

AN EXAMINATION OF POLICE CANINE USE OF FORCE
IN THE STATE OF FLORIDA

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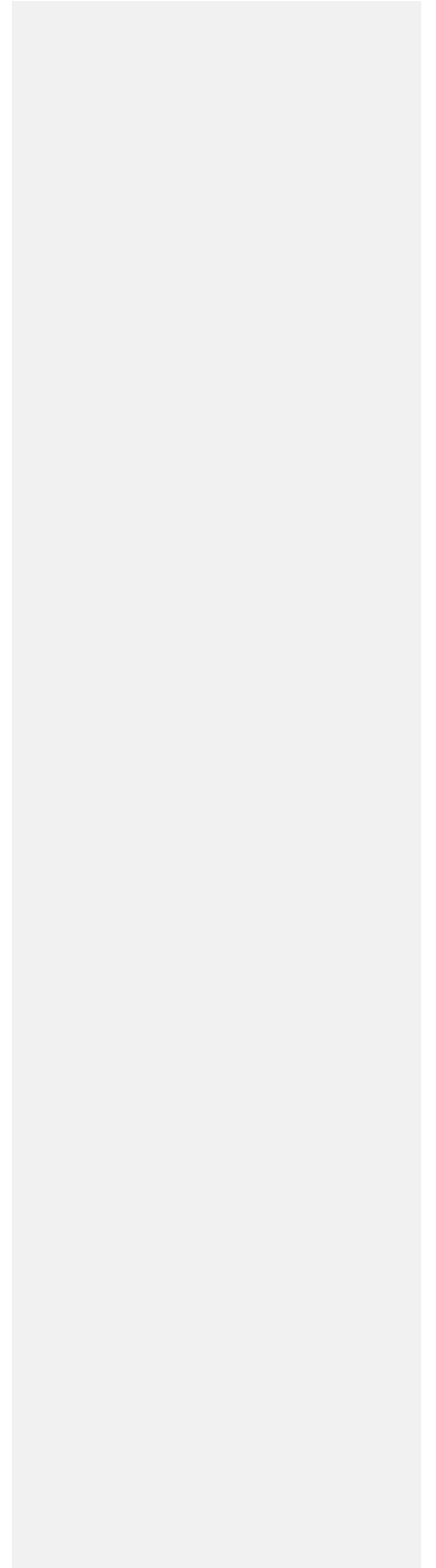
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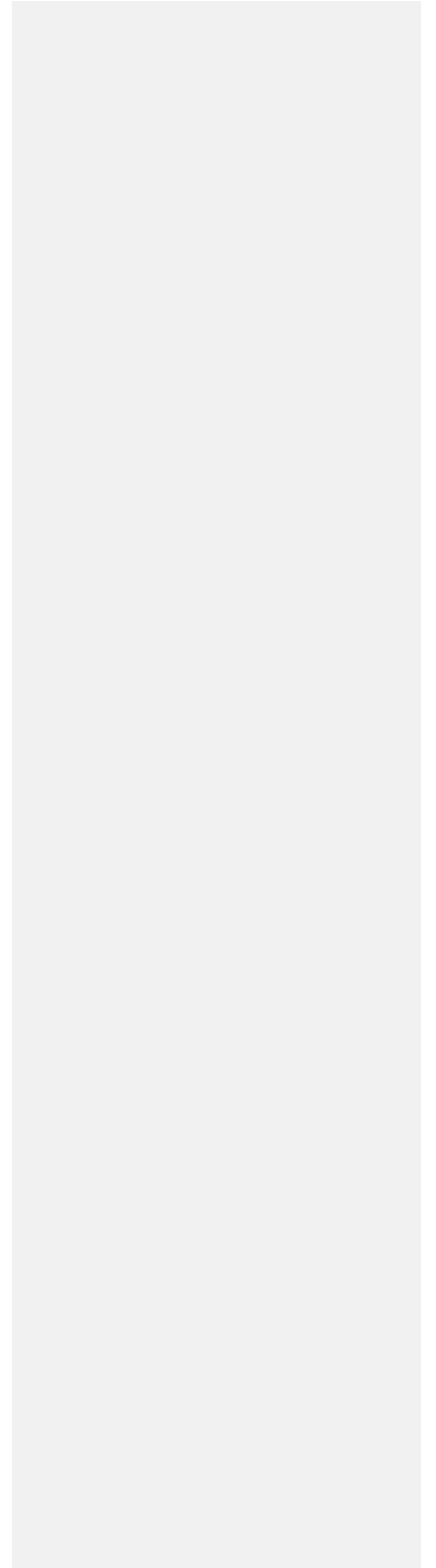
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ABSTRACT

The use of force with police dogs has caught the attention of both the media and the federal government, specifically the Department of Justice (DOJ). Recently, the Department of Justice has begun recommending sweeping changes for agencies that are under review for civil rights violations. The D.O.J. recommendation of interest to this study is the paradigmatic shift from "bite and hold" to "bark and hold" in canine apprehension methods. As there is no prior literature to base this decision upon, the question remains, will this reduce the number of suspect bitten by police dogs?

This work attempts to answer this question by asking canine handlers to reveal their bite ratios through a traditional method and through an innovative matrix (Bite Ratio Data Collector), which then become the force measurement. Individual, organizational, situational and

training variables are added to the linear regression model to identify correlates of canine force.

The survey was distributed to 334 canine handlers (comprising a census) in the State of Florida. Of those, 181 (52%) responded providing not only demographic information on themselves and their agencies but for their canine partners as well.

The results from Chapter 4 denote a number of findings. First, measurement differences were obvious between traditional reporting and the Bite Ratio Data Collector. Simply asking handlers to provide bite ratios tends to underestimate the actual amount of canine force. Second, handlers with "bark and hold" trained canines reported higher bite ratios than handlers with "bite and hold" trained dogs. Finally, additional factors such as dog breed, Shutzhund training, the number of canine calls, and whether or not the dog was sexually intact were all significant correlates of canine force in the final model.

This dissertation is dedicated to my wife, Jennifer, my son Perry, and my parents without whose love and patience I could never have come so far.

This dissertation is also dedicated to my canine partners Axel, Xina, Rommel and Caya who not only protected my life on numerous occasions but also provided a special insight into this type of research.

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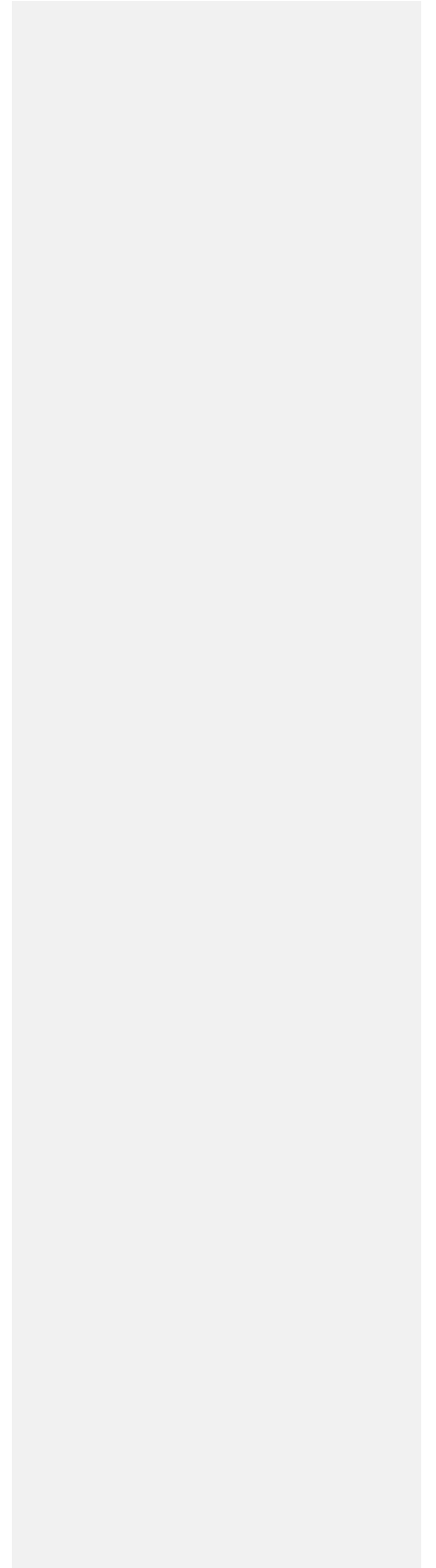
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LIST OF ABBREVIATIONS

Bite Ratio Data Collector	BRDC
Department of Justice	DOJ
Florida Department of Law Enforcement	FDLE
International Association of Chiefs of Police	IACP
Los Angeles Police Department	LAPD
National Police Canine Association	NPCA
National Institute of Justice	NIJ
North American Police Work Dog Association	NAPWDA
United States Air Force	USAF
United States Department of Agriculture	USDA
United States Police Canine Association	USPCA

CHAPTER 1: INTRODUCTION

Law enforcement agencies frequently use specially trained dogs for a variety of important purposes to aid in the detection and deterrence of crime. The primary reason is that dogs are a cost effective means for crime control. These dogs possess skills and abilities that frequently exceed that of existing technology. Their use in the past has provided law enforcement with a valuable tool, which if used properly, can improve both the efficiency and effectiveness of policing, all the while serving as an important public relations tool. However, little empirical research has been conducted regarding police dog deployment as a use of force.

Statement of the Problem

This study seeks to: (1) examine the effect of the paradigmatic shift to the "bark and hold" training method of patrol dogs in the state of Florida who were identified

by the Florida Department of Law Enforcement; (2) develop a new methodology for collecting bite ratio data; (3) determine to what extent bite ratios differ based upon selected demographic and training variables.

Historical Review

Dogs have shared their lives with mankind for the better part of the last 20,000 years. Some research indicates that the first domesticated canines were wolves used for the purpose of assisting humans hunt for food (Lilly & Puckett, 1997). This research is supported by a recent archeological discovery of a 12,000-year-old skeleton found cradling the body of a pup (Lange, 2002). Not only have canines helped humans hunt for food and provided them companionship, but they have also been used to provide for their master's protection. In fact, since early times, canines have been trained to fight and die on command (Jennings, 1998; Lilly & Puckett, 1997).

The extant literature on the use canines in warfare

dates as far back as 700 B.C.(Chapman, 1990). Evidence of their military contributions can be found in every conflict since antiquity (Lilly & Puckett, 1997; Murray, 1984). During World War II, it is estimated that 250,000 dogs were used by the participants of both sides in a variety of functions (Marders, 1960; United States Air Force, 1973). One military analysis credits scout dogs with saving over 2,000 American lives during the Vietnam conflict (Murray, 1984).

Canines have not just been used by the state for war. They have also been used to protect the peace and maintain domestic tranquility. In fact, the first reported use of canines to supplement law enforcement dates back to the 1300's in St. Marlo, France (Lilly & Puckett, 1997). However, it wasn't until 1889, that the first training school for police canines was established in Ghent, Belgium (Thurston, 1999; Jennings, 1998;Chapman, 1990; O'Block, Doeren, & True, 1979).

In the United States, it is unclear where the first police canine unit was established. Lilly & Puckett (1997)

purport that the New Haven (CN) Police Department is recognized as founding the first police canine program in 1910. However, Chapman (1983) claims that police dog programs in the United States were in place as early as 1907, with New York City and South Orange, New Jersey operating rudimentary training facilities.

Contemporary use of canines in police operations in this country began take root in the later half of the 20th century when researchers and handlers began to note how their keen olfactory (smell) sense could aide law enforcement efforts in the hunt for illegal narcotics, cadavers and a variety of other tasks. This contemporary proliferation of canines in law enforcement is bolstered by recent scientific evidence suggesting that canines possess abilities that far exceed that of human beings or existing technology (Waggoner, Johnston, Williams, Jackson, Jones, Boussom, & Petrousky, 1997). While we know their senses are more finely tuned than that of their human counterparts, our understanding of their olfactory skills is far from complete. In fact, the extant literature

detailing the true extent and limits of their olfactory senses is relatively non-existent (Department of the Treasury, 1993).

The Use of Canines in Modern Police Operations

Currently, canines are being used in police operations across the county for a variety of reasons. However, prior to the last twenty years, canines were primarily used for their intimidating presence when confronting would be combatants or fleeing felons. That has since changed. Currently, law enforcement agencies around the country use dogs for a variety of purposes. Canines can be trained to search for evidence left at a crime scene, detect human presence in a darkened building or search for explosive devices. There are many reasons why law enforcement agencies are now using canines more than any other time in our history but the primary reason centers upon their use as a cost effective tool that law enforcement can use to find an object quickly or simply, take an officer out of harms way (Lilly & Puckett, 1997; O'Block, Doeren, & True,

1979). It is estimated that there are over 9,000 police dogs currently operating in America (Hess, 2002). Within the state of Florida, 185 law enforcement agencies deploy close to four hundred dog teams (FDLE, 2001).

Not only do canines assist law enforcement in performing their jobs more efficiently, but previous research has consistently found that the use of canines in police agencies improves officer morale, deters would-be attackers from attempting an assault and allows agencies to send operatives into a building limiting potential loss of human life (Mesloh, Holmes & Wolf, 2002).

In contemporary society, canine units are an essential part of any metropolitan policing effort (Mesloh & Wolf, 2002). They can search buildings and locate missing or dangerous persons, detect hidden contraband in bags, boxes or containers, and serve as a symbolic threat to perpetrators who may attempt to elude an officer on foot.

Additionally, canines are being used in non-traditional roles ranging from locating forbidden fruits and vegetables (U.S.D.A., 2001) to the detecting dangerous insects and

snakes in quarantine zones (Welch, 1990;U.S.D.A, 2001). Most recently, the United States Government is testing the feasibility of the use of canines to detect biological warfare agents (Lawhorn, 2000), biohazards (Humanity Dog, 1997) and toxic dump sites (Arner, Johnston, & Skovronek, 1985).

Incidence and Prevalence of Police Canine Usage

The use of canines in police work is not limited to major or large city police departments. Currently, agencies and departments of all different shapes, sizes and functions use canines for a variety of tasks that fit their needs. For instance, federal agencies may use canines to monitor containers and other cargo that are brought in from overseas. State police agencies may use canines to sweep rural highways for drugs or other illicit materials. And local or university law enforcement agencies may use canines to assist them in crime control, public relations or to support the patrol function. Of course, each of the chosen tasks is specific to each type of police agency.

Canine Oversight and Training

Canines are not only used to track fleeing felons and detect illicit materials, but they are also used for officer/handler protection. The use of canines in this regard represents one of the most pressing issues that confront law enforcement operations today. Presently, there are very few very academies or licensing boards that register or certify police dogs or their handlers before beginning field operations. While there are many national organizations of canine handlers (i.e. United States Police Canine Association (USPCA); National American Police Work Dog Association (NAPWDA; and the National Police Canines Association (NPCA), membership in these organizations is voluntary and not mandated. Some state associations such as the Police Work Dog Association of Florida, offer voluntary certification, but it is often the responsibility of the handler should they choose to use their dogs at work.

There has been some effort is this regard in many

states, including Florida, to standardize training and proficiency measures for canines. For instance, the Florida Department of Law Enforcement (FDLE) is charged with establishing standards and maintaining the proficiency of canine teams operating within its jurisdictional boundaries. However, these standards apply only to patrol dog functions and as a result, only test apprehension and recall, off-lead building and area searches, and obedience, which all may be components of arrests where there is a higher probability of suspect injury. FDLE standards require that each patrol dog and handler re-certify before two state examiners each year. However, FDLE only tests such as basic obedience skills as stay, heeling, and distance voice control to demonstrate that the handler has verbal control of the dog while off leash. Further each of these tests takes place in a controlled environment. Additionally, advanced apprehension skills such as sending a dog to apprehend fleeing suspects under gunfire and release upon command have become key areas of concern, as they involve a high level of force utilization and are the

most difficult part of any certification process.

Body recovery, tracking, narcotics, evidence, and explosives detection are not regulated by FDLE, as they are simply scent detection oriented and have little potential to produce physical injury of suspects. In these tasks, the dog is trained to locate a specific odor and alert the handler when the scent is located. Regardless of the action taken by the handler, scent dogs are usually not trained to physically assist an officer in need.

While Florida is more progressive than some other states in the country, the lack of a firm guidelines or strict enforcement of training standards has created serious problems for departments nationwide as many suspects bitten by canines are filing civil litigation against the canine's sponsoring agency for the use of excessive force.

With no national sponsoring board or specified training guidelines that police canines and their handlers must adhere to, the use of canines for resisting or fleeing suspects has not only increased the liability of departments, but has forced many departments to shut down

their canine operations fearing potential future litigation.

This brief section of the use of canines in police operations denoting their widespread use and utility for law enforcement is imperative to our understanding of how canines are being used today in police operations. However, it is not the major or even the pivotal topic of this research. Instead what this research intends to explore is the increased liability that is inherent when canines are brought into contemporary police operations. Specifically we will focus of the use of canines in police operations as a function of police force.

The Legal and Practical Importance of This Research

The legal and practical importance of this study will become self-evident. Over the past year, the International Association of Chiefs of Police (IACP) has expressed interest and concern with the use of force by canine handlers and their partners. As a result, IACP's model

policy regarding canine unit utilization proposed that "Bark & Hold" be adopted by all law enforcement agencies. Shortly afterward, the Department of Justice in their publication, "Principles for Promoting Police Integrity"¹ stated that agencies should train their dogs "to find and bark rather than find and bite"².

One of the most troubling consequences of the IACP and the Department of Justice report is the lack of information provided on how they came to adopt this change in policy. Letters from many of the major national and state canine handler organizations have expressed concern that neither they nor any members of their organization were consulted prior to this policy change. According to many in the field, it is troubling that important policy decisions are being made without consultation from practitioners in the field, experts in training and force issues, or any type of tangible research study that validates such a wide sweeping mandate.

It is equally evident that apart from a few studies conducted as a result of civil litigation, there is almost

¹ Complete text of "Principles for Promoting Police Integrity" can be found online at <http://www.ncjrs.org/pdffiles1/ojp/186189.pdf>.

² The terms "find and bark" and "bark and hold" are used interchangeably.

no information regarding canine use of force. Making this point clear, currently almost every canine that is used in police patrol operations today is trained using the find and bite (or bite and hold techniques). Thus, with the radical change and federally mandated proclamation mandated in the "Principles for Promoting Police Integrity" document, almost every police canine in operation today is in violation of these new training requirements. Hence should a new civil litigation claim be brought against a police department or local municipality regarding the use of excessive force with a canine, each department will have to explain why they don't adhere to these federal guidelines.

This burden, clearly places each department and jurisdiction in a position to explain why they did not and currently do not require canines to be trained using these techniques and decreases the burden on the defendants to prove that the canines were not trained properly. Additionally, there is concern that forced compliance to these mandates will be achieved by linking acquiescence to

specific grant funding by the Department of Justice.

A financial consideration as well, if departments were to adopt these new training guidelines, they would have to take each of their canines out of operation and retrain or retire these assets. This approach is a very expensive proposition since many departments and handlers have thousands of dollars invested in these dogs. And in the interim, officer's lives may be placed in jeopardy while new dogs are trained to take their counterparts place.

