
# Less Lethal Weapon Effectiveness, Use of Force, and Suspect & Officer Injuries: A Five-Year Analysis

**A report to the National Institute of Justice**

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## Introduction

Law enforcement officers are legally justified to utilize force in many situations to bring suspects to justice, protect others, and for personal defense. However, police training on the use of force has no single consistent method in the United States to demonstrate the best response to subject resistance levels, even though many states and individual agencies have adopted very creative use-of-force matrices and continuums. For researchers, additional problems abound in the compilation and interpretation of the data available on police use of force.

Criminal justice research has persistently demonstrated that a small percentage of police encounters with the public involve use of force. While extreme uses of force often garners media attention, lesser levels of force are used regularly by police without public notice. Research in the areas of use of force, and subsequent suspect injuries, has focused on the level of force used by the police officer and the suspect, excessive force, and officer misconduct. The literature on suspect injuries, police officer injuries, and the environmental and situational factors leading to police uses of force, is limited.

This study examines use of force levels by the police and subject resistance levels in two agencies in Central Florida; the Orange County Sheriff's Office (OCSO), and the Orlando Police Department (OPD). Both agencies provided copies of force documentation pursuant to public records requests as stipulated in Florida law. While previous research on police force has focused on the rate of police force, this study examined situations that required force and the actions taken by the police and citizens during the encounter.

## Literature Review

Bittner (1970), and others (Garner, Maxwell, & Heraux, 2002; Reiss 1971; Scharf & Binder, 1983; Sherman 1980) claim that the capacity to use non-negotiable coercive force is at the core of the police role in society. So basic is the element of force to the police, that some researchers claim that the reason citizens call the police is based on the belief that force may be necessary (Langworthy & Travis, 1999).

Force can be defined as the "exertion of power to compel or restrain the behavior of others" (Kania and Mackey, 1977, p. 29) or when used in the context of policing, "acts that threaten or inflict physical harm on suspects" (Terrill, 2003, p. 56). Generally, police force can be classified

into several modal categories including: 1) deadly vs. non-deadly; 2) physical vs. non-physical; and 3) reasonable vs. excessive (Garner, Schade, Hepburn, & Buchanan, 1995).

"Deadly force" is used to define force that is likely to cause death or some serious bodily injury (Fyfe, 1988; Stock, Borum, & Baltzley, 1998); conversely, "non-deadly force" is the application of force that is not likely to result in death or serious bodily injury (Klinger, 1995; Pate, Fridell, & Hamilton, 1993). "Physical force" implies the touching, prodding, redirection, or physical manipulation of a subject to comply with demands (Garner, Buchanan, Schade, & Hepburn, 1996), whereas "non-physical force" implies the use of threats or other verbalization techniques to gain compliance (Clede, 1987; Terrill, 2003). "Reasonable force" is applied force which is necessary to achieve a legal goal, while "excessive force" is applied force which is disproportionate to what is necessary to achieve a legal goal (Petrowski, 2005).

The decision of police officers to intervene, or apply force, in a given incident is a subset of discretionary choices facing them everyday. As noted by Davis "a police officer may be said to exercise discretion whenever effective limits of his or her power leave the officer free to make choices among possible choices of action or inaction" (1969, p. 4).

Conclusions to use force, and decisions concerning the extent of force to be used, are within the discretion of police officers. Thus, an individual officer must decide in each situation whether to ignore, or confront and coerce a citizen to follow his direction. Through observational studies of police work, studies that have examined police use-of-force reports, citizen complaint reports, and from police/citizen surveys, it has become clear that police officers today rarely apply physical force (Bureau of Justice Statistics, 1998; Klinger, 1995; National Institute of Justice, 1999). Discretionary decisions regarding when, where, and how much force to use is a cumulative process (Goldstein, 1977); once a course of action is decided upon, additional discretionary choices follow that may lead an officer to either increase or decrease the level of force used. This was reiterated by Klinger (1995) who discussed that many different types of forceful police actions can occur in a single police-citizen encounter, and this force may vary in severity.

