A., Carter, D.L., & Katz-Bannister, A. (2004). Studying traffic stop encounters. *Journal of Criminal Justice 32,* 159-170.

Sherman, L.W. (1978). College education for police. The reform that failed? *International Journal of Police Strategies and Management 1,* 32-38.

Sherman, L. W. (1980). Causes of police behavior: The current state of quantitative research. *Journal of Research in Crime and Delinquency, 17,* 69-100.

Sherman, L. W., & Blumberg, M. (1981). Higher education and police use of deadly force. *Journal of Criminal Justice, 9,* 317-331.

Sherman, L.W., & McLeod, M. (1979). Faculty characteristics and course content in college programs for police officers. *Journal of Criminal Justice 7(3),* 249-267.

Shernock, S.K. (1992). The effects of college education on professional attitudes among police. *Journal of Criminal Justice Education 3(1),* 71-92.

Skogan, W. & Frydl K. (2004). *Fairness and effectiveness in policing: the evidence,* National Research Council of the National Academies. Washington, DC: The

National Academies Press.

Skolnick, J.H. (1964). A sketch of the policeman's working personality. In T. Newburn (Ed.) *Policing: Key Readings*, Uffclume, U.K.: Willan Publishing.

Skolnick, J.H., & Fyfe, J.J. (1993). *Above the Law: Police and the Excessive Use of Force*. New York, NY: The Free Press.

Smith, A., Locke, B., & Fenster, A. (1970). Authoritarianism in policemen who are college graduates and non-college police. *Journal of Criminal Law, Criminology, and Police Science, 61*, 313-315.

Smith, A., Locke, B., & Walker, W.F. (1967). Authoritarianism in college and non-college oriented police. *Journal of Criminal Law, Criminology, and Police Science, 58,* 128-132.

Smith, D. A., & Klein, J. R. (1983). Police agency characteristics and arrest decisions. In G. P. Whitaker and C. D. Phillips (Eds.) *Evaluating performance of criminal justice agencies,* 63-97.

Smith, M. R., & Petrocelli, M. (2001). Racial profiling? A multivariate analysis of police traffic stop data. *Police Quarterly, 4(1),* 4 –27.

Smith, S. M., & Aamodt, M. G. (1997). The relationship between education, experience, and police performance. *Journal of Police and Criminal Psychology, 12*, 7-14.

Spano, R. (2003). Concerns about safety, observer sex, and the decision to arrest: Evidence of reactivity in a large-scale observational study of police. *Criminology 41(3),* 909-932.

Stephens, G. (1976). Criminal justice education: Past, present, and future. *Criminal Justice Review 1*, 91-120.

Terrill, W. (2001). *Police Coercion: Application of the Force Continuum*. New York: LFB Publishing.

Terrill, W., & Mastrofski, S. D. (2002). Situational and officer based determinants of police coercion. *Justice Quarterly, 19*, 215-248.

Terrill, W. & Paoline, E.A. (2007). Nonarrest decision making in police-citizen encounters. *Police Quarterly 10(3),* 308-331.

Trojanowicz, R. (1994). The future of community polcing. In D. Rosenbaum (Ed.) *The Challenge of Community Policing: Testing the Promises*. Thousand Oaks, CA: Sage.

Truxillo, D. M., Bennet, S. R., & Collins, M. L. (1998). College education and police job performance: A ten-year study. *Public Personnel Management, 27,* 269-280.

Walker, S. (1977). *A Critical History of Police Reform: The Emergence of Professionalism.* Lexington, MA: Lexington Books.

Weiner, N.L. (1976). The educated policeman. *Journal of Police Science and Administration 4(4),* 450-457.

Westley, W.A. (1970). *Violence and the Police: A Sociological Study of Law, Custom, and Morality.* Cambridge: MIT Press.

Wilson, H. (1999). Post-secondary education of the police officer and its effects on the frequency of citizen complaints. *Journal of California Law Enforcement, 33,* 3-10.

Wilson, J.Q. (1975). *Thinking About Crime.* New York: Basic.

Wilson, J.Q., & Kelling, G.L. (1982). Broken windows. *The Atlantic Monthly 249(3),* 29-38.

Winship, C. & Mare, R.D. (1984). Regression models with ordinal variables. *American Sociological Review 49(4),* 512-525.

Worden, R. E. (1989). Situational and attitudinal explanations of police behavior: A theoretical reappraisal and empirical assessment. *Law & Society Review 23(4),* 667-711.

Worden, R. E. (1990). A badge and a baccalaureate: Policies, hypotheses, and further evidence. *Justice Quarterly, 7,* 565-592.

Worden, R. E. (1996). The causes of police brutality: Theory and evidence on police use of force. In W. A. Geller & H. Toch (Eds.), *Police violence: Understanding and controlling police abuse of force* (pp. 23-51). New Haven, CT: Yale University Press.

Xu, Y., Feidler, M.L., & Flaming, K.H. (2005). Discovering the impact of community policing: The broken windows' thesis, collective efficacy, and citizens' judgment. *Journal of Research in Crime and Delinquency 42(2),* 147-186.

Yerkes, R.M. (1921). Psychological examining in the United States Army. *Memoirs of the National Academy of Sciences 15,* 1-890.