On March 13, 2003, the Civil Rights Division of the U.S. Department of Justice concluded their investigation of the Miami (FL) Police Department. A twenty-three page report addressed a number "areas of concern", including the use of force with canines. The report stated that "a find and bark policy prevents canines from biting in situations where such force is not necessary to effect an arrest" and recommended that the Miami Police Department "explicitly adopt a find and bark policy" (p.4). This is an obvious overstatement of the impact of a "find and bark" training paradigm and stresses the need for this research.

The Present Study

While this research will not detail the limits and tolerances of canine's olfactory senses, it will focus on three primary research areas. First, it will examine the effect of a number of factors, including the differences between "bark vs. bite and hold" dogs in the final use of force model and try to determine which, if any factors are predictive of increasing levels of force. Further analytical models will be employed to determine if there is a difference in use of force complaints or bite ratios for dogs that are trained using these two alternative training modules.

Second, it will examine self-reported bite ratios (a measure of canine force) and test a new method of measuring the bite ratio in relation to the individual, organizational, and operational factors that are measured in the survey instrument. Bite ratios are currently used as a measure of performance across all agencies. Canines or handlers with higher bite ratios are often mandated for more training or are simply taken out of service. Further,

the courts today are often examining bite ratios of both individual canines and agencies as an indicator of misconduct. The importance of this measurement will later become apparent.

Finally, it will examine to what extent bite ratios are affected by the demographics of the handlers and the training that the dog receives. To date, there is a plethora of anecdotal evidence suggesting how canines are used. However, little attention has been paid to how these dogs are trained. In many agencies across the country, many individual handlers (officers) are responsible for training their own dogs. Adding to this dilemma is the varied state of training that the animal may (or may not) have had prior to delivery to a law enforcement agency. Different "purchase packages" are offered which allow a relatively untrained officer to be matched with a previously trained dog. However, the type of training the dog receives is often contingent on the skills and educational experiences of the handler. Without proper training, not only does the efficiency of the canine

decrease, but also the liability of the supporting agency increases exponentially. Thus, in this way, this research is unique and a solid addition to the professional literature.

To address these two primary research questions, permission to survey each of the patrol dog handlers in the state of Florida was received by the Florida Department of Law Enforcement. In September of 2002, FDLE provided a sampling frame of all certified canine handlers as defined in FSS 943 and Rule 11B-27.013. This list is the most current list available since it is updated each year by the state. Surveys were sent to each of the canine handlers that used their canines in police patrol functions. The survey asked each participant several questions dealing with such issues as the type and breed of dog, how they trained their counterparts, organizational policy regarding the interdiction of canines into police operations, bite ratios and current or past litigations that each department has regarding the use of canines in police operations, and most importantly whether or not their dog was trained in

the 'bark and hold' apprehension technique.

Summary and Conclusions

As shown in the preceding chapter, it is clear that canines are being used in American law enforcement operations with increased frequency. The use of canines improves officer morale, removes officers from risk in volatile situations, but also may potentially improve the efficiency in which police operations are performed.

The focus of this discussion, however, is not to provide a historical summary of how canines have been used in police operations or how they make the task of policing more enjoyable. Instead this analysis strives to focus on factors that influence increased use of force with police dogs during deployments.

Chapter two presents a review of the research and literature that is relevant to the problem of this study. It will focus on how canines are deployed in the law enforcement operations and conceptualized the trained dog

as a measure of police force. Included in this chapter is an in-depth discussion of the methods that these dogs are trained and the case law which governs their use.

Chapter three will detail how this research was operationalized. In this section, we will explore the sampling methodology employed and analytic strategy utilized.

Chapter four will present the results and provide readers with more than anecdotal evidence just how law enforcement canines in the state of Florida are being deployed and the levels of force that are involved during these deployments. This will assess the impact of the training paradigms (bark vs. bite and hold) on suspect injury outcomes (bite ratios).

Chapter five will discuss these findings and provide insight into how these analyses can be extended to a larger sample making these results more generalizable to the rest of the law enforcement community.

CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter provides a review of literature related to the law enforcement canine. This chapter is organized to discuss three areas of canine utilization in law enforcement: a historical review, canines training and use of force.

The use of canines in police operations during the past 20 years has flourished. Traditionally, police organizations in the United States and elsewhere used canines for their intimidating presence. Today, however, the police use canines in a variety of tasks not only to increase the efficiency and effectiveness of their operations but also to decrease exposure of officers in potentially dangerous situations. In the post-September 11th, 2001 era, one does not have to go far to see a police canine in action. One example is airports, which have begun utilizing canines even more. Police dogs can be readily seen walking with their handlers or sniffing checked baggage for drugs or explosives.

In contemporary American society we have begun to accept the use of canines as a way of doing business for the police and other security personnel. Rarely does anyone object to having a canine sniff his or her personal items. In fact, many would prefer this type of intrusion over having a member of the Transportation Safety Administration (TSA) rummage through their personal effects prior to boarding a flight.

For the purposes of this paper, the issue is not how police and other security officials are using canines for homeland security operations. Rather this paper will focus on how they are being used in traditional patrol operations. This paper will examine the use of the police canine throughout history, explore training for canines involved in law enforcement objectives, and examine operational issues concerning the use of force.

Efficiency Through Advances in Technology

Law Enforcement as a practice has continually sought

to become more efficient through advances in technology. The advent of the police car, the radio, less lethal technology and the mobile data terminal (MDT) have significantly increased the individual police officer's ability to perform his or her job more efficiently, while providing for their own individual protection.

Table 1 Early American Police Technology Timeline

Year	Technology
1850	Colt multi-shot pistol
1878	Telephone
1899	Police car
1910	Police dogs
1924	Polygraph
1928	One-way radio
1932	FBI Crime Lab
1934	Two-way radio
1948	Traffic radar
1958	Side-handle baton
1967	NCIC
1968	911 System
1970	Computers
1972	Kevlar body armor

While many of these technological advances are mechanically based (shown in table 2.1), the increased use of canines in police operations should be viewed as a biological tool (Carr-Harris & Thal, 1970; Williams et al,

1997). Each of these tools (whether mechanical or biological) has allowed officers to increase their efficiency of operation, while holding costs to a minimum. Whereas in the past, multiple officers would be required to physically search for persons, contraband and explosives, the police dog, as a biological detector, can complete this task much more quickly and with less risk to officers. This efficiency has been documented with the police dog performing a task 33% more effectively than human search teams (Mesloh & Wolf, 2002).

Historical Review

In the history of canine use in police operations, it is clear that canines were first used to assist officers in apprehending suspects and fleeing felons long before we began to recognize the utility of using their olfactory senses to assist security officers in other tasks.

Dogs have been a part of human life for 15,000 to 20,000 years or since the domestication of the wolf for the purpose of hunting (Lilly & Puckett, 1997). This timeline is supported by the recent archeological discovery of a

12,000 year-old skeleton found cradling the body of a pup (Lange, 2002). Since early times, humans have trained dogs to fight to the death on command (Lilly & Puckett, 1997), which developed into the protective role that dogs have fulfilled for mankind (Jennings, 1998).

Dogs have been found in the literature of warfare as far back as 700 B.C. (Chapman, 1990) and evidence of their military contributions found in every conflict since that time (Lilly & Puckett, 1997; Murray, 1984). During World War II it is estimated that 250,000 dogs were used by the participants of both sides for a variety of functions (Marders, 1960; USAF, 1970). One military analysis credits scout dogs with saving over 2,000 American lives during the Vietnam conflict, often giving their own life in return (Murray, 1984).

The first reported law enforcement use of dogs to supplement police officers was in the 1300's in St. Marlo, France (Lilly & Puckett, 1997). However, Ghent, Belgium is credited for establishing the first school for training police dogs in 1889 (Thurston, 1999; Jennings, 1998; Chapman, 1990; O'Block, Doeren, & True, 1979). In the

United States it is unclear where the first canine program was initiated. According to Lilly & Puckett (1997), New Haven, Connecticut Police Department is recognized as forming the first American canine program in 1910.

However, Chapman (1983) in his comprehensive look at police dog programs in the United States identified the early era of canine programs as 1907-1951 and reports New York City and South Orange, New Jersey as the first canine programs, which began operations in 1907. Regardless of which location is credited, since that time, the use of canines in law enforcement roles has significantly increased. It is estimated that the number of police dogs in America currently exceeds 9,000 teams³. Within the state of Florida, 185 law enforcement agencies deploy close to three hundred and fifty dog teams (FDLE, 2001). The following section will examine the specific deployments of police work dogs. Within each of these functions, the canine has been placed within circumstances where the potential for violence is great and suspect injuries are commonplace.

³ Personal communication with Russ Hess, President of United States Police Canine Association (1-19-02).

The Use of Canines in Police Operations

Law enforcement agencies around the country use police canines for a variety of tasks. Their use is not limited to a specific type of police agency or an agency representing one level of government or another. Although there are a variety of uses of canines in policing, the majority of agencies use dog-human teams to: search areas or premises where there is a large area or scene with limited visibility; or in a situation where the officers believe that an imminent threat to human life may be present. The cost effectiveness of this interaction between dogs and officers has been strongly documented in the literature (Mesloh & Wolf, 2002). The use of canine teams to supplement traditional patrol and investigative functions can thus be broken into a typology of tasks, each dependent upon specific and overlapping skills and training and includes: building searches, areas searches, tracking and physical apprehensions.

Building Searches

Law enforcement is often called upon to investigate intruders or locate criminal suspects within residences, businesses and other structures. This type of operation is

time consuming as well as hazardous to law enforcement personnel. Remsberg (1986) found that that greatest danger to officers conducting a building search is the ability for suspects to remain in concealment and ambush officers as they approach. As a result, the use of canine teams to locate hidden suspects has become a routine part of the police canine function (Eden, 1993). This ability has proven useful for law enforcement agencies since the police dog is able to clear buildings more accurately and safely than officers alone (Ellis & Kirchner, 1990; Bryson, 2000).

Wolfe (1991) found that canine teams were able to locate hidden suspects 93% of the time in comparison to human teams that were successful only 59%. Further, as the square footage of the building increased, the accuracy of the human teams decreased and their time involved with searching increased. Wolfe points out that the canine teams performed at 100% accuracy in all but one building. She hypothesized, but was unable to prove, that chemical odors may have interfered with the ability of the dog teams.

Area Searches

The area search function is similar to a building search, only it is performed outside. Unlike a building search, wind instead of air conditioning can play an important part in the successful discovery of hidden suspect. The area to be searched is contained by a perimeter of law enforcement personnel and the canine is released into the wind. The scent is carried in an ever-widening cone shape that may be distorted by features of the terrain (U.S.A.F., 1973; Rapp, 1979). During this function, the canine may or may not be operating out of sight of the handler.

The U.S. Army Limited War Laboratory commissioned a series of studies to examine the use of trained dogs in an off-lead capacity. Carr-Harris & Siebert (1969) trained several dogs to work off lead and in conjunction with a helicopter to locate enemy personnel. They found that canines were able to work independently of a handler. Similarly, Westinghouse (1973) tested an electronic dog handler system that allowed harness worn by the dog to transmit heading, range and action data back to a control

unit. The harness also functioned as a receiver of audio tones that allowed the dog to be controlled at great distances.

Finally, Woestman (1974) and Tomlinson & Krauss (1974) developed and evaluated a radio-controlled infrared light that enabled the handler to visualize the dog's location through the use of a special IR viewing device. Although, each of these studies further validated the multiple uses of trained dogs as a biological detection system, the very little use of technology to enhance their abilities has ever progressed beyond these field studies.

Tracking

Tracking is the ability of the dog, using his nose, to follow an invisible scent path to find a person (Pearsall & Leedham, 1958). There is a certain amount of controversy regarding exactly what the dog actually smells when he is tracking (Kristofek, 1991). Some feel that the dog is following the actual scent of the suspect (Pearsall & Verbruggen, 1982; Kristofek, 1991), others believe that the dog is following the scent of crushed vegetation or ground

disturbance (Rapp, 1979), and a number of researchers believe it is a combination of both (Bryson, 2000). Tracking evidence is accepted in 45 states provided that the proper foundation is laid (Clede, 1998). According to Hunt (1999), a properly trained dog can successfully follow a trail that is up to ten days old.

While the previous sections have explained the basic elements of common deployments, these functions vary from agency to agency. Some agencies use their canines as only scent detection tool, while other use them primarily as a function of force to apprehend suspects. Finally, a large number use trained canines in a combination of both of these uses. The following section examines the different agency types and how their canines are utilized.

Types of Agencies Using Police Canines

As described earlier in this paper, police canines are used at all levels of government within the United States. Canines used within the federal domain perform a variety of functions for agencies that are entrusted to police a specific purpose. Based upon data extrapolated from a 1994

US Treasury Department study looking at the use of canines in Federal law enforcement, it is clear that the Pentagon uses more dogs than any other government agency; however, the Department of Defense is also the largest government agency and the one with the most wide sweeping mandate. A number of other federal agencies use trained dogs in a variety of uses ranging from basic narcotic and explosives detection to locating hidden currency and untaxed cigars.

Like the federal government, states use canines for a variety of operations that fall under legislative mandates. While many state policing agencies are only responsible for policing the state's highway system or unincorporated areas, other jurisdictions assume a much broader role. Each of these agencies performs a variety of policing functions, however no two are quite alike or have identical resources. In a survey conducted by the Florida Department of Law Enforcement, only 6 of 28 reporting Florida state-level policing agencies reported using canines in their operations (FDLE, 2002). The survey also showed that that state law enforcement agencies in Florida were not

utilizing these dogs in an apprehension-type role. Search and rescue, accelerant detection and basic contraband detection were the substantive areas identified by these Florida agencies.

Canines are also being used nationally in the college and university environment. However many college and university agencies are either reluctant to use canines because of the inherent liability, or have disbanded a program quickly after a critical incident. Although the issue of increased arrests within the university setting may appear to be troubling from a public relations point of view, it is anticipated that the "long-term results, would be a drop-off in arrests, as more students and other campus visitors decide not to bring their drugs or other criminal activity to a facility that is adept at locating it" (Mesloh & Wolf, 2001, p.24). Additionally, there is the potential for enormous public relations benefits as past media perception of police canines has been positive (Mesloh & Surette, 2002).

As shown in Table 2, local law enforcement utilizes

canines in a wide range of deployments. While canines employed in their service perform a variety of services, a recent survey in the state of Florida indicates that the typical dog used by law enforcement has been trained primarily to detect illegal narcotics (FDLE, 2000). Other agencies use their canines for tracking and patrol operations, which may also include physical apprehensions.

Table 2 Tasks of Canines in Local Police Operations

Deployment / Use	Frequency
Narcotics Detection	218
Tracking	168
Patrol Only	148
Explosives Detection	46
Search and Rescue	21

Source: Florida Department of Law Enforcement. (2000).

And a significantly fewer number of agencies use their dogs to detect explosives and perform search and rescue operations (Florida Department of Law Enforcement, 2000 #14). What is not clear is the number of canines that are cross-trained between patrol and a specific scent related

function.

While these facts tend to show the current trends in canine utilization, they do not provide any answers regarding how or why canine use of force occurs. The explanation to these questions may be found in the way that police dogs are trained. The next section will examine the methods through which police dogs are taught to apprehend suspects.

How Canines Are Trained

The use of police dogs in patrol operations in the past twenty years has increasingly been scrutinized in criminal courts around the country. Since 1997, the number of civil suits filed against law enforcement agencies across the country has risen considerably. Plaintiffs are claiming departments are failing to properly supervise officers and train their dogs. The result of this failure, claim the litigants, is the result of excessive force. Through these lawsuits or criminal prosecutions, individual officers may be found at fault for misusing their canines in specific

situations, or the organization may be at fault for failing to properly train its officers or implement policy limiting the use of canines in accordance with stipulated national guidelines.

Just as important as how police canines are utilized in the field, are the issues surrounding the training of police dogs. Just as no two dogs are the same, no two training routines are the same either. Each canine has their own personality and are affected by stimulus and rewards differently. Thus, while different trainers may use a similar approach, the training approach used by canine trainers or handlers is specific to each dog. Despite this fact, we can speak in generalities concerning how canines are trained and the model of choice (i.e. "bark & hold" vs. "bite & hold") for each specific trainer. Each of these different and often opposing models are presented and explained later.

Apprehension Methods and Models

For most law enforcement agencies, the number of

apprehensions that a canine makes per year is a direct measure of the canine team's productivity. These occur as the result of tracking, building searches, area searches, and deployment on fleeing suspects. Subsequently, a number of these subjects are bitten during the course of their arrest. While certain suspect behaviors have been shown to precipitate a number of these canine bites (Campbell, Berk, & Fyfe, 1998), it has been proposed by the Department of Justice that specific canine training methods are more likely to produce higher injury rates.

To truly understand the issue of how force is involved in these apprehensions, one must understand how canines are trained. The next section details the two competing apprehension paradigms of how police canines are trained in this country and details the differences between them.

"Bite and Hold"

According to Mackenzie, one of "the greatest controversies centers around what the dog should do when, during a pursuit or search, the subject is standing still as the dog arrives and makes contact" (1992:18). The most

common system of apprehension is "bite and hold". The canine is sent and the apprehension is made by the dog as he engages (bites) the suspect and does not release until the handler arrives. A number of training tools such as the bungee cord and the shock collar (discussed later in chapter 3) may be used for remedial training for dogs that re-bite inappropriately or fail to release on command.

Dogs trained in this system engage the suspect under the order of the officer without provocation from the suspect. The dog remains under voice control at all times and should be operated within line of sight. However, tactical deployments frequently make visual inspection of the dog nearly impossible. According to Eden (2003), " A well trained service dog can be recalled at any point from the attack. Control of the dog through voice command permits the officer to call the dog off prior to or subsequent to the apprehension as the situation warrants"(p. 4).

This model has proven to be a very effective way to bring suspects fleeing from an officer under compliance quickly. While some argue that canines trained this way

represent a less than lethal force option, others say that the use of canines to bite the suspect without giving the suspect a last chance to comply before the canine arrives represents the use of excessive force. Critics of this training method claim that too much control is left to the canine (ACLU, 1992; Campbell, Berk, & Fyfe, 1998) and that it suffers from an unsatisfactorily high bite-ratio.

"Bark and Hold"

As a result of litigation and evolving law enforcement policies, a different form of training for police dogs has been suggested for implementation by the Department of Justice (See Principles for Promoting Police Integrity, 2001: 5-6) and the International Association of Chiefs of Police (IACP). This model is known as "bark and hold". According to Eden (1993), the theory of the reasonable force dog maintains, "if a suspect gives up, the dog will not bite and the dog is frequently in the position to make the decision whether or not to bite" (p.8).

According to Yarnell (1998), the "circle and bark",

which was developed to protect the canine that might be working away from the handler and would be killed by suspects that had learned to protect themselves from dogs that only attack. The idea is that the dog delays the suspect until the handler can arrive and make the arrest. Conceptually in this methodology, the dog will bark but will not engage the suspect unless he moves. The dog's primary function in this system is detection and not neutralization (unless the suspect perpetuates it through aggressive actions). It has been suggested that the bite-ratio for "bark and hold" is significantly lower than for "bite and hold".

Critics of this system believe that it places the dogs at greater risk by allowing the suspect the opportunity to arm himself, injure or kill the dog or escape (Eden, 1993). Additionally, it has been argued that if a suspect were to disable the dog, the officer is tactically at a disadvantage and the agency is left with the cost of replacing a trained dog (MacKenzie, 1992).