Terrill (2003) examined the complexity of police-citizen encounters involving force. He reported that when verbal commands are considered as a use of force, force occurs in more than half of all encounters. He also reported that the inclusion of suspect resistance into police force studies offers a "more complete picture within the context of how officers apply varying forms of force" (p. 54). Terrill based his study on previous observational and data collection studies of Klinger (1995)

and Garner, Schade, Hepburn, and Buchanan (1995). Both of these studies underscored the importance of understanding force in varying degrees and levels, from verbal commands to the use of deadly force. Additionally, these studies included suspect resistance levels as a measure to understand the police use of force.

***Use of Force Continuum***

To appreciate the complexity of situations where the police utilize force, one must conceptualize force not as a static concept but rather as a continuum of responses, ranging from verbal commands, as a minor exertion of force; to deadly force, the maximum amount of force possible to apply (Garner, Buchanan, Schade, & Hepburn, 1996; Garner, Schade, Hepburn, & Buchanan 1995; Klinger, 1995; Terrill, 2005).

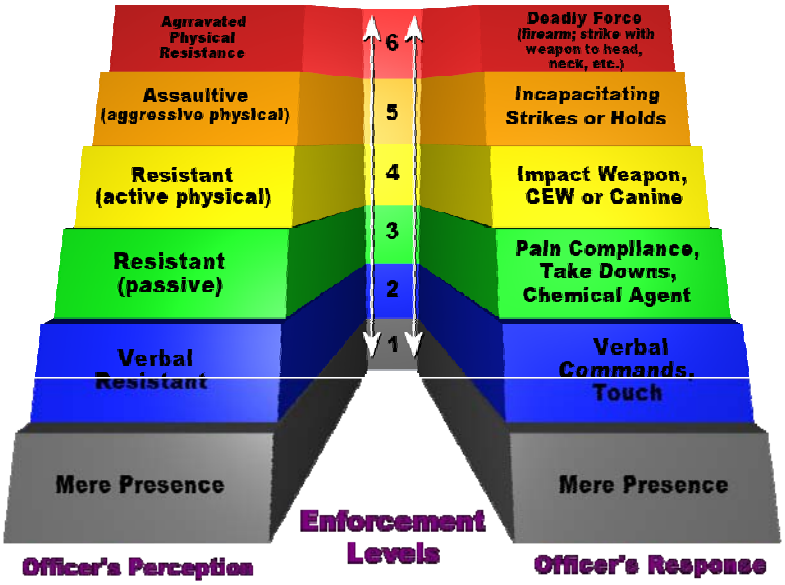
A use-of-force continuum relies on the concept of multiple categories of increasing officer perceptions of suspect resistance linked to similar groupings of the officer's response to those perceptions. As law enforcement officers are expected to make split second decisions based on rapidly evolving situations, the incorporation of a use of force continuum into departmental policy provides guidance to officers in making force decisions. Figure 1 shows a generic use-of-force matrix which incorporates Florida law and Federal Case Law as acceptable officer responses to perceptions of use of force by subjects encountered (Wolf, 2006).

Law enforcement officers incorporate these force continuums into pre-service and on-the-job training programs in order to be able to identify varying levels of severity of resistance (Terrill, 2005). While use-of-force continuums within the policies of different law enforcement agencies are not universal, they all rely on legally and publicly acceptable responses by the police (Garner, Schade, Hepburn, & Buchanan, 1995). These continuums propose that officers should progressively examine and react to each situation, de-escalating once resistance has declined or stopped (Williams, 2002), and attempt to clarify what may be considered "objectively reasonable" force (Terrill & Paoline, 2007).

Although these continuums are useful for training and policy setting, they provide very little information for academics delving into the subject quite simply because there is very little information on the actual levels of non-criminal resistance that police officers encounter. Conner (1991) found that 95 to 97 percent of all police-citizen contacts involve cooperative subjects, and Alpert and Dunham (1999) reported that 61 percent of the suspects who were being placed under

arrest did not resist the officer at all, and 18 percent offered only slight resistance. Even though the vast majority of citizens that police interact with on a daily basis can be classified as cooperative, many observational studies have found "disrespectful" or "uncooperative" citizens to be arrested more often (Sherman, 1980; Petersen, 1972; Friedrich, 1977; Reisig, McCluskey, Mastrofski, & Terrill, 2004; Worden, Shepard, & Mastrofski, 1996).

**Figure 1. Force Continuum**




Notes: reprinted with permission Ross Wolf, 2006
"CEW" listed in Level 4 Officer's Response is abbreviation for Conducted Energy Weapon, a category of weapons that includes electronic control devices or electro-muscular devices such as the TASER and Stinger.

In Toch's (1969) early study, it was realized that most police-citizen conflicts were a manifestation of a citizen's disrespect for officers' authority, and Chevigny (1969) found that of the authenticated use of force complaints, 71 percent arose out of citizen defiance of police authority. From both a legal and policy perspective, perceived suspect resistance is a decisive factor in police use of force (Terrill, 2003). Thus, citizen demeanor, according to the extant literature, is a crucial element in the officer's decision concerning the use of force.

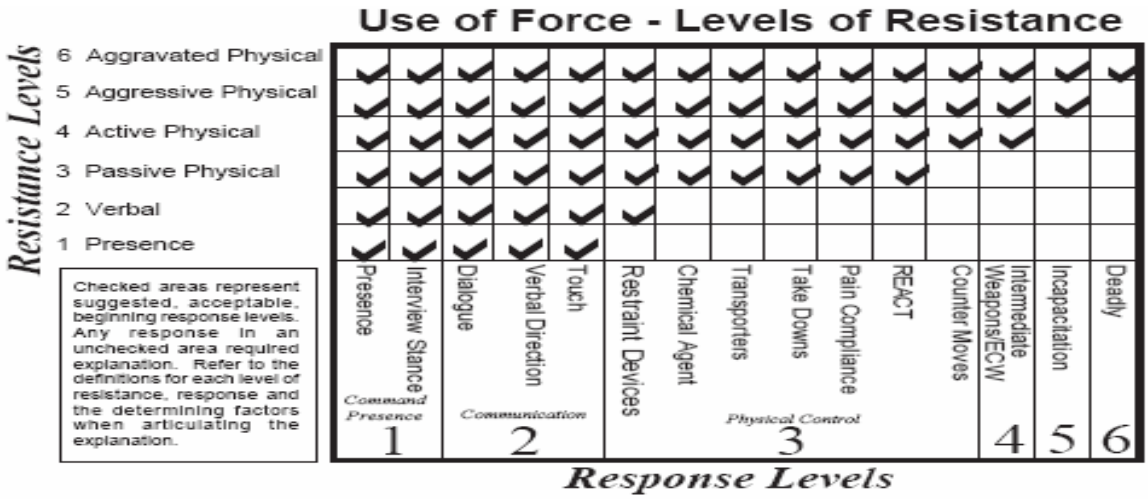
Worden, Shepard, and Mastrofski (1996), however, suggested that most qualitative research has dismissed the demeanor of the subject in a police-citizen encounter. Thus, it is not hard to see why there is virtually no information on how and under what circumstances force is used, given the limited amount of data that we have detailing police-citizen encounters, coupled with the rarity of

the actual utilization of police force (Croft, 1985; Pate, Fridell, & Hamilton, 1993; Skolnick and Fyfe, 1993; Reiss, 1971; Worden, Shepard, & Mastrofski, 1996).

**Orange County and Orlando Use of Force Continuums**

Both the Orlando Police Department and the Orange County Sheriff's Office utilize a use-of-force continuum within their agency policies. These continuums are designed to provide an officer with an acceptable range of responses based on the officer's perception of the subject's resistance during an encounter. Both agencies had established protocols, training, and safety procedures to ensure the proper use of TASERs and other weapons and tactics. A use-of-force continuum can also be called a use-of-force matrix, and is a visual representation of acceptable levels of force response by officers in reaction to resistance levels by subjects.

**Figure 2. Orange County Sheriffs Office Use of Force Matrix**




From "Orange County Sheriff's Office Use of Force" General Order 470

Officers who are issued TASERs are required to participate in training specific to the device, including how to inspect and test the weapon, probe target areas, safety precautions, and how to remove barbs. These issues are also covered in policy for both agencies, providing officers with guidance when encountering a subject, based on the subject's actions and the officer's perception of the situation. Figures 2 and 3 reflect the use-of-force matrices which the Orange County Sheriff's Office and the Orlando Police Department employ.