A great deal of training is required to maintain "bark

and hold" dogs. If this training is not adequate, the dog will begin to bite when it is not warranted (Eden, 1993). As a result of training methods, the dog may also perceive the bite as the reward for apprehending the suspect. When this happens, the dog will precipitate the movement of the suspect by bumping them, thus fulfilling the requirements necessary for a 'proper' bite. This will greatly increase the number of inappropriate bites and have exactly the opposite effect sought by the Department of Justice. This point was clearly made by Eden (2003) who stated, " a "circle and bark" dog however, is trained to attack on the slightest movement...there is very little tolerance level in a "circle and bark" dog. If he locates a suspect and the suspect stumbles or moves accidentally, there is a high likelihood of an unwarranted bite" (p. 5)

If it is indeed true that the "bark and hold" training method results more often in the use of excessive force, then it is reasonable to assume that agencies and officers that train their dogs using this method are more likely to have significantly higher bite ratios than other agencies

that train their dogs using "bite & hold techniques." This proposition is one that has never been tested in the extant literature. However, to make sure valid comparisons are made, we will control how bite ratios are computed by including several different methods of computing the denominator in bite ratios. Using both conservative and liberal methods of computing bite ratios, this research will be the first to make the valid empirical comparisons.

If significant differences do exist, we can then state that there may be some true and significant differences in how canines are trained and their propensity to cause bodily harm to suspects. However, as it currently stands, there is no valid empirical evidence to suggest that the recommendations made by the Department of Justice in the "Principles of Promoting Police Integrity" document to replace "bite & hold" training techniques with "bark & hold" modules.

Law enforcement is complicated by a myriad of factors, which seem to be unique to each and every situation to which an officer responds. When responding to these

situations the officer is charged with either quelling the disturbance or apprehending a suspect(s). This being the case, officers are sometimes required to use force in the course of their duty, whether it is during an arrest or in course of protecting themselves, citizens or other officers from harm.

Use of Force

Use of force is at the core role of policing and is the "distribution of non-negotiated coercive remedies" (Bittner, 1978:36). According to Peak (2000), this force can take several forms, " a simple verbal command, or a light touch on the arm to encourage someone to move along or comply with an order, the use of a baton or Mace to control an individual, the use of the carotid restraint ..., or the use of deadly force" (p. 248)

A review of the literature finds that many researchers have focused on discriminatory abuses of force, excessive force and wrongly applied deadly force (Lersch, 1998; NIJ, 2000; NIJ, 1996; White, 2001; Hunter, 1999;

Fyfe, 1998; Lawson, 1999 and Walker, 1996). However, for the purpose of this analysis, we will focus upon discretion as it applies to canine deployments.

Discretion

A police officer has discretionary power whenever he or she can choose how to respond to a situation (Langworthy & Travis, 2002). This discretion hinges on priorities at the time, evidence available, and the seriousness of the situation (Purpora, 2002). Thus, it is the ability to

properly choose between these options, while weighing various factors that are at the heart of officer discretion. However, the dynamics of the citizen / officer encounter and the law may constrain an officer's choices but they do not dictate them (Brown, 1988).

A number of law enforcement research studies have examined officer related factors in an attempt to identify predictors of inappropriate use of force (unrelated to canine deployments). However, use of force does not appear to be related to officer demographics, such as race, age,

and gender (Adams, et al, 1999; Garner & Maxwell, 2002).

Suspect behavior, on the other hand, significantly influences officer discretion and consequently the final outcome of a citizen officer encounter. The use of force by the suspect (including passive resistance and flight) is a significant predictor of force by officers (Holmes, 1997; Johnson, 2001). This relationship between suspect behavior and final outcomes appears to be consistent in canine deployments as well (Campbell, Berk & Fyfe, 1998). The actions of the suspect may also determine the types of force that are used against them.

Force can range from the simple presence of the officer, to use the use of deadly or lethal force. Within this range are physical countermeasures on the part of the officer ('hands on' techniques used to gain control over a suspect) and less lethal force options. As canine falls into the later of these categories, the following section will examine the concept of less lethal force and review the specific categories of technology that are available.

Less Lethal Force Options

Police officers frequently encounter individuals where the use of force is necessary to bring about compliance or arrest (Lumb & Friday, 1997). Common scenarios include flights by suspects, hostage situations and crowd control (McEwen, 1997). In each of these circumstances, the use of deadly or lethal force may be inappropriate. Consequently, less lethal weapons and technology have developed to fill the gap between the physical combat between officer and suspect and the use of deadly force. Although the misuse of some less lethal weapons can still be fatal to the recipient, they do not have the propensity to inflict mortal wounds with any consistency, as do firearms. As a result, lethal or deadly force is defined as that force which is likely to produce serious injury or death (McEwen, 1997).

The below table illustrates the current less-lethal options that are available to law enforcement officers. Six typologies delineate the various technologies that have evolved to meet specific needs. Projectiles, chemical

agents, electric, sound and light weapons allow the officer the ability to deliver a variety of force options from a safe distance. Impact weapons require the officer to be within striking distance of the suspect, but are more easily carried and thus are more likely deployed.

Table 3 Less Lethal Technology

Projectiles	Chemical Agents	Impact Weapons
12 gauge bean bag	Oleoresin capsicum	A.S.P
40 mm sponge round	Mace	PR-24
Ring foil	Tear gas	Straight baton
Sting grenade	Malodorants	Riot baton
Pepperball	Sticky foam	Pas-Con
Capturenet	Sedative agents	Nunchaku
Electric	Sound	Light
TASER	Ultrasound	LASER
Stun gun	Audible	Dazzler
Stun shield		

Consequently, agency choices regarding the less-lethal options available to officers are based upon the perceived effectiveness of the intervention, the cost of the technology, and the ease in which it can be carried and

deployed. Obviously missing from this table is the use of the canine as a function of less-lethal force. Based upon case law and the definition of deadly force, the law enforcement canine falls into the category of a less-lethal technology. Unfortunately, as a biological technology, it does not easily fit into one of the existing categories. As a result, most force continuums do not address the police dog as an instrument of force. Accordingly, it is the canine handler on the scene that must know the level of force that his or her particular dog is capable of producing.

Like most patrol officers, the canine handler has a range of force options at their disposal. However, in addition to these 'routine' law enforcement type decisions, the canine handler must also to what extent his dog will be deployed. Certainly suspect related factors such as the severity of the crime, if the suspect possesses a weapon, and prior knowledge of the suspect would be weighed heavily in this decision-making process. However, environmental factors related to the risk of conducting the search such

as darkness, availability of back-up officers, limited visibility, and an abundance of potential concealment areas for the suspect also would influence the discretion of the canine handler. As a result, handlers are often required to make split second decisions that may become scrutinized by the court at a later time.

Law enforcement officers across jurisdictions and agencies interact with citizens every day. Some police-citizens encounters are amicable and others are not. Therefore, when police canines are brought into theater, it is the handler that is the responsible party and the one that must be held accountable for making decisions. Thus, the handler must be thought of as the party held responsible for not only their own actions but also that of their canine counter-part. If the canine reacts violently or ignores policy with regard to the level of force necessary to make an arrest, that use of force is an issue that must be dealt with either as a serious breach of policy or at a minimum, considered misconduct or even malfeasance on the part of the handler.

Relying upon the writings of the Department of Justice, it would be reasonable to assume that agencies and officers that train their dogs using the "bite and hold" method are more likely to have significantly higher bite ratios than other agencies that train their dogs using "bark & hold techniques." This proposition is one that has never been tested in the extant literature and has vast implications for canine handlers across the country. However, the system of "bark and hold" places the decision making on the police dog, instead of the police officer, since these dogs are trained not to bite the suspect unless they move or resist arrest.

"Bite and hold" techniques, however, mandate that when an officer takes the dog off the leash, they are instructing the canine to take down the suspect. In this case, the officer makes the decision for the dog to bite, instead of letting that decision rest in the hands of a German Shepard that has the intelligence comparable to that of a seven-year old child (Air Force Office of Scientific Research, 1970).

The importance of this distinction cannot be overstated. Under the current model, "bite and hold", officers make the decision when the dog is to bite and potentially injure the suspect. Under "bark and hold" techniques, the canine makes the decision when they should bite and when they should not. This fact alone makes it difficult to justify a training method where or even when the dog is allowed to make a decision as to the amount of force that should be deployed against a suspect (Eden 2003).

Canine as a Forceful Intervention

Just as the police officer on the street may improperly use a baton or firearm on a suspect, the canine handler may improperly or unknowingly utilize his dog and create unnecessary injury. Given that a German shepherd can exert a bite force of 1500 p.s.i. (Hutson et al., 1997), the potential for serious injury is great. These injuries range from deep punctures, to large rips and crush damage (Pineda et al, 1996; Hutson et al., 1997). Fortunately, to date only three documented deaths as a result of police canine

apprehensions exist in the United States.

Building on the physical and mental attributes of the traditional police canine, it has been determined that a mature German shepherd has the intelligence comparable to that of a seven-year old child (Air Force Office of Scientific Research, 1970). As it would be unrealistic to entrust a child to make important decisions themselves, that is exactly what police officers do when they use their dogs in police-citizen encounters with suspects. That is, they introduce an immature being into the scenario, and often one that does not have the mental capacity to choose right from wrong and to decipher what is appropriate from inappropriate action.

The courts have stated that the handler is responsible for the canine that hurts or maims a suspect and can be held liable. The standard for "unreasonable intervention" or "excessive force" is if a reasonable person, applying contemporary standards would believe that more force was applied than should have to gain the active compliance of the suspect (Graham v. Connor, 1989).

Unfortunately, after conducting an exhaustive search of the literature, very few articles could be identified that relate specifically to the use of force with police dogs. This fact had been previously stated in the literature (Campbell, Berk, & Fyfe, 1998; Hickey & Hoffman, 2003) In fact, only two scholarly articles were identified that even addressed the concept of the police dog as an instrumentality of force.

Campbell, Berk and Fyfe (1998) examined the relationship between racial composition of neighborhoods and the use of police dogs in the Los Angeles area. Forty-four percent (44%) of the suspects that were apprehended using canines were bitten by the LAPD canine unit, while thirty-six percent (36 %) of the suspects were bitten by the Los Angeles County Sheriff's canine. Both agencies suffer from unacceptably high bite ratios, which for some individual canine officers exceeded eighty percent. However, black suspects were shown to be at less risk of dog bites than white suspects. Of particular value in this analysis were the odds multipliers from a logistic regression, which

identified a number of suspect behaviors that increased the likelihood of being bitten by the police dog. Behaviors such as failing to heed warnings regarding the canine, or refusing to leave a place of concealment, increase odds of being bitten by a factor of seven and fourteen respectively. Attacking the dog increases the odds of being bitten by a factor of almost five thousand.

In a similar study, Hickey & Hoffman (2003) examined canine deployments of the Montgomery County Police Department (MD) Canine Unit over a six-year period. Their study examined canine apprehension and bite rates, in comparison with officer injuries. They found that canine handlers had a significantly lower probability of being injured during an apprehension than non-canine officers. Rather than using the bite ratio, this study used a bite rate, which was defined as the number of suspects bitten per one hundred apprehensions. The agency under study had a bite rate of 14.1 %, which would clearly fall within an acceptable range as defined within the case of *Kerr v. City of Palm Beach, 1989* (See Appendix). Additionally, they

found that non-white suspects had a significantly lower bite rate, which supports the earlier findings of Campbell, et al. (1998).

Unfortunately, Hickey and Hoffman's study suffered from a number of methodological weaknesses. Buried in an endnote was the fact that they sampled only 239 of 1,179 reports due to time constraints. This was approximately twenty percent of the total reports. Further, the authors relied solely upon nonparametric tests (chi square) rather than more robust measures and, as a result, complex relationships that were likely present were not examined.

These studies, while important and a substantial contribution to this literature in its infancy, did not address the issue of the variability of how bite ratios are computed and its importance in the paradigm shift in recommended training techniques. The following section will examine specific case law relating to police canines and how these cases have impacted deployments and training.

Case Law

A number of legal decisions have sprung up over recent years that define and frame the perceptions and utilization of police work dogs. Stuart (1991) identifies a number of areas that receive the most attention in canine civil liability cases as:

- Handler and dog selection
- Adequate training and record keeping
- Development of policies and the use of the dog in the field
- Prior court decisions regarding use of force

As a result, a review of these cases is necessary in order to understand the context in which the legal community views these trained dogs. As shown in table 2. , the salient issues in canine deployment litigation fall into distinct but sometimes overlapping categories. Clearly, a strong majority of the cases have originated in the 9th District Court of Appeals, primarily in the urban centers of California.

Of specific interest to this analysis is the clear delineation of the use of canines as a non-deadly use of

force. Unreasonable deployments have been also been defined in one case (*Jarrett v. Yarmouth, 2002*), where the release of a police dog on a non-violent misdemeanor was held to be an inappropriate level of force. The threat to the officer becomes of primary concern when determining reasonableness in deployments against misdemeanor suspects. However, at the point where the misdemeanor suspect becomes combative, the use of the canine is now deemed appropriate (*Mendoza v. Block, 1994*). Deployments against felony offenders were upheld in all cases, with the exception of *Chew v. Gates*⁴(1994).

Despite the variety of opinions in case law, there does exist some consensus of opinion with regard to when canines can be utilized. For example, armed violent offenders tend to be viewed as legitimate targets for canine deployments. The seriousness of the original offense and threat to officers defines whether or not the release of the dog will be later viewed as appropriate.

⁴ In *Chew*, the court found canine deployment against a felony offender contained within an impound lot to be an unreasonable use of force.

Table 4 Canine Case Law

Reasonable Canine Force	Handler Control
Gill v. Thomas (1996)	Fikes v Cleghorn (1995)
Caldwell v Davis (2002)	Quintanilla v Downey (1996)
Brewer v Napa (2000)	Vera Cruz v Escondido (1998)
Robinette v Barnes (1988)	
Matthew v Jones (1994)	
Grant v Los Angeles (1994)	
Mendoza v Block (1994)	
Fikes v Cleghorn (1995)	
Quintanilla v Downey (1996)	
Vera Cruz v Escondido (1998)	
Canines Not Deadly Force	Unreasonable Canine Force
Robinette v Barnes (1988)	Chew v Gates (1994)
Matthew v Jones (1994)	Jarrett v Yarmouth (2002)
Brewer v Napa (2000)	
Vera Cruz v Escondido (1998)	
Quintanilla v Downey (1996)	
Bite Ratios	Bark v. Bite and Hold
Kerr v Palm Beach (1989)	Kerr v Palm Beach (1989)
Chew v Gates (1994)	Watkins v Oakland (1998)

Source: LexisNexis Academic (2003)

Additional case law has identified other areas of concern such as deployment and training issues, such as

apprehension methodology ("bite and hold"), off-lead control over the canine, and an agency's responsibility to monitor canine use of force is addressed in a number of cases. The key point of these cases was the ability to demonstrate that the handler was able to maintain control over his dog, whether on or off lead.

Failure on the part of the agency to monitor performance and provide maintenance training for dogs failing to meet these standards subjects the law enforcement agency to liability. In *Kerr v. City of Palm Beach* (1989), the city and the police chief were found liable (using the deliberate indifference standard) for the inadequate training of the canine division, which suffered from a higher bite ratio than surrounding agencies.

Due to the issues that have been identified where suits have been brought against the police for using excessive force when using canines, police departments around the country have begun to closely monitor their use of canines and the situations when they are introduced into theater. Risk management experts from a variety of jurisdictions are

now requiring departments to keep training records for each canine employed on file and up to date. Additionally, notation within an offense report is often required when an officer uses a dog in the course of operations. The problem with these reports is that some departments only require officers to document canine deployments when the dog is actively engaged. Unfortunately, some agencies have few policies that govern which deployments are documented and which are not.

The central issue here is how often and under what circumstances any injury results to a witness or suspect as a result of the canine introduction. It is from these reports that police departments now compute bite ratios. Bite ratios are now a fairly common measure used by all departments. These bite ratios include the number suspect injuries in the numerator, and the total number of possible deployments in the denominator. However, as mentioned previously, these ratios are highly variable since there is no standard rule for the type of call outs that are placed in the denominator of these ratios. Thus it is possible

for some agencies to use their dogs frequently, report a rather large number of suspect injuries, while their bite ratios are relatively low. While it is assumed that agencies with large bite ratios are more at risk than agencies with smaller ones, these arguments are moot unless we can come to agreement with regard to the definitional units that should be placed in the denominators.

Bite ratios are currently used as a measure of performance across all agencies. Canines or handlers with larger bite ratios are often mandated for more training or are simply taken out of service. Further, the courts today are often examining bite ratios of both individual canines and agencies as an indicator of preparedness or an agency in trouble. Explored in this next section are how bite ratios are computed and their computational components.

Bite Ratios and Computational Components

A recent trend has been the use of a bite-ratio to act as an early warning system for abuse of authority by canine handlers. This ratio is determined by comparing the number

of bites to the number of apprehensions and can be illustrated in formula as:

[a /a+b], where a= the number of apprehensions with bites and b= the number of apprehensions without bites.

For example, 5 bites with 50 apprehensions can be shown as [5/5+45] or a 1/10 (10%) ratio. Although varying from agency to agency, acceptable ratios can range from 5% to 20%. Unfortunately, this system does not take into account factors such as the assignment of the dog or the amount of time that specific dogs are requested to accomplish certain tasks. For example, if a canine were assigned to an auto theft unit for the purpose of apprehending suspects that flee from stolen cars, the bite-ratio would be substantially higher than another canine assigned a less aggressive assignment involving less risk for physical confrontation. Additionally, the number of violent offenders versus property crime offenders might not be factored into this analysis (Eden, 1993). As a result of this weakness, the value of the bite-ratio is significantly reduced and may be of little value. Supporting this

position is the International Association of Chiefs of Police (I.A.C.P.) concepts and issues paper Law Enforcement Canines (2001), which states:

Reliance on formulas or ratios alone can often inappropriately and unfairly simplify an otherwise complex problem. In reality, each canine bite or canine-produced injury should be individually evaluated to determine whether it was justified in the total context of the situation and the manner in which the canine was handled (p.19).

Summary

The purpose of this chapter was to provide a review of the research and related literature on the law enforcement canine. It has focused on how canines are deployed in the law enforcement operations and conceptualized the trained dog as a measure of police force. We have also examined the extant literature to determine how canine's are currently being used in different types of police operations, case law, what elements comprise the bite ratios, and how different agencies define these important statistics differently. Included in this chapter was an in-depth discussion of the methods that these dogs are trained and

the factors that affect their training.

The importance of this research has been stressed in local news media coverage within the state of Florida. The Associate Press has begun covering the recommendations of the Department of Justice to the City of Miami Police Department regarding police dog deployments. As with the cities of Cincinnati and Washington, D.C., Miami Police Department has been instructed to "explicitly adopt a find and bark policy" (Miami Herald; March 14, 2003). Considering the scope of these recommendations, the timeliness of this research could not be more appropriate. The following chapter will discuss the methodology and procedures utilized for the completion of this current study.

CHAPTER 3: METHODOLOGY

Introduction

This chapter provides an overview of the methodology and procedures utilized in this study. It contains a detailed description of the processes utilized in the collection of survey data and later analysis to identify factors that influence greater use of force with police dogs.

Problem Statement

This study seeks to: (1) examine the effect of the paradigmatic shift to the "bark and hold" training method of patrol dogs in the state of Florida who were identified by the Florida Department of Law Enforcement; (2) develop a new methodology for collecting bite ratio data; (3) determine to what extent bite ratios differed based upon

selected demographic and training variables.

Hypothesis Testing

As there is no empirical data in the literature with regard to the influence of police dog training factors on suspect injuries (bite ratios), several hypothesis are proposed.

The U.S Department of Justice has suggested that canines trained in the "bite and hold" method more frequently use excessive force. If it is indeed true then it would be reasonable to assume that agencies and officers that train their dogs using this method are more likely to have significantly higher bite ratios than other agencies that train their dogs using "bark & hold techniques."

However, there is no literature to support or refute this position. As a result, the first analysis will test the hypothesis that there is no difference in bite ratios for "bark and hold" trained dogs than police canines trained in traditional "bite and hold" models. This can be stated as:

H0: There is a not significant difference between bite ratios of bark and hold vs. bite and hold trained dogs.

H1: There is a significant difference between bite ratios of bark and hold vs. bite and hold trained dogs.

Additionally, the process for computing the bite ratio in the past has suffered from a number of methodological weaknesses. While traditional reporting methods were used in one section of this survey instrument, an innovative more accurate collection device (Bite Ratio Data Collector) was tested in a later section. Consequently, it is likely that a large region of misreporting will be identified and eliminated. The second analysis tests the hypothesis that the two reported bite ratios are not equal, as shown below.

H0: Bite ratios computed through traditional methods will not be equal to bite ratios computed through the Bite Ratio Data Collector.

H1: Bite ratios computed through traditional methods will be equal to bite ratios computed through the Bite Ratio Data Collector.

Finally, as this is exploratory research, I propose to examine the relationships between specific individual, organizational and operational variables on canine force,

as measured through the bite ratio. A number of these factors came to light during interviews and focus groups. Many handlers felt that other variables should be examined, as their impact on bite ratios had not yet been determined. Factors such as the demographics of the dog and handler, the amount and length of training, and different methods and equipment for aggression training in canine have been added as control variables for the final model.

Methodology

The last two chapters have reviewed the current state of knowledge relating to the use of canines in law enforcement. Although a plethora of scholarly literature exists regarding the scent capability of the modern *canis familiaris* or dog, little data exists regarding the local police dog on patrol. State agencies, such as the Florida Department of Law Enforcement (FDLE), and certifying canine organizations such as the USPCA, NAPWDA, and NPCA⁵ have yet to collect basic demographic information, much less, complex training methodologies that may yield great value.

⁵ United States Police Canine Association, North American Police Workdog Association, and National Police Canine Association

Further, few have addressed this law enforcement tool focusing on its use in forcing suspects to comply with officer demands. In fact, in most published use of force matrices, canine introduction is not mentioned at all. Because of this weakness in scholarly literature, administrators at all levels are forced to rely on anecdotal evidence to make far-reaching policy decisions regarding when canines should be used, how they should be trained and how much force they represent on the use of force continuum.

One of the primary policy decisions that spurred this research was the mandate by the Department of Justice in the Principles for Promoting Police Integrity (2001). In this document, the introduction of canines in traditional police patrol work is defined as a forceful intervention. Its declarations did not stop there. As shown in the following passage, The Department of Justice attempted to define when dogs should be employed and how they should be trained and employed.

The use of a canine to attempt to apprehend or seize a civilian is a use of force. Special precautions are required to ensure that such force is not used

unnecessarily or unreasonably. A canine should be deployed to apprehend or seize an individual only where: (a) the individual is suspected of having committed a serious or violent felony, (b) less potentially injurious techniques are insufficient, and (c) unless it is precluded by officer safety, a verbal warning is given prior to deployment and a supervisor's approval is obtained. Agencies should train their canines to follow the approach of "find and bark," rather than "find and bite." (4-5).

Although the *Principles* were designed to guide officers as they encounter moral dilemmas, the Department of Justice in publishing this declaration mandated policy, which many police departments are compelled to follow. While a training policy of "find and bark" sounds more politically correct than a policy of "find and bite⁶," this is a radical departure from the way that many contemporary canine handlers have trained their dogs.

Handlers across the country will tell you that the thing that makes a dog effective is the fear that they evoke. If suspects become aware, or are told of a policy where dogs are taught not to bite suspects but simply will bark at them, there is little chance that fleeing suspects will stop and voluntarily give themselves up. Additionally,

⁶ The terms 'bark and hold' and 'find and bark' are used interchangeably, as are 'bite and hold' and 'find and bite'.

suspects, when given this opportunity may arm themselves and injure or kill both the police dog and officer. Finally, since the majority of the dogs in operation today have been trained using "bite and hold" techniques, the assumption is that they will have to be taken out of service, retrained, or more likely replaced before the department will allow the canine unit to continue operation. On a national scale, this would represent monumental challenge to replace tens of thousands of work dogs. However, what has alarmed most handlers and the national organizations that represent them, is not the switch in techniques that is being advocated, but rather how those in DOJ came to the conclusion that "bark and hold" techniques are desired or at least more preferable over traditional "bite and hold" techniques. This decision was made without consultation from practitioners in the field or experts in training. If it is indeed true that this training method results in the use of excessive force, then it is reasonable to assume that agencies and officers that train their dogs using this method are more likely to have significantly higher bite ratios than other agencies

that train their dogs using "bark & hold techniques." This proposition is one that has never been tested in the extant literature. Additionally, many fear that these recommendations will soon become a standing policy. Although the Department of Justice has no direct control over municipal or county agencies, acquiescence can be achieved by linking compliance to grant funding.

This chapter provides an overview of the methodology employed by this study to fill the gaps in the literature as it pertains to use of force interventions where canines are introduced into theater. It describes the method used to develop the survey instrument, collect the data and analyze the results to answer some of these questions that has evaded the extant literature.

The Sample

In order to determine the factors that are related to police dog use of force, this study will use a census of dog handlers registered with the Florida Department of Law Enforcement in the State of Florida. While this sample may

not be generalizable to the entire country, Florida is a large state with counties and cities ranging in both diversity and affluence. Should the results of this study yield conclusions currently at odds with the DOJ report advocating bark and hold techniques, a second nationally representative sample will be commissioned at a later time with a national sample.

Florida is not only a good state to conduct such a preliminary inquiry because of its diversity, but also because the State requires that all canine dog teams register each year with the Florida Department of Law Enforcement. Thus each year, the list of certified canine handlers is updated, with new officers added and retired officers removed. This certification process allows researchers to address these questions with a up to date sampling frame from the panhandle of Northern Florida to beaches of Key West. Hence, this list represents as complete a picture as possible of all canine handlers in operation in this state. While it is possible that some officers may be added or removed from this list from the

time it was ascertained to the time the surveys were administered, this error is likely to be random and should not represent a threat to the generalizability of the intended sample frame.

The use of this census of canine handlers in the State of Florida eliminates a number of the common errors in survey research. First, by using a census of canine handlers we are likely to eliminate or at least control for sampling and coverage error. That is, it is unlikely we missed many canine handlers within the state due to a sampling error. If law enforcement officers follow the requirements of the law and register with FDLE, then it is likely that every certified canine handler will be included in our sampling frame. Further, as a census, the data and subsequent findings were certainly generalizable to Florida, likely to the southeastern states, and possibly to the entire country. However, great care will be taken to avoid generalizing the results of this research outside of this region.

Before proceeding to surveying our population, it is

important that we define exactly what canine handlers we will be surveying. In order to maximize our efforts to target officers that are not only certified but work with canines every day in patrol situations, we will not focus on certified handlers per say, but rather direct our research to include members of current dog teams. The term *patrol dog team* is defined by the F.D.L.E. Criminal Justice Standards & Training Commission as "a certified officer and a specific patrol canine controlled by the handler working together in the performance of law enforcement or correctional duties. This definition does not include canines used by certified officers exclusively for tracking or specific detection, which are excluded from the certification process" (11B-27.013). By this definition, all dogs that are not trained for physical apprehension (attack or handler protection) were excluded from the sampling frame. This excludes hundreds of non-aggressive single purpose dogs that are trained solely for scent work. Dogs excluded could be used in narcotics, explosives, and cadaver detection, as well as for tracking purposes.

In order to identify all patrol dogs in Florida, F.D.L.E. was contacted to obtain canine handler names and corresponding agency addresses. Upon first inspection, the canine handler list seemed impressive with over 750 potential respondents. However, upon closer examination it was found that a large number of certifications were no longer valid (expired). After removing the expired certifications and handlers that were not engaged in traditional law enforcement duties, 334 patrol dog teams remained.

The Survey

A review of the literature did not reveal any previous attempts at collecting any data from patrol dog handlers regarding the use of force. As a result, the survey instrument for this study was constructed based upon issues identified in the salient extant literature and case law.

The instrument (see appendix) was designed in booklet format as suggested to achieve as high of a response rate as possible (Dillman, 2000). The booklet used for this survey utilized legal size paper folded in half (8 ½ x 14)

and folded a second time to fit in an envelope. There was a great deal of concern about exploring sensitive issues within this closed law enforcement subculture. As a result, the cover letter was simple, yet established trust through an explanation of my affiliation with the University and experience as a former certified patrol dog handler. However, additional steps were taken to increase response rate. Further, a letter of introduction of this research was published weeks prior to survey administration in the newsletter of the United States Police Canine Association, which has the largest trade journal known as the Canine Courier. Following the publication of these research notes, this researcher fielded over 50 calls via telephone and email regarding the scope of the research and issues of anonymity.

Focus Group and Pilot Study

An early version of the survey instrument was pilot tested with a focus group consisting of a ten canine handlers that had expressed interest in the research. On-

line chat rooms and web meetings allowed repeated conferences to take place and a number of problems in question design were identified. Revisions by the focus group continued until a final satisfactory survey instrument was agreed upon.

Distribution of the Instrument

In the first week of October 2002, the survey instrument, an explanatory cover letter, and a postage-paid self-addressed return envelope were sent via first class mail to all 334-dog handlers that comprised a census of the State of Florida. There was a great deal of controversy regarding the survey after the first mailing, which was illustrated by web board postings, emails, and questions regarding my background and what would be done with the data. After replying to these inquires and posting responses on web boards, it appeared that any questions regarding the integrity of the study had been answered. However, it was clear that there were still some officers that were uncomfortable revealing such sensitive

information. The issue of distrust of researchers from outside an organization has been previously identified in the literature (Patenaude, 2001). As the validity of survey responses is based upon the honesty of the respondents (Klockars et al., 2000; Adams, 1996), certain limitations to this type of research become painfully obvious.

A follow-up letter, a second survey instrument and a second postage paid return envelope were mailed to non-respondents in the first week of November 2002. Finally, emails (when available) and letters (to all non-respondents) were sent to both agency administrators and canine handlers in the first week of December as a final reminder to encourage participation. At the conclusion of data collection, a total of 181 survey instruments (52%) had returned.

Study Data

In this study, several types of data will be used. These data will come from one of five sections in the survey, and are applied in relation to the bite ratio. These sections include: apprehension methods, methods of

training, agency type and demographics, policies and productivity, and individual level demographics regarding the handler and dog.

Dependent Variable

Bite Ratios

The key focus of the survey was the examination of the bite ratio. As discussed in Chapter 2, this ratio is determined by comparing the number of bites to the number of apprehensions and can be illustrated in formula as:

$$\text{Bite.Ratio} = \frac{\text{Apprehensions.with.Bites}}{\text{Total.Apprehensions}}$$

[a /b], where a= the number of apprehensions with bites and b= the total number of apprehensions . For example, if a canine team were to apprehend 50 suspects but during the course of arresting them 5 suspects were bitten by the dog, it could be shown as [5/50] or a 1/10 (10%) ratio.

Figure 1. Bite Ratio Model

For researchers not familiar with the use of bite

ratios as an industry standard, it might appear that canine handler's might not readily recall the amount of deployments, apprehensions and bites within a year timeframe. However, for the canine handler, this is their lifeline. For instance, a baseball pitcher will be able to instantly recount his won/loss record because if nothing else, this is a measure of his value to the team. The same can be said of bite ratios for canine handlers. This is how they are measured. Bite ratios are a measure of their efficiency and their worth to the organization. In fact, at one time (in the not so distant past), canine handlers displayed stars on the side of the dog's cage in the patrol vehicle, which represented the number of suspects that had been bitten by the police dog. This act of openly displaying use of force as a badge of honor came to light in *Kerr v. City of Palm Beach (1989)*. Since that court decision, the practice of using stars seems to justly have gone out of fashion.

The issue of the bite ratio is probed in two sections of the survey. First, the respondent is asked whether their

agency monitors bite ratios and if so, to list their bite ratio for the previous calendar year. Later, the total number of yearly deployments is broken down by utilizations (tracking, area search, building search, and fleeing suspect) and the respondent is asked to list the number of apprehensions and bites within each category. This second reporting was made to insure accurate recording of ratios. Interviews during the testing portion of the development of the survey indicated that a number of agencies "padded" their numbers in order to reduce the appearance of impropriety of having an unacceptable bite ratio. This model is illustrated below adding uses with apprehensions:

$$\text{Bite.Ratio} = \frac{\text{Total.Bites}}{\text{Total.Deployments}}$$

[a /a+b+c], where a= the number of bites and b= the total number of apprehensions and c= all other deployments. For example, 5 bites with 50 apprehensions and 50 other deployments can be shown as [5/50+50] or a 5/100 (5%) ratio.

Figure 2 Bite Ratio Padded

For example, one large metropolitan agency used a bite-to-use ratio, where use could be defined as any application of the police dog (public relations, drug search, etc.) where there was no opportunity for the dog to exert force or injury.

As shown, with a simple change in denominator of the reported bite ratio, this rate can be reduced almost in half. This issue was addressed by Campbell et al.(1998) in their analysis of Los Angeles area canine units. From a policy perspective, this is problematic since no two agencies report their ratios the same way. Agencies that do not have a problem may choose the former of the two formulas, while agencies that have had a problem in the past or are currently involved in some type of litigation may choose to implement the latter of these formulas.

Further, it is impossible to speak with one voice regarding the nature and extent of this problem since no state or national agency mandates a formula that must be followed with regard to an agency's bite ratio. If however, we code the bite ratio as the total number of apprehensions and bites from each of the utilizations (tracking, area search, building search and fleeing suspect

apprehension) and combine it to form a uniform bite ratio that is comparable across agencies within the state, then it is possible to compare agencies from across the state to examine the individual, situational and organizational correlates of canine forceful interventions

Table 3.0, shown below, illustrates a novel method of data collection and force monitoring. Each deployment (tracking, area search, etc.) is broken down into an exact number of apprehensions and resulting bites. From this data, a bite ratio can be computed within each typology. It becomes impossible to 'pad' the numbers in any of the categories and modify the results.

Table 5 Bite Ratio Data Collector

Tracking	___Apprehension	___Bite	___Bite ratio
Area Search	___Apprehension	___Bite	___Bite ratio
Building Search	___Apprehension	___Bite	___Bite ratio
Fleeing suspect	___Apprehension	___Bite	___Bite ratio
___ Total apps	___ Total bites	___ Total bite ratio	

In the survey, K9 handlers were asked to provide only

the number of apprehensions and bites, but were not required to compute bite ratios for the last twelve month period. It was anticipated that once officers realized that high bite ratios were occurring within a specific deployment, there was the possibility that they would modify their data to conform to a more socially desirable response. Keeping track of the data this way can assist law enforcement personnel with keeping better tabs on their personnel. For instance, if some specific utilization (such as tracking) have high bite ratios, it can be more indicative of handler misconduct. For example, during a track, the officer is in close proximity to both offender and canine. Thus, the handler and has the ability to intervene and increase or decrease the level of force that is used at that time. When elevated bite ratios are present in these deployments, it is usually due to handler carelessness rather than suspect resistance. Although the bite ratio should not be considered the final word in measuring force with police dogs, it does act as a barometer for misconduct and measured police violence.

Independent Variables

Apprehension Method

The method of apprehension in which the dog was trained is of vital importance to this study and future policy decisions. The Department of Justice report "*Principles of Promoting Police Integrity*" has promoted the adoption of the bark and hold model. The idea is that the dog delays the suspect until the handler can arrive and make the arrest (Yarnell, 1998). In such as search, the dog will bark but will not engage the suspect unless he moves.

The current system of apprehension is bite and hold. The canine is sent and the apprehension is made by the dog. Under this model, the canine engages (bites) the suspect and does not release until the handler arrives (Eden, 1993). Dogs trained in this system engage the suspect without provocation. While this model may sound barbaric, officers are trained that they should not deploy their dogs unless the situation warrants a dog bite. Hence, a handler would not send a canine after a suspect that the officer

did not perceive to be a threat. In the data, the variable representing apprehension method is coded a 1 if the dog is trained in bite and hold and 0 if trained in bark and hold. However, other training issues will be examined as well. One of the critical questions that these variables seek to answer is if different training paradigms impact bite ratios.

Training Methods

This section of the survey examined a variety of different training concepts that could affect the future performance of police dogs. These variables can be divided into equipment and methodology related training issues. There is no research that has examined any of these variables.

Equipment for the training of police dogs is quite diverse and varies greatly in cost, usefulness and availability. For persons not familiar with the large number of options available when seeking dog training equipment, an examination of the Ray Allan catalogue

(www.rayallen.com) offers an overview of state of the art in this arena⁷. Although there are a number of training options, certain key items of equipment are used with great frequency and are directly related to aggression training. These items the electric collar and bungee cord both rely heavily on negative reinforcement to pattern behavior.

The electric collar (or shock collar) is a training tool, which allows the handler to deliver small electric shocks of varying strength by remote control. Through a negative stimulus (shock), the dog can be trained to avoid certain behaviors. They are incredibly useful in the hands of a competent trainer. However, they can and are in training by less experienced trainers or as an option when dealing with extremely 'difficult' dogs that resist conventional methods. Additionally, some research has linked electric fields (such as those used in pet containment systems) to extreme aggression in normal docile animals. Electric collar use is coded as 1 if used and 0 if not used.

The variable bungee reflects the use of a bungee cord

⁷ The Ray Allan Company is viewed as the industry leader in police dog equipment and supplies.

for agitation training. It is used to build drive and reduce re-biting. The dog bites an agitator wearing a protective sleeve, who begins walking backward away from the post that the dog is tethered by the bungee cord. The cord is stretched out and if the dog releases or attempts to release in order to re-bite (also known as typewriter biting), the dog will be flung backward creating an immediate negative feedback for the behavior. This negative re-enforcement is repeated until the dog correctly maintains his grip on the agitator. Bungee cord use is coded as 1 if used and 0 if not used.

Just as equipment variables used in training are important in this analysis, so are the methods of training. There are so many variations and models used to train dogs, but there are a limited number that directly relate to aggression. In this next section, I examined the factors in police dog training that the literature suggests could be of predictive value.