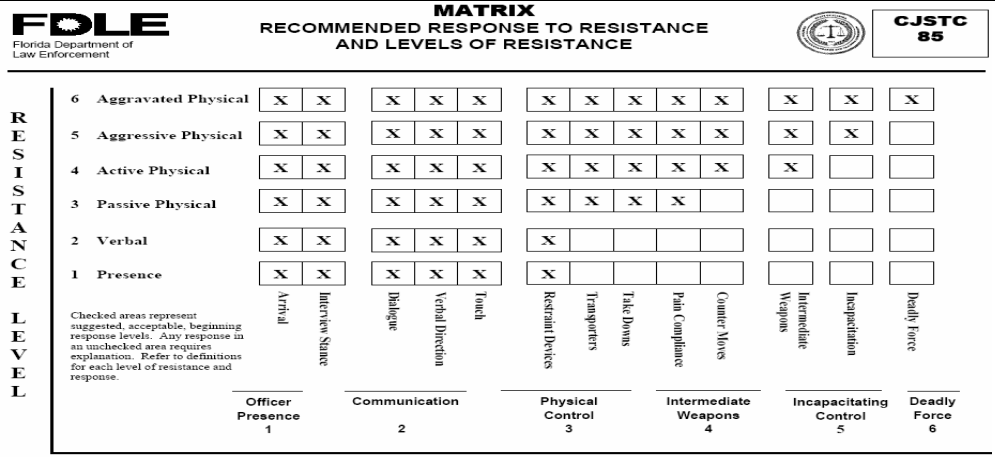
**Figure 3. Orlando Police Department Use of Force Matrix**

| SUSPECT'S RESISTANCE | EMPLOYEE'S RESPONSE |
|---|---|
| **LEVEL I – INDICATORS OF RESISTANCE**<br>Non-verbal cues indicating subject's demeanor and attitude coupled with an apparent readiness to resist. | **EMPLOYEE'S PRESENCE**<br>The employee's attitude and demeanor and their lawful right to be where they are. |
| **LEVEL II – VERBAL RESISTANCE**<br>The subject's verbal responses indicating non-compliance and unwillingness to cooperate | **VERBAL DIRECTIONS**<br>The employee's verbal communications that specifically direct the actions of the subject and offer the opportunity for compliance. |
| **LEVEL III – PASSIVE RESISTANCE**<br>The subject fails to obey verbal direction preventing the member from taking lawful action. | **SOFT CONTROL**<br>The employee applies techniques that have a minimal potential for injury to the subject, if the subject resists the technique. |
| **LEVEL IV – ACTIVE RESISTANCE**<br>The subject's actions are intended to facilitate an escape or prevent an arrest. The action is not likely to cause injury. | **HARD CONTROL**<br>The member applies techniques that could result in greater injury to the subject, if the subject resists their application by the member. |
| **LEVEL V – AGGRESSIVE RESISTANCE**<br>The subject has battered, or is about to batter a person/member and the subject's action is likely to cause injury. | **INTENSIFIED TECHNIQUES**<br>Those techniques necessary to overcome the actions of the subject, short of deadly force. If the subject resists or continues to resist these techniques there is a strong probability of injury being incurred by the subject. |
| **LEVEL VI – DEADLY FORCE RESISTANCE**<br>The subject's actions are likely to cause death or great bodily harm to the member or another person | **DEADLY FORCE**<br>Member's actions may result in death or great bodily harm to the subject. |

From "Orlando Police Department Policy and Procedure" 1128.7, Use of Force

While these continuums show the highest level of appropriate force based on the officer's assessment, officers are also allowed to use lower level force as response. These matrices may be similar in content, but they contain different ways of depicting appropriate levels of force acceptable by the agency. Not only is the nomenclature different (i.e., OCSO calls actions by a subject that are likely to cause death or great bodily harm "Aggravated Physical Resistance," OPD calls it "Deadly Force Resistance"), the visual representation of acceptable standards is also different. The Florida Department of Law Enforcement's (FDLE's) Resistance Response Matrix is a very similar visual representation when compared to the OCSO Use of Force Matrix (see Figure 5).

**Figure 4. Florida Department of Law Enforcement Resistance Response Matrix**




From the "Florida Department of Law Enforcement" as incorporated by reference in Rule 11B-27.0011(4)(c)1., Florida Administrative Code

Table 1 shows the various types of less lethal munitions and chemical agents deployed in Orange County and the City of Orlando, and to which units they are assigned. Officers are trained, certified and issued the following equipment, however they are not necessarily trained and equipped in all of the following and as such can only use or deploy what they carry or to which they have access.