Training for tracking deployments could influence bite ratios. The dog follows an air-borne or ground scent to

locate the suspect, while wearing a harness attached to a 6-30 foot tracking leash. One method of training uses the concept of agitation to stimulate interest in tracking. During the training scenario the "offender" taunts the dog before fleeing. This stimulates a prey drive where the dog's instinctual urge to pursue anything that runs from him (Air Force Office of Scientific Research, 1970). Most police dog training is based upon operant training principles (Department of the Treasury, 1993), which are based upon the idea of behavior shaping to prompt a correct response to commands (Pryor, 2000). A trained behavior produces a reinforcer that can be positive or negative. Positive reinforcers increase the likelihood of a repetition of that behavior (Department of the Treasury, 1993). Rewards such as food, praise, and petting (or all of the above in combination) have been successful positive reinforcers in the past (Phillips, 1971). However, when agitation is used to stimulate interest, the reinforcing reward is the physical apprehension (bite) at the end of the track. Thus, the dog learns to expect a bite at the end of every track. Thus the variable agitation track will be

included as a dichotomous variable with the responses of yes (coded 1) and no (coded 0).

If the concept of agitation in tracking is a factor in bite ratios, certainly the frequency of positive reinforcement through training bites will need to be examined. This will further probe the fundamental premises of operant conditioning and its affect on police dog outcomes. The second training methodology variable will be the percentage of training tracks ending with a bite. This variable is measured as the actual recorded percentage.

Policy Guidelines

Regardless of training methodologies, officers are ultimately governed by the policies and procedures of their agencies. These policies may restrict or encourage differing levels of force in determining which deployments are acceptable and which are not. Policies regarding the release of the K9 on a fleeing suspect are examined through five dichotomous responses in a policy scale, which were coded positive and negative (yes coded as 1 and no coded as

0), in response to increasing levels of suspect threat as illustrated below:

- Fleeing nonviolent offender
- Fleeing nonviolent misdemeanor
- Fleeing violent misdemeanor
- Fleeing nonviolent felony offender
- Fleeing violent felony offender

We expect that agencies that have more policies in place regarding specific situations where canines can be used, will use their dogs less frequently, and when they do employ them, they are less likely to end in suspect injury or a bite. This hypothesis will be tested by including this additive scale as an independent variable in subsequent regression runs to test and see if policy guidelines serve as a correlate of bite ratios.

In addition, a single dichotomous variable regarding limitations on tracking (i.e. felonies only) was included at the end of this section. This variable identifies agencies that have relatively strict policies that limit the frequency and circumstances that the canine will be deployed.

Comment [MSOffice1]: Why did you code 0 and yes, and 1 as no. This is really confusing here. Also I really don't know what you mean when you talk about exalating effects. We are going to have to talk about this and where this question came from

Individual Officer Demographics

Certain officer demographics have been previously linked to misconduct (Lersch & Mieczkowski, 2000; Weisburd, 2000; Hickman, Piquero, & Green, 2000; Metcalfe & Dick, 2000; Stevens, 1999; Haarr, 1997; Barker, 1997; Toch, 1996). Farkas (2001) identified a number of corrections related research (table 3.1) that also addressed the relationship between officer demographics and misconduct.

Table 6: Condensed Meta Analysis of Officer Misconduct and Police Officer Demographics

Gender	Race	Education	Age
Whitehead, Lindquist & Klofas, 1987 Zupan, 1986	Johnston, 1996	Musheno & Boyle, 1987	Cullen et al., 1989
Zimmer, 1986	Jackson & Ammen, 1996	Champion, 1990	Klofas, 1986
Jurik, 1985	VanVoorhis, Cullen, Link, & Wolf, 1991 Klofas, 1986	Cullen, Lutze, Link, & Wolfe, 1989 Jurik, Halemba, Jurik, 1985	Klofas & Toch, 1982 Jacobs & Kraft, 1978
Jurik & Halemba, 1984	Jurik, 1985 Alpert, 1982 Jacobs & Kraft, 1978	Crouch & Alpert, 1982	Farkas, 2001 Farkas, 2000b

Comment [MSOffice2]: Charlies this table make sno sense. First you say there are conflicting opnions but you don't say who said what. You need to define these more clearly. If you want you can make a table and list the authors name and the variables, but in the text you must mention what they found. This is just incomplete.

The literature suggests that the relationship between individual variables may or may not influence the individual attitudes of personnel. This may or may not also be true when considering the relationship between officer demographics and canine use of force. As a result, the personal characteristics of each officer responding to this survey are also included in this analysis. The basic items include age (measured as recorded), gender as male (coded 1) and female (coded 0), race as white (coded 1), black (coded 2), Hispanic (coded 3) and other (coded 4). Education contained a rank order scale to record the highest level of education. As important as personal characteristics may be in this analysis, the next section may be key in the understanding of police use of force as it examines each officer's number of complaints and exposure to litigation as a result of canine deployments.

Organizational/Environmental Variables

Kappeler, Kappeler, and Del Carmen (1993) found that in law suits against police departments where a canine was

involved, the agency was successful in defending itself in less than 50% of the time. Thus, when the police lost their case and a Section 1983 claim was levied and confirmed by a court of law, the average fine awarded to the plaintiffs was \$118,698. Further, in 53% of those cases in which law enforcement lost, the main issue which the jury or judge hinged on before making a decision was failure to properly train personnel or dogs.

This section will examine reported misconduct and legal actions. The variable complaint measures with threshold of three or more or less than 3 complaints against an officer in 12 months (as determined by Lersch as a problem-prone officer) and was measured as a dichotomous variable with positive and negative responses. A second variable regarding more than 4 complaints in three years was also added after it was successfully tested and found to be a reliable measure (See the Osceola Jail Study; Mesloh, Henych, and Wolf, 2001).

Also examined are two dichotomous response variables regarding lawsuits with K9 and settlements paid as a result

of legal action, which measure the consequences or outcomes of perceived misconduct. The final section of officer demographics will look at training and experience with police dogs and its possible link to excessive force.

Canine Training

Training of police canines is one of the biggest issues facing the police departments who use canines in their daily operations. The Courts have held in *City of Canton v. Harris* (1989) that when an agency fails to train their dogs properly, it constitutes a case for managerial neglect under Title 42 United States Code Section 1983. Thus if dogs are to be used in police service, they must be supervised and trained well. Failure to do so, is not just the responsibility of the officer or handler, but their supervisor, the organization and the city which they represent.

Variables in this section explore the overall level of experience of the handler and the amount of continuous training. It can be expected that canine officers that

Comment [MSOffice3]: I am really confused here. Tell me why deviant prone officers are important to this analysis. As it stands, your transition here is weak. Please strengthen this up!

have little experience and undergo little training are more likely to make very damaging and costly mistakes. These variables, includes number of years in K9 unit, how long certified with current dog, and how many canines handled. Each of these are measured as recorded.

The final question of this section examines the amount of training the handler undergoes each month. According to Hess (1995),

No matter how smart or how good a canine unit is upon graduating from school, unless an in-service training program is also initiated, a proficient unit will lose its proficiency. A minimum of four hours a week should be allotted to in-service training. (p 2).

Reinforcing this idea, United States Police Canine Association Executive Director Russ Hess has gone so far as to state that there is a there is a link between poor training and litigation. He states officers or organizations that do not train their dogs or fail to hold their handlers to high expectations are more likely than similar groups to make mistakes and face civil litigation. In his view it is not the type of training that they receive "bark and hold" vs. "bite and hold" but rather the

quality and quantity of hours a handler spends with his dog doing drills. He goes further and states that the Courts have traditionally upheld that it doesn't matter which paradigm a individual handler chooses to train his/her dogs in, rather what matters is if they follow the standards laid down by the USPCA. He states:

The cases litigated also show a lack of any national standard of recognized performance. The hallmark case is Robinette v. Barnes 854 F2d 909 (6th Cir. 1988). It supports the proper training of police dogs and the standards of the USPCA. The USPCA standards have been court tested. They are an industry standard of recognized performance." (p 1).

Agency Type and Productivity

Because there are so many different types of law enforcement agencies in the state of Florida, it made sense to separate the respondents into different categories. There are perceptions in law enforcement that large municipal agencies deal with more serious crimes and with greater frequency. Conceptually, this would affect the types of deployments that canine units would encounter. Consequently, this section will examine the agency types, agency sizes, and finally the K-9 calls for service on a

monthly basis.

As the extant literature suggests municipal police agencies can be very different entities than county sheriff are. In municipal agencies, the chief of police is appointed by the mayor and not directly accountable to the voters. However county Sheriff's are elected by the people every four years. Thus, it stands to reasons that officers from Sheriff Agencies may be more prone to take precautionary steps and train their dogs more thoroughly than those employed by municipal agencies. To test this proposition, I have included a variable agency type to denote these distinctions. Agency type is coded a 1 if the officer is from a municipal agency and 0 if they are not.

Police agency size is also another important variable. In the current police organization literature, organizational size serves as a correlate for such factors as functional and task differentiation, organizational complexity and many others (Langworthy, 1986). In this context, we expect larger police organization to be able to afford more training for their officers and dogs. This is

a double-edged sword however. Because large organizations are more likely to represent large jurisdictions which include predominately poor areas, we will investigate if there is an interaction effect between organization size, hours of training and number of complaints against the officer or their agency. The variable organization size will be measured as recorded.

A third component of agency type and productivity is the quantity of calls that police canines are involved in. It would be easy to say that large agencies are more likely to have more complaints filed against them for excessive use of force due to canine call outs, but before we can empirically test this, we must control for the total number of times an agency actually uses their dogs. Some agencies may rely on police canines exclusively, while others may use them sparingly. Thus, the importance of the number of callouts and times the canines are introduced into theater is a very important control variable. This variable, number of calls was measured as recorded.

Canine Demographics

The demographics on each patrol dog are examined for two very important reasons. First, as this is exploratory research, these demographics may provide rich background information that can later be used in cost analysis, policy development, or a basic overview of the status of canine law enforcement within Florida. Second, as it has been proposed that training methodology influences bite ratios, it is imperative to examine the entire picture of each dog's training and history for a comprehensive analysis. As a result, this section will examine the breed of the dogs, their country of origin, and the type of training that they have undergone.

The first of these variables is the breed, which is measured as Malinois (coded 1), German shepherd (coded 2), and other (coded 3). For regression analysis, these variables were subsequently dummy coded. The inclusion of breed in this analysis is important since most canine breeds are often chosen for their size and stamina. Obviously, aggressive dogs that have the potential for

causing injuries create new issues in liability and public relations. However, they offer the ability to apprehend dangerous offenders while using less-lethal forms of force, which can in itself be of value in forming community perceptions.

German shepherds tend to be the most commonly found breed as they have a good temperament, are easily trained for multiple tasks and their large size tends to deter would-be attackers (Mesloh, 2002A). However, medical issues regarding their hips and joints have persuaded agencies to investigate other working breeds. The Belgian Malinois has received increased attention due to its extremely high drive, which is explained by its selective breeding to be a work dog. Other breeds in canine service tend to be viewed as an oddity and are encountered less frequently.

The next variable is where the dog was purchased, which is measured as locally (coded 1), not local but within state (coded 2), not within state but within the U.S. (coded 3) and outside the United States (coded 4). Those recording a purchase outside the U.S. were asked to

identify the country of origin. These were measured as Germany (coded 1), Hungary (coded 2), Czech Republic (coded 3), Yugoslavia (coded 4), and Holland (coded 5). For regression analysis, these variables were dummy coded. The next series of variables continue to examine specific factors relating to the original purchase and its affect on the final outcomes of police dogs.

A number of options are available in the training of the handler and dog. The final analysis of which purchase/training option will include factors such as the amount of training that the dog has received prior to purchase, the length of time that the training of the handler and dog together will require and location that the training is offered. Out-of-town training becomes expensive very quickly as travel, hotel and per diem costs add up. It should be noted that the length of time required to train canine teams varies greatly from dog to dog and may even have a mandatory minimum length of training as defined by each state's licensing authority. However, the basic canine handler course in the State of Florida is 400 hours,

but is only required if the canine has no prior training. It does not mandate a minimum number of training hours for the handler, although the canine team must demonstrate proficiency once each year using a standardized testing system.

Some companies offer to place an inexperienced handler with a pre-trained dog for a short orientation course. This option has a higher start-up cost for the purchase of a partially trained dog (which tends to be older and seasoned), but provides a working dog team in the smallest amount of time and with a reduced per diem payment as a result. The down side is that the handler has not learned how to train a dog and only knows how to handle one.

Another option is the training of the inexperienced handler with an inexperienced (green) dog. This option has a lower start-up cost for the purchase of the dog but the travel costs (if out of town training is required) can be very high. Additionally, the length of training is considerably longer and while training the canine team is not available for call for service. The advantage of this

option is that the handler learns to be a trainer in this process and not just an operator. Furthermore, over the course of the 400-hour training, officers become socialized into their new role as canine handlers and learn specific tasks that other officers that have been 'fast tracked' with pre-trained dogs may not have an opportunity to learn. It is likely that these factors will impact performance. To examine the impact of these factors, information was collected regarding age at time of purchase, cost, and the length of original training, which were measured as recorded.

The final series of questions in this section relate to different types of training that the canine may have been exposed. Specific scent functions, such as narcotics detection, explosives detection and cadaver detection tap certain drives of the dog. Although an unlikely predictor of bite ratios, no quantitative analysis has ever examined their impact on the aggression of the dog. For this reason, they will be included in this model. Each are measured as dichotomous variables as yes (coded 1) and no (coded 0).

Conclusion

The following chapter has discussed how the officers in the study were selected, how the survey was disseminated and how each of the variables were constructed and coded. These are all very important pieces of information to answer the central research question of the effect of the "bark and hold" vs. the "bite and hold" model really makes a difference in the overall performance of canines in law enforcement operations. The next chapter will begin by describing the basic demographics of the sample and will move to test hypotheses regarding the utility of moving toward a federally preferred policy that has never been tested in the field.

CHAPTER 4: FINDINGS

Introduction

This chapter provides findings for the analysis of this study. It contains detailed demographics of the population and an analysis identifying factors that influence greater use of force with police dogs. Three research questions were designed to guide this study.

The first question examines the effect of the how the dependent variable (bite ratio) is measured. It is believed that traditional methods of measuring bite ratios significantly underestimate canine force and a new methodology is tested. The second question examines the effect of "bark and hold" training on bite ratios and the final question examines the combined effect of individual, organizational, situational and training variables on canine force outcomes.

Presentation of the Findings

Prior to presenting the findings of this study, it must be clearly stated that this was non-traditional research and as such did not test pre-existing theories. As a review of the salient literature shows, there were no previous models to test and as a result, the author was forced to build from the ground up.

First, demographics of the population of canine handlers in the State of Florida are presented in a series of tables representing individual, organizational, situational and training characteristics. This data has never been analyzed or discussed in any previous research study and provides a unique view of this closed law enforcement community. In traditional research, this information would simply be used to show how closely the sample resembles the population. However, as a census of a non-heterogeneous population, additional emphasis was placed on these distributions as they provide rich data regarding the ethnographical composition of the law enforcement canine industry in the State of Florida.

Second, each of the research questions was

statistically tested using the individual, organizational, situational, and training factors previously identified. One goal was to test an innovative method of collecting bite ratio data, and compare it to a traditional self-reporting of bite ratios throughout the analyses. This design was used to illustrate the primary problem in bite ratio data collection through self-report data.

Unfortunately, this may add to a degree of confusion as readers struggle to understand how complex relationships can change depending upon how the dependent variable is both conceptualized and measured. The traditional method of collecting this data was to simply ask canine handlers to report their own bite ratios. This is problematic as it is subjective which deployments comprise the denominator of the ratio. Consequently, it is likely to be a conservative measure of actual canine force. The BRDC makes it much more difficult to 'pad' the denominator as the components of what is considered a deployment is clearly defined.

The second goal was to empirically study the affect of training methodologies on canine force outcomes. As the debate over "*Bark and Hold*" vs. "*Bite and Hold*" continues,

statistical evidence will be offered as to the actual affect that these paradigms have on bite ratios measured both ways.

Population and Demographic Characteristics

Of the 334 patrol dog handlers identified by FDLE and surveyed, 181 (52%) responded to one of the three requests for participation. Tables 4.1 through table 4.5 present the demographic information obtained through a descriptive analysis of frequencies and percentages for the demographic items on the survey instrument.

Items 1 through 9 (gender, race, education, supervisory status, age, complaints, years as a dog handler, number of dogs handled, and length of time certified with current dog) were used to elicit personal information about each respondent and are presented in table 7. Items 10 through 15 (breed, location of purchase, country of foreign purchase, age at purchase, cost, and length of original training) are used to gather information on each dog and are presented in table 8. Items 16 through 21 (agency type, number of officers, number of calls,

previous lawsuits, previous settlements, and monitoring bite ratio) are used to obtain basic data on each organization and are presented in table 9.

Items 22 through 31 (Shutzhund training, electric collar use, bungee use, use of agitation in tracking, tracks ending with bites, monthly hours of training, apprehension method, and cross certifications in narcotics, explosives and cadaver) are used to acquire data regarding the training of the canines and are presented in table 10. Items 31 through 36 examine agency policies under which it is considered appropriate to release the canine and are used to elicit information regarding situational factors affecting canine force. These factors are presented in table 11.

Officer Demographics

Table 7 presents the personal characteristics of the survey respondents. One hundred and seventy seven (97.8%) were male and one hundred and sixty one (91%) were white. Respondents were also asked for information regarding their highest level of education completed. Two (1.1%) described

themselves as having achieved an advanced degree, while forty-two (23.2%) stated that they had completed a bachelor's degree. The majority of the respondents indicated that they had completed less than a bachelor's degree as indicated by the breakdown of associates degrees (23, 12.7%), some college (99, 54.7%), and high school graduates (15, 8.3%).

Another section of table 7 examines the mean scores for ages of the handler (36.4), the number of years as a handler (6.9), the number of dog handled (2.0), and the length of time certified with current canine partner (2.8 years). Accordingly, this group of canine handlers could be classified as extremely homogeneous as most are white males that are under 37 years old, are not supervisors but have a substantial amount of experience as canine handlers. Only a small number (less than 6%) had received more than four complaints in three years.

Table 7 Officer Demographics

Demographic Information	Frequency	Percent
Gender (n = 181)		
Male	177	97.8%
Female	4	2.2%
Race (n = 178)		
White	161	91.0%
Black	2	1.1%
Hispanic	13	7.3%
Other	1	.6%
Education (n = 181)		
High School / GED	15	8.3%
Some College	99	54.7%
Associates Degree	23	12.7%
Bachelors Degree	42	23.2%
Advanced Degree	2	1.1%
Supervisor (n = 179)		
Yes	39	21.8%
No	149	78.2%
Age (n = 177)		
Median	36.0	
Mean	36.4	
More than four complaints in three years (n = 180)		
Yes	10	5.6%
No	170	94.4%
Number of years as handler (n = 178)		
Median	5.0	
Mean	6.9	
Number of dogs handled (n = 178)		
Median	2.0	
Mean		
How long certified with current dog (n = 166)		
Median	2.0	
Mean	2.8	

Note. Not all respondents completed every survey item.

Additionally, the education level of the handlers explains the dearth of literature on patrol dogs. Over half of the population reported having less than an Associates Degree and less than 2% reported an advanced degree. This suggests that only a few handlers have the formal education necessary to identify the complex issues that comprise canine force, although none have methodologically tested these five models in the past.