**Table 1. Less Lethal Weapons Availability and Type**

| Type | Orange County Sheriff's Office | Orlando Police Department |
|---|---|---|
| Chemical Agent | 5% OC | 5% OC |
| Electronic Control Device | TASER models M26 and X26 | TASER model M26 |
| Impact Weapons | ASP model F21 (21") | ASP model F26 (26") |
| Compressed Air Weapons | ERT/SWAT (PepperBall) | ERT (PepperBall) |
| 12-gauge Beanbag | ERT/Patrol/SWAT | no |
| Less-Than-Lethal Munitions | ERT/SID/SWAT (40mm) | SWAT/Patrol (Sage 37mm); ERT/SWAT (40mm) |
| Police canine for apprehensions | Felony only | Felony only |

Note: from information obtained from Orange County Sheriff's Office (OCSO) and the Orlando Police Department (OPD). Abbreviations used in this table include Oleoresin Capsicum (OC), Special Weapons And Tactics (SWAT), Emergency Response Team (ERT), Special Investigations Division (SID). ASP is the manufacturer of expandable batons used by both agencies. Sage Control Ordinance, Inc. manufactures the Sage munitions 37mm and 40mm launcher.

While it would certainly be an aspiration of police agencies to be able to capture and arrest suspected criminals with the least possible amount of injuries, doing so is not always possible. Officers must rely on Federal case law and available weapons and tactics in order to successfully take into custody suspected criminals.

### *Citizen Oversight*

The environment of policing may tend to create ethical pitfalls and accountability problems. While the police have incredible responsibility to protect the public and impose the sanctions of our criminal court system, the police also have a unique and awesome authority. Police officers may use physical force, legally, to protect themselves or to overcome resistance against arrest.

"Policing is a human service activity requiring great discretion on the part of the police officer" (Walker, 2001, p. 8). One flourishing method of controlling the police use of improper force is the Citizen Review Board (CRB) or Citizen Oversight Committee. Citizen review committees consist of citizens who have been appointed to serve and review allegations of police

misconduct, misuse of force, or other police abuses (Alpert & Dunham, 2004). These committees can supplement traditional oversight models to achieve police accountability. While citizen oversight has potential pitfalls, the advocates feel that the method provides a more thorough and fair investigation than could be provided by the police themselves, professionalizing the police department and providing a needed perception of independence to the community (Walker, 2001).

The CRB movement has thrived and grown in both the number of police departments that have implemented them, but also in the amount of power that has been given to them, including the power to subpoena police officers and conduct their own investigations. Many boards have also gotten away from merely finding whether an officer was responsible for the alleged act, but for the recommended discipline. This has and may continue to cause harsh conflict between the police and their CRBs (Alpert & Dunham, 2004). For the purposes of this study, it is important to note that both the City of Orlando and the Orange County Sheriff's Office have developed Citizen Review Boards with review authority of professional standards investigations. Both agencies have taken this step to promote police professionalism and less likelihood of force abuse.

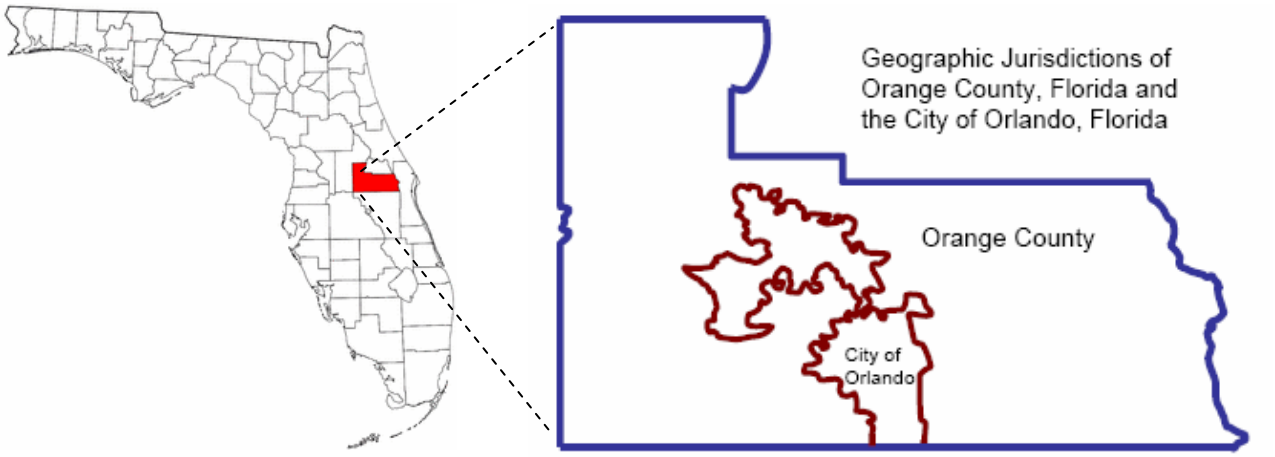
***Orange County and Orlando Jurisdictions***