Demographics of Police Dogs in Service

Table 8 presents the details regarding the demographics of the police canines in the State of Florida. The great majority of the 181 respondents (142, 78.5%) stated that they were utilizing German Shepherds, while only thirty four (18.8%) utilized the Belgian Malinois.

Table 8 Demographics of Florida Patrol Dogs

Demographic Information	Frequency	Percent
Breed (n = 181)		
German Shepherd	142	78.5%
Malinois	34	18.8%
Other	5	2.8%

Location of purchase (n = 181)		
Locally	37	20.4%
Not locally, but within state	55	30.4%
Not within state, but within U.S.	34	18.8%
Outside the U.S	55	30.4%
Country of foreign purchase (n = 47)		
Germany	10	21.3%
Hungary	19	40.4%
Czech Republic	6	12.8%
Yugoslavia	1	2.1%
Holland	11	23.4%
Age at time of purchase in months (n = 180)		
Median	24.0	
Mean	22.6	
Cost of purchase in dollars (n = 178)		
Median	\$4000.00	
Mean	\$4136.16	
Length of Original Training in hours(n = 177)		
Median	480	
Mean	479	

Note. Not all respondents completed every survey item.

A profile of the Florida patrol dog was then developed. Most were purchased within the continental United States at approximately two years of age for a median cost of \$4,000. Of specific interest to this study is the fact that the length of original training that handlers received actually exceeds the mandated minimum required by the Florida Department of Law Enforcement. This suggests that few handlers are taking advantage of the

pre-trained dogs requiring a shorter start-up training period.

Organizational Demographics

Table 9 presents the organizational characteristics for the agencies that the respondents work. Of the 181 canine handlers that responded to the survey, 99 (55.3%) worked for police departments, while 80 (44.7%) worked for sheriff's departments. Mean scores were also computed for number of sworn officers in each agency(697) and the number of canine calls for service per month (30).

Three dichotomous response questions measure previous legal actions as a result of the actions of their canine. Twenty-four (13.3%) reported a previous lawsuit related to their canine. Of those having a previous lawsuit, sixteen paid some type of settlement. Further, only 143 (79.4%) of the agencies required any type of bite ratio monitoring.

Table 9 Organizational Demographics

Demographic Information	Frequency	Percent
Type (n = 179)		
Police Department	99	55.3%
Sheriff's Department	80	44.7%
Number of Officers (n = 179)		

Median	350	
Mean	697	
Number of Calls for Service (n = 174)		
Median	25	
Mean	30	
Agency ever sued because of K9 (n = 181)		
Yes	24	13.3%
No	157	86.7%
Settlement paid on K9 Lawsuit (n = 181)		
Yes	16	8.8%
No	165	91.2%
Monitors bite ratio (n = 180)		
Yes	143	79.4%
No	37	20.6%

Note. Not all respondents completed every survey item.

These organizational variables were originally designed to control for agency size, activity and factors that might affect deployment policies. Interestingly, over half of the agencies settled their lawsuits at some time in the process. It is yet unclear whether this action was taken due to perceived liability caused by the canine or whether it was fear that legal costs would quickly exceed the cost of any settlement.

Training Demographics

Table 10 shows the factors related in canine training.

Four dichotomous response questions measure specific exposure to different training paradigms. Twenty-five dogs (13.9%) were reported to have received Shutzhund (German dog sport) training, while the remainder (155, 86.1%) did not. This is surprising as the "*Bark and Hold*" model is closely linked to Shutzhund.

Slightly less than half of the respondents stated that they used either the electric collar (89, 49.2%) or the bungee (84, 46.4%). These factors make up the bulk of the equipment related variables and had actually lower usage than was predicted by the focus group. Although there is no way to know for sure, this could indicate that are fewer dogs requiring extreme training aids being marketed to U.S. law enforcement agencies.

Table 10 Training Characteristics

Demographic Information	Frequency	Percent
Received Schutzhund training (n = 180)		
Yes	25	13.9%
No	155	86.1%
Use of electric collar in training (n= 181)		

Yes	89	49.2%
No	92	50.8%
Use of Bungee (n = 181)		
Yes	84	46.4%
No	97	53.6%
Use of Agitation in Tracking (n = 180)		
Yes	59	32.8%
No	121	67.2%
Percentage of tracks ending with bite (n = 158)		
Median	10.0	
Mean	26.1	
Number of hours /month training dog (n = 178)		
Median	20.0	
Mean	24.3	
Apprehension Method (n = 181)		
Bark and Hold	46	25.4%
Bite and Hold	135	74.6%
Narcotics Detection (n = 181)		
Yes	124	68.5%
No	57	31.5%
Explosives Detection (n = 181)		
Yes	26	14.4%
No	155	85.6%
Cadaver Detection (n = 181)		
Yes	10	5.5%
No	171	94.5%

Note. Not all respondents completed every survey item.

Less than one-third (59, 32.8%) of the respondents

stated that they use agitation in foundation tracking exercises and even a smaller percentage (26.07%) concluded training tracks with a bite. This implies that fewer dogs are actually expecting to receive a bite at the end of the track as a reward. Consequently, fewer unnecessary bites should occur. As canine handlers reported an average of 24.3 hours of training their dogs per month, it is promising that these areas indicate responsible training practices.

Cross training of the canines for specific scent operations was also captured through dichotomous responses. One hundred and twenty four (68.5%) reported narcotics detection training, while twenty-six (14.4) reported explosives training. Cadaver trained dogs were the smallest group (10, 5.5%), but could overlap into either of the other scent groups without any substantial training issues.

Table 10 also contains the identification of those canine teams trained in "*bark and hold*" vs "*bite and hold*". As defined earlier in this study, the "*bark and hold*" dog does not engage (bite) the suspect unless the suspect moves

or actively resists. Forty-six (25.4%) of the respondents stated that their dogs were trained in "*bark and hold*" (find and bark).

Slightly less than three quarters of the respondents (135, 74.6%) reported that their dogs were trained in "*bite and hold*" (find and bite). These dogs are released under certain circumstances (often defined by policy or severity of the crime) and are under voice control of the handler. The canines trained in this method will bite a suspect on command regardless of the suspect's actions. This demographic provides a first look at the scope of the issue, should a national mandate require all dogs to be trained in "*bark and hold*". Almost seventy five percent of Florida's patrol dogs would need to be taken out of service and retrained, adding to the budgetary strain placed on municipal and county governments.

Situational Factors

Table 11 illustrates the situational factors that could affect canine deployments. In this section, canine handlers were asked through a series of dichotomous

questions concerning circumstances their agency policies would allow the release of their dogs on a fleeing suspect.

Table 11 Situational Factors

Demographic Information	Frequency	Percent
Release on traffic offender (n = 180)		
Yes	9	5%
No	171	95%
Release on non-violent misdemeanor (n =180)		
Yes	15	8.3%
No	165	91.7%
Release on violent misdemeanor (n =180)		
Yes	91	50.6%
No	89	49.4%
Release on non-violent felon		
Yes	168	93.3%
No	12	6.7%
Release on violent felon		
Yes	178	98.9%
No	2	1.1%
Restrictive Tracking Policy (n = 179)		
Yes	72	40.2%
No	107	59.8%

Note. Not all respondents completed every survey item.

Nine respondents (5%) stated that they were allowed to release their dog on a traffic offender, while fifteen (8.3%) could release on a non-violent misdemeanor. Ninety-one law enforcement officers (50.6%) were allowed to

release against a violent fleeing misdemeanor. Felony offenders appeared to be considered legitimate targets with slight differentiation between non-violent (168, 93.3%) and violent (178, 98.9%) offenders. In other words, if a suspect of any felony crime flees, most law enforcement agencies around the State authorize their handler to release their dogs. Fewer than half (72, 40.2%) of the agencies subscribed to a 'felony only' tracking restriction.

The previous tables have summarized the demographics of the population of canine handlers within the State of Florida. Although not of specific focus for this study, this information does provide a snapshot of the condition of the law enforcement canine industry. Prior to discussion of the research questions, a brief explanation of the reasoning behind specific decisions in the analysis is necessary.

Significance Testing

Determining the alpha level is based on the potential consequences of committing a Type I or a Type II error

(O'Sullivan & Rassel, 1999). Commonly found alpha levels for hypothesis testing are .05, .01, and .001 (O'Sullivan & Rassel, 1999; Spatz, 2001). However, throughout this study, an alpha level of .10 was chosen since it represented significance at the .05 level for a one-tailed test. There are several reasons for positing a one-tailed test for our hypothesis but chief among them was that we expect traditional bite ratios will underestimate the true bite ratio. The new BRDC should not only be more accurate, but should in most cases produce a higher estimate than other self report data commonly used by the law enforcement community.

The following sections examine each of the research questions in detail to provide a better understanding of the factors comprising canine force. The first of these questions examines the differences between data collection methods in the analysis of canine force data.

Research Question 1

To what extent do bite ratios computed through traditional methods differ from bite ratios computed through the Bite Ratio Data Collector (BRDC)?

Table 12 shows the analysis between the two methods of collecting bite ratio data. Hypothesis 1 predicted that bite ratios computed through traditional methods would not be equal to bite ratios computed through the BRDC. The results of a one-tailed paired sample t-test support this hypothesis, ($t(180) = -5.25, p < .001$). Mean bite ratios provided by canine handlers (9.19) are shown to be statistically significantly lower than those produced by the BRDC (17.45) using either a one-tailed or two-tailed solution.

Table 12 Mean Scores of Methods for Collecting Bite Ratio Data

Method	Mean	Standard Deviation
Self Report (n=181)	9.19	9.70
BRDC (n=181)	17.45	21.84

Paired Methods	Mean	SD	DF	t
Self Report-BRDC	-8.25	21.14	180	-5.25***

Note. *** $p < .0001$ (one tailed). SD = standard deviation, DF= degrees of freedom.

This illustrates a major problem in data collection in this area of criminal justice. Although conceptually these scores should be identical, as they are designed to measure the same thing, asking canine handlers to compute and then

report their bite ratios potentially underestimates the bite ratio. Although all analysis in this paper will include the self-reported data along with that collected by the BRDC, it should be stated that canine use of force could be underestimated when using self-reported data collected through traditional means. This is due to the lack of a clear universal definition of what factors comprise the ratio or an attempt on the part of an individual or agency to reduce bite ratios through padding.

Consequently, BRDC data is much more likely to be closer to the actual amount of canine force used, although it is still subject to social desirability bias in handler responses, as few are willing to divulge extreme misconduct in the forum of a survey.

In summation of research question one, there is an obvious difference in the data collection methods. As the BRDC makes padding more difficult, it is more likely to be closer to actual bite ratios. The next section will address the second research question and the analysis of its data.

Research Question 2

To what extent are bite ratios (collected through both methods) affected by the apprehension method that the canine is trained?

Table 13 shows the analysis between the method of canine apprehension and the two separate bite ratio collection methods. Hypothesis 2 predicted that there is a no significant difference between bite ratios of bark and hold vs. bite and hold trained dogs.

Table 13 Independent Samples t-Tests Between Apprehension Methods on Bite Ratio Outcomes Using Two Data Collection Methods

	Measurements			
	<u>Self-Reported</u>		<u>BRDC</u>	
	M	SD	M	SD
Bark and Hold	6.05	5.82	22.4	26.7
Bite and Hold	10.3	10.5	15.7	19.8
t	-3.37**		1.79*	

Note. * $p < .05$; ** $p \leq .001$ (one tailed).
SD = standard deviation, M = mean.

An independent samples t-test was used to test the effects of training methodology on bite ratios. However,

there is an obvious difference in reporting between the two data collection methods, which appears to affect the outcomes.

Using a traditional self-reporting of bite ratios the analysis revealed that "*bark and hold*" trained canines (M=6.05, SD=5.82) reported significantly lower bite ratios than "*bite and hold*" trained canines (M=10.3, SD=10.5), which is consistent with our earlier predictions, $t(179) = 1.79, p < .001$. However, as previously stated, the self-reported ratio should be viewed with a degree of skepticism as it is at best a conservative estimate of canine force.

Conversely, analysis of bites using the BRDC reveals that "*bark and hold*" trained canines (M=22.4, SD=26.7) appeared to have significantly higher bite ratios than "*bite and hold*" trained canines (M=15.7, SD=19.8). This serendipitous finding was not consistent with our earlier predictions, ($t(179) = 1.79, p < .05$).

Of specific interest to this analysis is the fact that the direction of the relationship changes depending upon the method used to collect the dependent variable. When using the self reported data computed by handlers, it

appears that *"bark and hold"* dogs have a lower bite ratio (thus supporting the position of DOJ). However, when handlers were required to input data into the BRDC matrix, *"bark and hold"* dogs actually have higher ratios, which would not support the mandates of the Department of Justice. In fact, this data implies that the proposed paradigm shift to *"bark and hold"* would substantially increase the number of canine bites.

To summarize this section, there is an obvious measurement problem when using self-report data. This problem actually changes the direction of the relationships. The BRDC ratios are less prone to social desirability in its responses and may represent this concept more clearly. *"Bark and hold"* dogs have higher bite ratios, implying a higher level of canine force. These findings are exactly the opposite of what has been suggested by the D.O.J. and wide-scale implementation may greatly increase the number of suspects bitten by police dogs across the country. The next section will examine specific individual, organizational, situational and training factors that affect canine force outcomes.

Research Question 3

To what extent do bite ratios (measured through both data collection methods) differ based upon selected demographic and training variables?

Four initial models are tested using OLS regression, examined individual, organizational, situational, and training variables. A final model combines the significant correlates to explore the impact of specific factors on canine bite ratios. For each of the models, examining normal probability plots of residuals and scatter diagrams of the residuals tested assumptions necessary for regression. The dependent variables for bite ratios (traditionally reported and the bite ratio data collector) was severely positively skewed. As a result, a log10 transformation was completed to produce a normal distribution. Additionally, mean substitution was used for missing data. No violations of normality, linearity, or heteroscedasticity were noted. In addition, box plots revealed no evidence of outliers. The following four models

examined key correlates in canine use of force.

Model One: Handler Demographics

This regression analysis examined officer demographics utilizing bite ratios as the dependent variable, measured through both collection methods. Table 14 displays the R^2 , the unstandardized coefficients, intercept, and standardized regression coefficients for each variable. Inconsistent with previous research, female canine handlers use more force than their male counterparts in both measurement systems.

Table 14
Model 1: Multiple Regression of Bite Ratios by Officer Demographics

Variable	Self-Reported Bite Ratio			Bite Ratio Data Collector		
	B	SE	β	B	SE	β
Gender	-8.55	4.98	-.133*	-20.5	13.7	-.139*
Education	.066	.802	-.007	-2.67	1.70	-.117
Age	-.094	.163	-.062	-1.34	.347	-.389***
Years in K9	.279	.260	.165	1.07	.553	.280*
Number of dogs	-1.37	.907	-.219	-1.03	1.93	-.072
Four complaints	-4.49	3.33	-.108	3.54	7.10	.037
Supervisor	.138	1.93	.006	-8.13	4.11	-.153*
F	1.01			4.62***		
R	.202			.403		
R^2	.041			.162		

Note. B = unstandardized coefficient, SE = standard error, β = standardized coefficient. *p < .05 **p < .01 *** p < .001. (one tailed)

Using data collected by the BRDC, the variables age, years in canine and supervisory status were also significant. This suggests that as officers get older and gain more experience they tend to use less force. However, a positive coefficient in years of canine suggests that force increases with experience within this law enforcement subset. Finally, once they reach supervisory status, they tend to use less force, presumably due to experience once again or the stress of positive career growth which compels them to use lower amounts of force as an example to subordinate canine handlers or the desire to continue advancement which could be interrupted by claims of civil rights violations. The next model will examine the affect of organizational variables on canine force outcomes.

Model Two: Organizational Variables

This regression analysis examined organizational variables utilizing bite ratios as the dependent variable,

measured through both collection methods. Table 15 displays the R², the unstandardized coefficients, intercept, and standardized regression coefficients for each variable.

Table 15 Multiple Regression of Bite Ratios by Organizational Variables

Variable	Self-Reported Bite Ratio			Bite Ratio Data Collector		
	B	SE	β	B	SE	β
Monitor Ratio	-.513	1.99	-.021	3.14	4.52	.057
Agency Type	-4.12	1.59	-.209**	-3.42	3.61	-.076
# of Officers	-.001	.001	-.079	.002	.002	-.108
# of K9 Calls	-.003	.039	-.008	-.133	.089	-.120
Agency Sued	2.87	3.12	.098	11.5	7.08	.174
Agency Settle	-2.96	3.63	-.084	-13.8	8.25	-.175*
F	1.40			1.57		
R	.220			.232		
R ²	.048			.054		

Note. B = unstandardized coefficient, SE = standard error, β = standardized coefficient. *p < .05 **p < .01 (one tailed).

Agency type was the only organizational variable that was significant within the self-reported data. This indicates that sheriff's departments have higher bite ratios (11.37) than municipal police departments (7.61). However, this relationship is not present in the BRDC data. Canine officers that had been involved in the settlement of a canine related lawsuits (within the BRDC data) had lower bite ratios (11.85) than officers that had not (17.99). This was not totally unexpected as officers might be less willing to use force after facing a civil action and

losing. On the other hand, there was very little difference in bite ratios for officers that had simply been involved in a legal action. The next model will examine the affect of situational factors on canine force outcomes.

Model Three: Situational Factors

This regression model examined situational correlates of the two measures of bite ratios. Table 16 displays the R², the unstandardized coefficients, intercept, and standardized regression coefficients for each variable. Using the self-reported bite ratios, only one variable, tracking restrictions for felonies offenders only, was significant. In other words, agencies with this type of restriction actually have higher bite ratios (11.64) than agencies without them (7.62).

Table 16 Multiple Regression of Bite Ratios by Situational Factors

Variable	Self-Reported Bite Ratio			Bite Ratio Data Collector		
	B	SE	β	B	SE	β
Non Vio Traffic	-7.09	3.46	-.160	-7.26	11.6	-.073
Non Vio Misd	3.58	5.02	.102	8.81	9.40	.112
Vio Misdemean	-1.47	4.07	-.076	2.96	3.59	.068
Non Vio Felony	-4.68	2.93	-.121	-9.75	6.78	-.112
Vio Felony	1.41	6.90	.015	10.4	15.9	.050
Track Limitation	4.72	1.54	.238***	-1.44	3.56	-.032
F		2.31*			.641	

R	.274	.148
R ²	.075	.022

Note. B = unstandardized coefficient, SE = standard error, β = standardized coefficient. *p < .05,***p < .001 (one tailed).

This could be explained by two separate explanations.

First, the policy restrictions could be a reaction to an excessive number of suspect bites or handler misconduct and the policy solution is not an effective deterrent. Second, by reducing the number of tracking deployments to only serious offenders, the canine and handler only come into contact with the most dangerous, motivated suspects that may resist and face a dog bite rather than return to jail or prison. However, this relationship does not exist within the BRDC data.

Individually, the policy restrictions regarding release upon fleeing suspects explain very little of the variance in bite ratios. Consequently, an aggregate index of policy restrictions ($\alpha = .52$) was created for use as a control variable in the final model. The next regression will examine the affect of training variables on bite ratios.