Figure 2 represents the geographical borders of Orange County Government (and therefore the Orange County Sheriff's Office) and the City of Orlando (and the Orlando Police Department) within central Florida. Orlando is America's 27th largest metropolitan area; however the jurisdictional limits of the city of Orlando "proper" have a population of 217,327. The City of Orlando is the largest municipality within the jurisdictional limits of Orange County, which has a total population of over 1.04 million. In addition to the resident population, the Orlando Metropolitan Statistical Area acts as host to over 47 million tourists a year, creating a need for additional government resources, which include policing resources.

The Orlando Police Department has a mayoral appointed Chief of Police and serves a jurisdiction of approximately 94 square miles. The population living in the city of Orlando is 61% white, 27% African-American, 17.5% Hispanic, 2.7% Asian, and .4% other. The median age of the population is 32.9 years, and 40.8% of the population owns their own home. Eighty-two percent of the 25 year-or-older population within the city limits of Orlando has a high school (or equivalent) education or higher, 19.9% have a bachelor's degree, 8.3% have a graduate or professional degree, and the median household income in Orlando is $35,732. The percentage of people living under

poverty in the city limits is 19.9% (Goltz, 2006). The Orlando Police Department has a nine-member Citizen's Review Board, which has an advisory role with the Police Chief with regard to citizen complaints.

**Figure 5. Jurisdictional Boundaries of Orange County and the City of Orlando**




Note: From information available on urban service area boundaries and municipal jurisdictions as reported by Orange County Government. All borders are approximate. OCSO is abbreviation of the Orange County Sheriff's Office and OPD is the abbreviation of the Orlando Police Department.

The Orange County Sheriff's Office has an elected Sheriff, and serves a total jurisdiction of approximately 907 square miles. Within this jurisdiction, however, there are 13 separate municipalities, each run by their own governments and most with their own police agencies. Home to Disney World, the population served by the Orange County Sheriff's Office (those residents that are not in the city limits of a municipality) is 680,687.

Those living in unincorporated Orange County are 68.6% white, 18.2% African-American, 18.8% Hispanic, 3.4% Asian, and .4% other. The median age of the population is 33.3 years, and 60.7% of the population owns their own home. 81.8% of the 25 year-or-older population within the city limits of Orlando has a high school (or equivalent) education or higher, 18.3% have a bachelor's degree, 7.9% have a graduate or professional degree, and the median household income is $41,311. The percentage of people living under poverty in the city limits is 12.1% (Goltz, 2006).

Orange County has a nine-member Citizen Review Board; one member appointed by the County Mayor, six members appointed by district County Commissioners confirmed by a vote of the Board of County Commissioners, and two members appointed by the Orange County Sheriff. This board has been under recent scrutiny, and has created a rift between the County Sheriff and the

County Commission; some feel that the board has been "publicity seeking," while advocates of the board say that it has finally gotten away from being a rubber stamp for the Sheriff's Office Professional Standards Division.