Model Four: Training Variables

The following regression analysis examines the training variables predicting the dimensions of bite ratio data collection. Table 17 displays the R^2 , the unstandardized coefficients, intercept, and standardized regression coefficients for each variable.

The breed of the dog variable was significant regardless of the data collection method. This suggests that the Belgian Malinois has a significantly higher bite ratio than that of the German Shepherd. In fact, subsequent analysis reveals that the Malinois has two times the bite ratio (based upon beta and mean values), which has never been identified as an issue in past research. This may have serious policy implications in the future, as agencies may tend to avoid purchasing Malinois in an attempt to lower their force usage and consequent liability.

Common across both data collection methods were a number of variables that were not significant predictors of canine force, such as cross training in all scent functions, equipment oriented variables, and specific training methods.

Table 17 Multiple Regression of Bite Ratios by Training Variables

Variable	Self-Reported Bite Ratio			Bite Ratio Data		
	B	SE	β	B	SE	β
Apprehend Meth	2.91	2.06	.126	-9.34	4.57	-.175**
Dog Breed	-6.24	2.24	-.243***	-28.7	4.96	-.484***
Narcotics Dog	-3.18	2.40	-.144	-5.99	5.25	-.117
Explosives Dog	1.35	2.98	.048	-3.53	6.58	-.055
Cadaver Dog	.986	3.32	.024	-.259	7.32	-.003
Age Purchased	.130	.106	.105	-.170	.234	-.060
Orig Training	-.009	.006	-.132	-.015	.013	-.094
Schutzhund	-5.00	2.77	-.148*	-12.1	6.12	-.154*
Electric Collar	.548	1.64	.028	4.27	3.62	.094
Bungee	-1.15	1.66	-.059	-.932	3.68	-.020
Agitation Track	-2.44	1.89	-.115	-1.23	4.17	-.025
Bite Track	-.028	.030	-.083	.009	.067	-.012
Sex Intact	-5.33	2.21	-.198**	-3.89	4.87	-.063
F	2.30			4.25		
R	.472			.538		
R ²	.223***			.289****		

Note. B = unstandardized coefficient, SE = standard error, β = standardized coefficient. *p<.05, **p <.01, *** p < .001,****p<.0001.

Cross training dogs to do scent related functions, such as narcotics or explosives detection, did not significantly increase or decrease bite ratios. Similarly, the use of the bungee and the shock collar has no predictive value as well. Their use seems to be evenly distributed between dogs and handlers reporting both high and low levels of force. Finally, there appears to be no relationship between higher levels of force and the use of agitation in tracking training. It had been suggested that

by stimulating the prey drive of the dog in foundation tracking or by rewarding the dog with a bite on a protective sleeve at the conclusion of a track would significantly increase later force levels. Had this been the case, a simple solution to reduce force levels would be to slightly modify training scenarios. As this is not the case, trainers and handlers may still use this shortcut to increase the performance of their canines without later suffering from high bite ratios as a result.

Unfortunately, other training related variables that were statistically significant in self-report data, such as the sexually intact (whether the dog had been 'fixed') variable were not significant in BRDC data. Anecdotally, dogs that were sexually intact were perceived to be more aggressive, which could translate to higher incidents of force. However, the data from this study is contrary to this belief. Officers with sexually intact dogs reported lower mean bite ratios (8.49) than officers with dogs that had been 'fixed' (13.18). It is unclear what factors are in play that could produce that outcome. Since the BRDC data also indicates that 'fixed' dogs are not a correlate

of force, agencies and handlers should consider this procedure on a case-by-case basis and not as a matter of policy.

Finally, data that were significant in BRDC data, such as apprehension method was not significant in self-report data, indicating a serious measurement issue. Relying on the BRDC data, it is clear that "*bark and hold*" dogs will produce much higher bite ratios than "*bite and hold*". Again, this is contrary to the findings of the Department of Justice and has serious implications for the future.

The previous models have tested specific characteristics or functions to determine whether they are correlates of canine force. Items that were significant in either measurement system were moved forward to the final model, along with necessary control variables. It was hoped that these factors previously identified in earlier models would add to the robustness of the final model and as a result present a rich overview of the dynamics of canine force. Furthermore, variables that did not perform well in earlier models have been removed.

Final Model: Combined Factors

Based upon these preliminary models, it was possible to identify those factors that which would have the greatest effect in the combined model.

Table 18 Multiple Regression of Bite Ratios by Combined Variables

Variable	Self-Reported Bite Ratio			Bite Ratio Data Collector		
	B	SE	β	B	SE	β
Apprehend Meth	3.70	2.27	.154	-26.8	4.70	-.480***
Dog Breed	-5.96	2.24	-.237***	-20.5	4.63	-.350***
Schutzhund	-2.01	2.47	-.074	-12.6	4.65	-.199***
# of Calls	.049	.043	.103	-.209	.088	-.189**
Gender	-6.57	5.24	-.094	-23.6	10.7	-.145*
Sex Intact	-6.00	2.16	-.220***	-7.70	4.48	-.121
Age	.120	.189	.080	-.571	.392	-.164
Supervisor	-.238	2.24	-.009	-3.06	4.64	-.047
Years in K9	-.139	.195	-.083	.068	.403	.018
Hours Training	-.072	.064	-.092	-.122	.131	-.067
Agency Type	-4.08	1.77	-.204**	-4.69	3.67	-.101
# of Officers	-.001	.001	-.087	-.002	.002	-.073
Length cert	-.137	.395	-.028	1.27	.817	.109
Agency Sued	1.70	3.35	.059	6.67	6.94	.099
Agency Settle	-1.06	3.60	-.032	-9.90	7.46	-.130
Orig Training	-.012	.006	-.176**	-.015	.012	-.090
Policy scale	-1.10	.976	-.095	-.505	2.02	-.019
Track Restrict	5.50	1.69	.276***	-1.12	3.49	-.024
F	3.28***			6.24***		
R	.544			.666		
R ²	.296			.444		

Note. B = unstandardized coefficient, SE = standard error, β = standardized coefficient. *p<.05, **p <.01, *** p < .001, (one tailed).

The final regression model containing individual, organizational, situational and training factors that were

correlates of either measurement of the dependent variable were included in the regression run.

Table 18 displays the R^2 , the unstandardized coefficients, intercept, and standardized regression coefficients for each variable. To simplify this final examination of canine force, it has been separated into self-reported data and BRDC data.

Self Reported Data Analysis

For the regression analysis using self-report data, five variables are significant correlates of canine force at the .05 level or better. In terms of individual relationships between the independent variables and bite ratios, dog breed ($t = -2.66$, $p < .001$), agency type ($t = -2.30$, $p < .01$), sexually intact ($t = -2.77$, $p < .001$), length of original training ($t = -2.28$, $p < .01$) and tracking restrictions ($t = -3.25$, $p < .001$) each significantly predicted bite ratios. According to this data, Belgian Malinois, employment within a sheriff's department, dogs that are 'fixed' with shorter amounts of original training and agencies with a felony tracking restriction are all

predictive of higher levels of canine force usage.

The apprehension method is not a significant correlate in this model, although it approaches significance using a one-tailed test and may be significant with a larger sample. The reported mean values of "*bark vs. bite and hold*" trained dogs suggest that "*bark and hold*" dogs have a lower level of force usage.

BRDC Data Analysis

Substantially different results occur with the data collected in the BRDC matrix. Four variables are significant at the .01 level (or better) and one variable at the .05 level (one-tailed). Although apprehension method is significant ($t=-5.69$, $p < .001$), the direction of the response has shifted from positive (as shown in table 19) to negative. A negative coefficient indicates that higher bite ratios are associated with "*bark and hold*" trained dogs. This was illustrated in an earlier t-Test and with descriptive statistics while examining the second research question of this study. However, it can now be suggested that "*bark and hold*" trained canines do not reduce the

number of suspects bitten and may in fact significantly increase them.

Gender was also significant in the final model ($t = -2.20, p < .05$). Female canine handlers reported higher bite ratios than their male counterparts, which is contrary to the extant literature on general use of force. However, as only four female handlers responded to the survey, it is likely that this finding may not be accurate and future research with a larger female sampling is necessary.

Schutzhund training was found to significantly predict bite ratios ($t = -2.71, p < .001$). Canines trained in this method had lower mean bite ratios (9.64) than dogs that were not trained (18.82) in this method. As stated earlier, this was surprising as there is strong link between "*bark and hold*" and Shutzhund. The immediate implication from this finding will likely see an increase in the number of canines purchased from Eastern European countries, which produce dogs trained in this manner.

The number of canine related calls was also found to be significant ($t = -2.36, p < .01$). Originally, this question was designed to control for agency size and activity.

However, it appears that agencies with more canine related calls per month actually have lower bite ratios than those agencies with high levels of activity. One explanation could be that officers in low activity jurisdictions seek to prove their dog's worth and deploy them aggressively when given the opportunity. However, that is beyond the scope of this analysis and future qualitative examination of individual deployments will be necessary for conclusive determination.

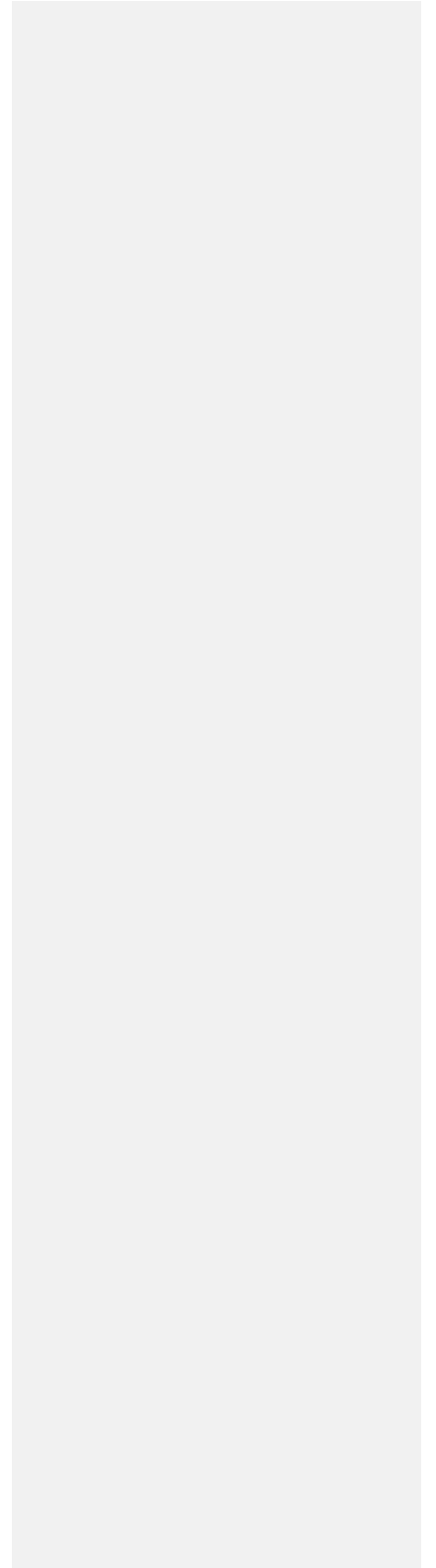
Finally, the breed of the dog is significant ($t=-4.42$, $p < .001$). This is the only variable that shows overlapping significance in both data collection methods. The German Shepherd dogs ($M=13.43$, $SD=16.20$) reported significantly lower bite ratios than the Belgian Malinois ($M=34.10$, $SD=32.40$). Consequently, agencies that are truly concerned about canine force should not purchase a Malinois unless their proposed handlers have extensive training and experience.

Summary

An analysis of the data obtained through the use of the State of Florida Police Canine Survey mailed to 334

patrol dog handlers in October, 2002 has been presented in the chapter. A profile of respondents using individual, organizational, situational and training related factors has been developed and the data analysis presented for the research questions.

As has been shown in the previous series of analysis, there has in the past existed a serious problem with the method that canine force data is collected. This directly relates to asking officers to compute their bite ratios without a clear definition of factors feeding the denominator. Although it may have seemed pointless to continue to report the data and results obtained through the traditional self-report (self-computed) method, it was necessary to illustrate the danger that exists when survey data is collected. Simply asking canine handlers for their bite ratios provides data that may be skewed or may produce spurious findings. In essence, it becomes a case of 'garbage in, garbage out'. A discussion and summary of this analysis are presented in the following chapter along with conclusion and recommendations for future practice and research.



CHAPTER 5: CONCLUSION

Statement of the Problem

This study sought to: (1) examine the effect of the paradigmatic shift to the "bark and hold" training method of patrol dogs in the state of Florida who were identified by the Florida Department of Law Enforcement; (2) develop a new methodology for collecting bite ratio data; (3) determine to what extent bite ratios differed based upon selected demographic and training variables.

Chapter 1 introduced the scope of the problem and the extent to which it will affect law enforcement agencies around the country. Chapter 2 examined the salient literature in order to properly and accurately frame the issues and identify possible correlates for later analysis. Chapter 3 described the methodology and a description of

the population. Chapter 4 tested those factors (individual, organizational, situational, & training) identified in the literature review to see if they were correlates of canine use of force. In order to test the central research questions in this dissertation, a population of 334 patrol dog handlers were identified and surveyed. The survey was designed to measure salient issues identified in case law and existing police canine research. It was mailed to the 334 Florida patrol dog handlers in October, 2002. Multiple follow-up letters and surveys were mailed to non-respondents in November, 2002 yielded a return of 181 survey instruments, or 52% of the population.

The survey was designed to measure the differences in methods of reporting bite ratios, the impact of apprehension methodology upon bite ratios and effect of selected factors upon bite ratio outcomes. Additional items, which requested information on individual, organizational, situational, and training variables were tabulated and used in the analysis of bite ratios.

Previous research in this area relied upon secondary

data collected from official documents (See Campbell, Berk & Fyfe, 1998; Hickey & Hoffman, 2003). The Florida Law Enforcement Patrol Dog Survey was the first research of its kind to analyze factors that predict canine force through the use of a survey instrument. Consequently, it was able to capture a broader range of information for analysis.

Summary and Discussion of the Findings

The summary and discussion of the findings for the data collected in response to the Research Questions for this study are as follows:

Research Question 1

To what extent do bite ratios computed through traditional methods differ from bite ratios computed through the Bite Ratio Data Collector?

Frequencies and percents of response choices were analyzed from a self-reported bite ratio and the bite ratio data collector. Using a traditional self-reporting of canine bite ratios, a mean score (9.19%) was computed and then compared with mean scores collected through the bite ratio data collector (14.45%). A paired samples t-test

indicated that there was a significant difference between the two methods of measuring bite ratios ($t(180) = -5.25$, $p < .001$). This tends to suggest that it is problematic to simply ask for a self-report of bite ratios that is computed by the handlers. This finding actually supports the position by the IACP, which stated, "reliance on formulas or ratios alone can often inappropriately and unfairly simplify an otherwise complex problem" (p. 19). As a result, information from the self computed /self reported data should be viewed with a degree of skepticism.

Either handlers are miscomputing bite ratios due to a lack of understanding of those deployments which feed the equation or they are deliberately padding the denominator by substituting canine deployments in the place of apprehensions. In either case, breaking down apprehensions and bites by deployment (as the bite ratio data collector does) eliminates this issue and provides a more accurate method of measuring canine force data. Consequently, handlers will either report their apprehensions and bites honestly or be forced to fabricate their numbers through trial and error to reduce their bite ratio to an acceptable

level.

Currently, FDLE requires Florida canine handlers to recertify once each calendar year. In this process, handlers use a standardized form, which is completed by examiners who forward the paperwork to a regional law enforcement academy for processing. It is suggested that the Bite Ratio Data Collector be added to this form. As an official form, it would be more likely to capture accurate data and serve as an early warning system for agencies that display high bite ratios. Although the bite ratio is not the final word in measuring canine use of force, it does act as a barometer for measuring extreme cases of misconduct. Handlers reporting bite ratios above a specific range (perhaps 30% if the Kerr standard is used) would trigger at least a cursory review to insure that extreme malfeasance is not occurring. However, it should be noted that a number of factors influence these canine force outcomes and each bite should be viewed on a case-by-case basis, using the Reasonableness Standard set out in *Graham v. Connor*.

Research Question 2

To what extent are bite ratios affected by the apprehension method that the canine is trained?

Measurement issues between the data collection methods continue to be a problem across each analysis. As has been previously shown, bite ratio data collected through self-report (self-computed) may produce spurious findings. Accordingly, this data will not be used in the formulation of these conclusions.

Using the only the BRDC data, *bite and hold* dogs had lower mean bite ratios (15.7) than bark and hold trained canines (22.4) and there was a statistically significant difference (using an independent samples t-Test) between the two apprehension methods. Consequently, any mandated changes in apprehension training are not a feasible solution to combat canine use of force issues. This may seem odd; dogs trained in what was perceived as a reduced level of force actually generating higher levels of force. However, several concepts may better explain how this is so.

First, the data does not capture the length of time

that each dog has been trained within the apprehension method. Many of the "*bark and hold*" trained dogs could have started out as "*bite and hold*" and been transitioned into the opposing paradigm, as a result of legal action or unacceptable bite ratios. In either case, a canine with previous behavior problems, such as inappropriate levels of aggression, will likely continue to have high bite ratios regardless of training.

The second, and more likely concept is handler related. It may be that canine handlers with "*bark and hold*" dogs may be deploying their canines under circumstances where bite and hold dogs are not. In this scenario, the handler is allowing his or her canine to operate freely in a wider variety of conditions and relying on the training to provide a framework for the dog to make decisions. Once again, it is unreasonable for a human officer to rely upon the decision-making abilities of a dog, no matter how well trained. Law enforcement agency policy should clearly define the acceptable and non-acceptable deployments for their canines. Although many handlers may feel that they are in the best position to

determine appropriateness in deployment of their canines, agency administrators ultimately have the final word and should guide their personnel through unambiguous policies and general orders.

Research Question 3

To what extent do bite ratios (measured through both methods) differ based upon selected demographic and training variables?

The Florida Law Enforcement Patrol Dog Survey collected individual, organizational, situational and training variables to develop a profile of canine handlers in the State of Florida and to identify factors that are predictive of canine force.

The majority of the respondents was male (177, 97.8%), white (161, 91%), held a non-supervisory status (149, 78.2) and had less than an associate's degree (114, 63%). Respondents tended to be seasoned officers as indicated by their median values for age (36), years as a canine handler (5.0), number of dogs handled (2) and the length of time certified with their current canine partner (2.0 years). Only a small number (10, 5.6%) reported receiving four or

more complaints within the last twelve months, which would classify them as problem prone officers (as modified from Lersch's & Mieczkowski's study (1996) and pre-tested in the Osceola Department of Corrections Study (Mesloh, Henych, and Wolf, 2002)).

A series of multiple regression models were calculated to identify the likely correlates of canine force. The correlates from the early models were then carried forward to a final model, which contained individual, organizational, situational and training variables. Using only the BRDC data, five principle factors were identified.

First, the breed of the dog was a significant predictor of canine force. The Belgian Malinois had a much higher bite ratio than the German Shepherd. Although many agencies successfully use this breed without incident, agencies without experienced handlers and trainers might chose a less aggressive breed, such as the German Shepherd. However, this decision should be made on a case-by-case basis, and not viewed as a theoretical moratorium on specific breeds in law enforcement.