**Table 2. Jurisdictional Demographics**

| | Orange County, Florida | City of Orlando, Florida |
|---|---|---|
| **Population** | 1,043,437 | 217,327 |
| **Population served by police agency** | 680,687 | 217,327 |
| **Jurisdiction size** | 907 $mi^2$ | 94 $mi^2$ |
| **Demographics** | | |
| White | 68.6% | 61.1% |
| African-American | 18.2% | 26.9% |
| Hispanic | 18.8% | 17.5% |
| Asian | 3.4% | 2.7% |
| Other | 0.4% | 0.4% |
| **Median age of population** | 33.3 yrs. | 32.9 yrs. |
| **Percent of population age 15-24** | 15% | 13.9% |
| **Home ownership rate** | 60.7% | 40.8% |
| **Education (2000 data)** | | |
| HS diploma or higher | 81.8% | 82.2% |
| Bachelor's degree | 18.3% | 19.9% |
| Graduate/professional | 7.9% | 8.3% |
| **Median household income** | $41,311 | $35,732 |
| **Population under poverty** | 12.1% | 19.9% |
| **Large entertainment facilities** | 1 | 4 |
| **Airports** | 0 | 2 |
| **Airport travelers (annual)** | 0 | 34.1 million |
| **UCR Crime Data (2005)** | | |
| Murder | 49 | 22 |
| Rape | 283 | 165 |
| Robbery | 1,790 | 1,204 |
| Aggravated Assaults | 4,229 | 2,410 |
| Burglary | 7,337 | 3,882 |
| Larceny | 17,366 | 12,175 |
| Auto Theft | 4,046 | 2,169 |
| **Police Agency (2005)** | | |
| Actual # of sworn officers | 1,284 | 675 |
| Actual # of civilian employees | 633 | 267 |
| Full-time sworn ratio per 1,000 population | 1.88 | 3.2 |
| Calls received | 1,221,675 | 977,474 |
| Calls requiring police | 301,548 | 181,229 |
| Self-initiated activities | 415,584 | 177,066 |
| Total number of arrests | 24,075 | 18,785 |
| Traffic citations issued | 82,000 | 66,332 |

Notes: Table derived from Goltz, 2006 with data obtained from the Florida Benchmarking Consortium (FBC), Data Reported by Police Agencies, 2005 Total Index Crime for Florida by Jurisdiction from FDLE Web Site, 2005 Criminal Justice Agency Profile from FDLE Web Site, 2000 U.S. Census Data, the Bureau of Economic and Business Research (BEBR), and the University of Florida Local Government Population Statistics (2005).

### *How the Courts have Framed Police Use-of-Force*

The Supreme Court interpreted excessive force with the decision of *Graham v. Connor (1986)*. In this case, the Court established the "objective reasonableness standard," mandating that

actions of officers involving questions of use of excessive force be "judged from the perspective of a reasonable officer coping with a tense, fast-evolving situation." The Court also addressed the use of deadly force in the case of *Tennessee v. Garner (1985).* The Court ruled in this case that the state can legally "seize the life of an individual" only when an officer believes that a suspect's actions place either the life of the officer or the lives of other citizens nearby in jeopardy. These U.S. Supreme Court decisions, while providing a general standard for the efficacy of police behavior, fail to provide specific criteria that officers may use when deciding whether and how much force should be applied. Even in more recent case law, such as *Brosseau v. Haugen (2004)*, the Court remained ambiguous, allowing that even unwise use of force may be legal, and there is a "sometimes hazy border between excessive and acceptable force" (Petrowski, 2005).

***Contemporary Literature***

Studies that examine police force do not "always specify clearly how force was defined or measured, and the definitions and measures of force tended to be unique to each study" (Garner, Maxwell, & Heraux, 2002, p. 712). Additionally, research on the police use of force has focused on several theoretical perspectives: situational, organizational, psychological, or neighborhood characteristics. However, none of these theoretical perspectives has appeared in all studies, and are often not even measured or reported (Garner, Maxwell, & Heraux, 2002).

Garner, Maxwell, & Heraux, (2002) explain that police use of force research, while expansive, has varying approaches that are each fraught with "limited strengths and substantial weaknesses" (p. 707). A review of the literature reveals that there are numerous accepted ways to gather information about police use of force. These include examinations of agency policy (Adang & Mensink, 2004; U.S. Government Accountability Office [USGAO], 2005), observational accounts of police force incidents (Klinger, 1995; Terrill, 2003; Terrill, 2005; Weidner & Terrill, 2005), analysis of official police records and use-of-force reports (Morabito & Doerner, 1997; Ross, 1999), citizen complaints about the use of force (Hickman, 2006; McClusky & Terrill, 2005), and surveys of police officers or arrested persons (Garner, Buchanan, Schade, & Hepburn, 1996; Garner & Maxwell, 1999). Regardless of the research strategy employed, one constant finding is that police force utilization is uncommon and its improper use is exceedingly rare (Garner, Buchanan, Schade, & Hepburn, 1996; Garner, Schade, Hepburn, & Buchanan, 1995; Klinger, 1995; National Institute of Justice, 1999; Reiss, 1971; Worden, Shepard, & Mastrofski, 1996).