Second, the apprehension method became a significant

predictor. When placed in the regression model and controlling for the other factors, "*bark and hold*" trained dogs were predictive of canine force. Therefore, the data suggests that current model of "*bite and hold*" is less damaging than shifting to the "*bark and hold*" paradigm.

Third, the presence of Shutzhund training in the dog's background was found to reduce bite ratios. Shutzhund is a method of rating dogs that are performing a series of complex functions. All competitions are off-lead and the dogs are under the voice control of the handlers. To perform at this level requires a great deal of training and discipline. These dogs are under handler control and are not required to make complex decisions. It is not surprising that the additional training and subsequent control over the dog has a direct impact on later use of force.

Fourth, the number of canine calls per month is predictive of force. Handlers reporting fewer canine calls also reported high bite ratios. As stated in Chapter 4, this could be a result of handlers wanting to prove their dog's worth. Consequently, their canines are deployed at

every opportunity regardless of the appropriateness or risk to suspects. This was the only factor identified in this study, which implies any type of misconduct on the part of the handler. However, it may be worth analysis in the future.

Finally, dogs that were sexually intact had lower levels of force. This may be a spurious finding as it is contrary to previous research and to commonly held beliefs. There are several reasons to view this finding with skepticism. First, there were only 27 dogs that had been 'fixed', in comparison with 154 that were intact. A larger number of 'fixed' dogs would have given a better picture of this issue. Second, the difference between the two groups, although statistically significant, was relatively small. Sexually intact dogs had a reported bite ratio of 17.29, while those that were not intact reported a bite ratio of 18.34. Third, as police dogs are not routinely 'fixed', this group of 27 is an aberration in itself. These may be dogs that were considered to be 'out of control' and this option was taken in an attempt to lower levels of canine aggression.

Conclusions and Recommendations

As the data from this study were analyzed, two future research needs were identified. These areas include: replication of this study with a larger population and a more complex analysis of factors, including suspect behavior, on canine force outcomes.

Replication

The first area for future research should start with a replication of this study by adding the BRDC to the existing FDLE canine certification form. This would allow ongoing analysis of Florida bite ratios from this existing benchmark. This may also evolve into a new form of early warning system where handlers with unacceptable bite ratios are identified and corrective action taken, when necessary. Through the investigation of these high bite ratios, additional canine force correlates may be identified providing a more complex picture of this complex issue.

Second, it is recommended that there is a replication of this survey instrument with a nationwide sample.

Although these findings are certainly representative of canines and handlers in the State of Florida, it suffered from a small population size. Prior to applying this data to other state or national populations, it should be replicated on a large scale using only BRDC as a method of data collections. Additionally, several control questions regarding the length of time within an apprehension method and the amount of recurring aggression training should be captured in the survey instrument.

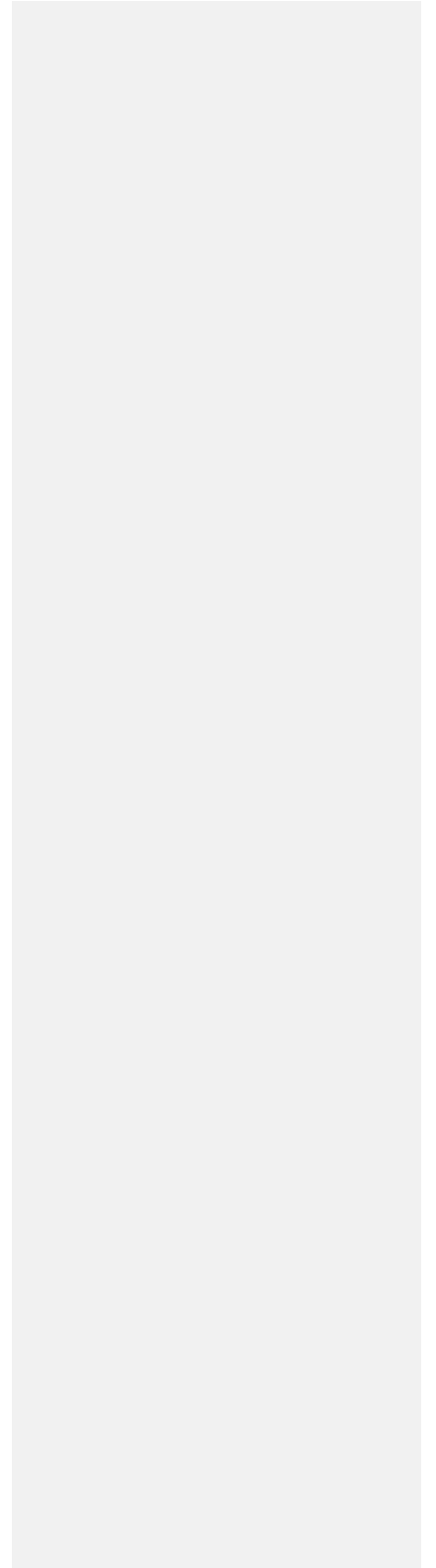
Future Research

As identified in the regression models, a number of correlates were discovered and but present new questions in canine force. As the final regression model was able to explain 44% of the variance in the bite ratios, a large portion of variance has yet to be discovered and identified. One potential answer is to combine qualitative and quantitative designs, in conjunction with secondary data to determine the degree to which the suspect perpetuates his or her own demise. This interaction has been explored in previous literature (see Campbell, Berk &

Fyfe, 1998), but only used secondary data and did not use any of the correlates identified in this study within their regression model. Consequently, by combining these approaches, a more distinct view of the interactions between suspect and canine team may develop.

APPENDIX A

DEFINITION OF TERMS



Apprehension- Suspects captured through the use of the dog (also known as "catches" or "finds")

Physical apprehension- Dog makes physical contact with the suspect (usually by biting) and holds them until the handler commands them to release

Patrol dog- Classification of police dog that has been trained to apprehend suspects

Cross training- Additional training in scent related functions (narcotics, explosives, cadaver) that a patrol dog can receive.

Bark and hold- Apprehension method where the dog is trained to first bark at the suspect and not make contact unless the suspect moves or resists (also known as find and bark; circle and bark; harass and delay, reasonable force method).

Bite and hold- Apprehension method where the dog is sent by the handler to make the apprehension (also known as find

and bite; handler-control method)

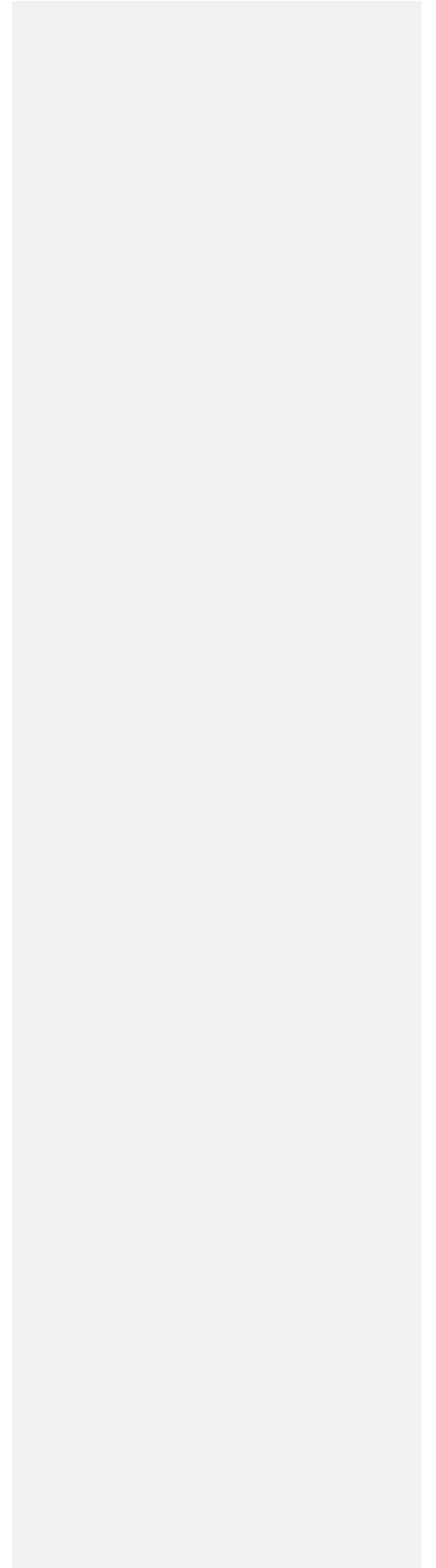
Bite ratio- a formula used as a crude measure of use of force with police dogs where the number of suspects bitten is divided by the total number of apprehensions

On lead Dog is tethered to the handler on a leash ranging from six feet to thirty feet long

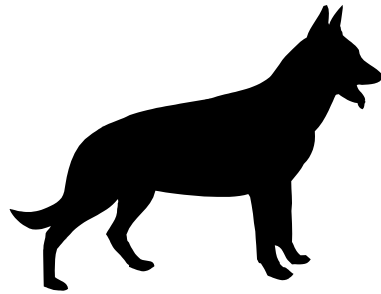
Off-lead- Dog is not tethered to the handler and is controlled by verbal commands

APPENDIX B

FLORIDA LAW ENFORCEMENT PATROL DOG SURVEY



**FLORIDA LAW ENFORCEMENT
PATROL DOG
SURVEY**



Charles Mesloh, M.P.A.
University of Central Florida Police Department

University of Central Florida

POLICE CANINE SURVEY

We are seeking your assistance to evaluate and better understand the various aspects of police workdogs and your work experiences. The information you provide will be used as part of a broader study that will help to design programs and implement positive changes. Your answers are completely confidential and will be released only as summaries so that no individual's answers can be identified. Your cooperation is appreciated.

START HERE

1. Do you think your commitment to the department has increased, decreased, or remained the same since you came to your department?

- Increased
- Decreased
- Remained the same

2. Do you feel your decision to work for this organization was a mistake on your part?

- Yes
- No

3. Does your department inspire the very best in the way of job performance?

- Yes
- No

4. Are you glad that you chose this department to work for rather than other agencies you may have considered?

- Yes
- No

5. Could you just as well be working for a different department as long as the type of work was similar?

- Yes
- No

6. During the last year, have **YOU** received more than three official complaints?

- Yes
- No

7. During the last **THREE YEARS**, have **YOU** received more than four official complaints?

- Yes
- No

8. Which apprehension method is your dog trained?

- Bark and Hold
- Bite and Hold

9. Which national canine associations are you a member of?

- United States Police Canine Association
- North American Police Work Dog Association
- National Police Canine Association
- Other: _____

10. What type of dog are you currently using?

- Malinois
- German Shepherd
- Rottweiler
- Other: _____

11. What is your gender

- Male
- Female

12. What is your race?

- White
- Black
- Hispanic
- Other

13. How much education have you completed?

- High school graduate (or G.E.D.)
- Some college
- Associate Degree
- Bachelors Degree
- Advanced Degree (Masters degree or beyond)

14. What is your age? _____

15. Are you a supervisor?

- Yes
- No

16. How many years have you been a dog handler? _____

17. How many dogs have you worked? _____

18. How many hours per month do you train with your dog? _____

19. What type of agency do you work for?

- Police department
- Sheriff's department
- State police
- Federal agency

20. How many full-time sworn officers work at your agency? _____

21. How long have you been certified with your current dog? _____

22. Has your agency ever been sued as a result of allegations against you and your dog?

- Yes
- No

23. Has your agency ever paid a settlement as a result of allegations against you and your dog?

- Yes
- No

24. Is your dog trained in narcotics detection?

- Yes
- No

25. Is your dog trained in explosives detection?

- Yes
- No

26. Is your dog trained in cadaver detection?

- Yes
- No

27. Regarding your agency's policy concerning the release of your dog, please indicate which of the following events would be considered acceptable:

- | | | |
|-------------------------------------|------------------------------|-----------------------------|
| Fleeing nonviolent traffic offender | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Fleeing nonviolent misdemeanor | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Fleeing violent misdemeanor | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Fleeing nonviolent felony offender | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Violent felony offender | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

28. Regarding the use of your dog in the last 12 months, please give the number of apprehensions and bites for the following utilizations:

- | | | |
|-----------------|-------------------|-----------|
| Tracking | _____Apprehension | _____Bite |
| Area Search | _____Apprehension | _____Bite |
| Building Search | _____Apprehension | _____Bite |
| Fleeing suspect | _____Apprehension | _____Bite |
-

29. How often would an officer in your department report another officer for sleeping on duty?

- Always
- Sometimes
- Rarely
- Never

30. How often would an officer in your department report another officer for excessive force?

- Always
- Sometimes
- Rarely
- Never

31. How often would an officer in your department report another officer for not accurately documenting an incident?

- Always
- Sometimes
- Rarely
- Never

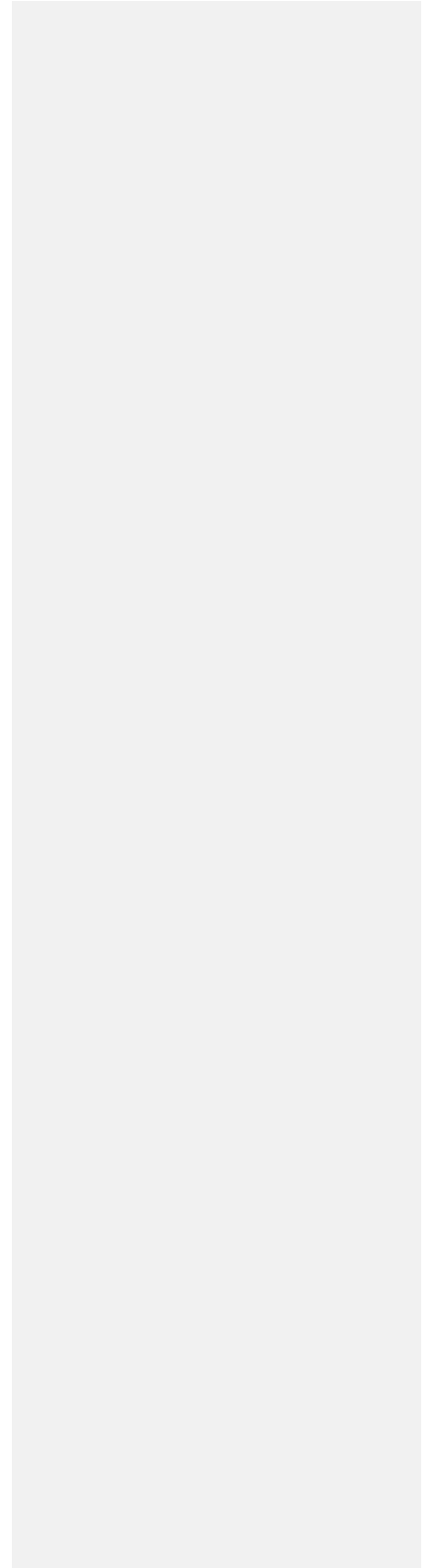
32. How often would an officer in your department report another officer for drinking before duty?

- Always
- Sometimes
- Rarely
- Never

33. Have you answered all of these questions as honestly as possible?

- Yes
- No

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE. IF YOU HAVE ADDITIONAL COMMENTS ABOUT THIS SURVEY OR THIS RESEARCH STUDY, PLEASE CONTACT THE PRINCIPLE RESEARCHER LISTED ON THE BACK COVER.





University of Central Florida

**DEPARTMENT OF CRIMINAL JUSTICE &
LEGAL STUDIES
P.O. BOX 161600
ORLANDO, FL 32816-1600
407 823 2603**

**IF THERE ARE ANY QUESTIONS PLEASE
ADDRESS THEM TO THE RESEARCHER:**

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APPENDIX C

META ANALYSIS OF CANINE RESEARCH

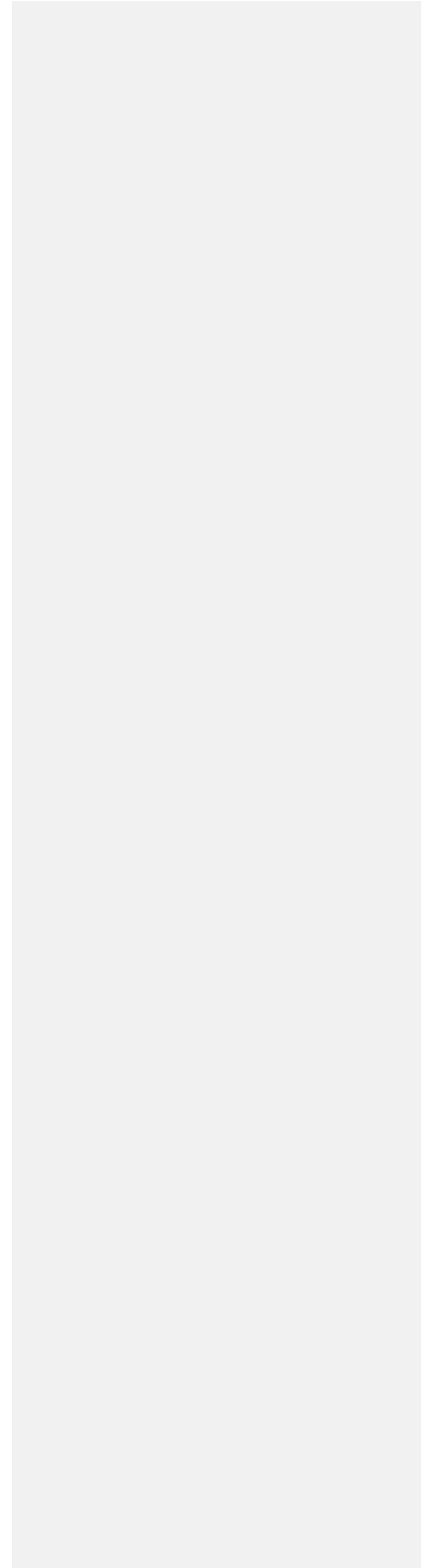


Table 19: Meta-Analysis of Specific Canine Research Areas

Building Search	Narcotics
USAF, 1973	Romba, 1971
Remsberg, 1986	Dean, 1972
Ellis & Kirchner, 1990	Burke, 1973
Wolfe, 1991	Moody & Mosier, 1989
Eden, 1993	Bensen, 1991
Mesloh, Wolf, & Holmes, 2002	Waggoner et al, 1997
	Williams, et al., 1997
	Bryson, 2000
	Bulzomi, 2000
	Mesloh, Henych, & Wolf, 2002
Explosives	Tracking
Carr, Harris, & Thai, 1970	Pearsol & Leedham, 1958
Phillips, 1971	Rapp, 1973
O'Neil, 1972	Kristofek, 1991
Knauf, et al., 1973	Clede, 1998
Nolan & Gravitte, 1977	Hunt, 1999
Kristofek, 1991	Bryson, 2000
Williams, et al., 1998	
Mistafa, 1998	
Evidence Search	Area Search
Kristofek, 1991	USAF, 1973
Bryson, 2000	Rapp, 1979
Mesloh, 2002	Tindall & Lothridge, 1995
	Kurtz & Midkiff, 1998
Scent	Cadaver
Syrotuck, 1974	Quinn & Montanarelli, 1973
O'block, Doeren & True, 1979	Komar, 1999
Settle et al, 1994	Smiley, 2000
Moulton, 1975	Lowry & McAlhany, 2001
Schoon, 1998	
Mesloh, 2002	

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