While each type of data collection has strengths and weaknesses, the review of police records may have certain advantages over other categories. Garner, Maxwell, and Heraux (2002) explain that this type of review provides more organized data on more use of force incidents than actual interpretations of police work through observations. Additionally, review of police report data provides a wider view of police behavior over the studied jurisdictions than can normally be captured through observational accounts. A major weakness, however, of police report review in the context of police force is that these reports suffer from bias provided by the officers who wrote the reports. Garner, Maxwell, and Heraux (2002) remark that this approach may be most suitable for inter-jurisdictional comparisons rather than intra-jurisdictional comparisons.

Scholarly efforts have been able to determine that police force, and its intensity, is commonly affected by the context in which the police and citizens meet (Garner, Maxwell, and Heraux, 2002; Reisig, McCluskey, Mastrofski, Terrill, 2004; Weidner, 2005). Thus, to better understand officer definitions of appropriate police force, it is necessary to explore the impact of theoretically relevant individual, situational, and community factors (Friedrich, 1980; Sherman, 1980).

Situational factors may also affect an officer's decision to use force, factors such as the time of day, the community characteristics in which the encounter takes place, the seriousness of the offense and actions taken by others at the scene may also contribute to the officer using more or less force (Manzoni & Eisner, 2006). The literature seems to point to situational correlates as the most important indicators of how disputes or police-citizen encounters are resolved (Croft, 1985; Friedrich, 1977; Sherman, 1980;). These correlates include mobilization type, type of incident or call, time of day, number of officers present, location type, suspect's demeanor, indications of substance abuse by the suspect, and level of suspect resistance.

Reiss (1971) found that if an officer proactively initiates an encounter citizens are more likely to be treated without antagonism than if they respond to a call for service (see also Konstantin, 1984). The time of a police-citizen encounter may also be important when evaluating how the police interact with citizens. For instance, Croft (1985) and Lundstrom and Mullan (1987) found that forcible incidents occur throughout the day, but increase in frequency around mid afternoon and peak from 10:00 p.m. through 5:00 a.m. Since the majority of calls for police service occur between the late evening and early morning hours, it may be that officers simply do not believe that they have enough time to deal individually with each potential suspect to bring about a peaceful non-forceful

resolution. Therefore, officers may be inclined to use their authority more often to conserve their time for other calls.

The physical setting or social setting of a use of force incident is also an important element in the consideration of how police behave and interact with citizens. Perhaps one of the most fundamental distinctions lies in the difference between public/private or police/citizen controlled places. One common suggestion in the literature is the notion that police-encounters that occur in private places or in places the police control are more volatile than those that occur in public places (Friedrich, 1977; Worden, Shepard, & Mastrofski, 1996).

Early literature suggested that a lone officer responding to a situation may be more cautious and less authoritarian than if other officers are present (Banton, 1964; Wilson, 1963;). Others have found that a lone officer at a scene makes it more likely that he/she will rely on the formal law by making arrests and filing reports (Boydstun, Sherry, & Moelter, 1977; Friedrich, 1977). While these studies tell us little about the determination of force, they do indicate that in situations where officers have no peer support, they may be less willing to engage in high-risk behavior than when they have backup.

Previous research has also focused on race, social class, age, physical characteristics, gender, mental condition, and demeanor of the citizen and the officer as potential predictors of the ways in which force is used (Garner, Buchanan, Schade, & Hepburn, 1996; Parker, MacDonald, Jennings, & Alpert, 2005; Terrill, 2005). Research has also investigated the factors that may influence an officer's perceptions and attitudes (Balch, 1972; Sklansky, 2006). Early works by Croft (1985) and Friedrich (1980) reveal that both the most and least experienced officers were less likely to patrol and arrest aggressively.

Generally, the literature has shown that better educated officers have fewer civilian complaints of brutality filed against them, and is posited that higher educated officers will likely evaluate the need for forceful resolutions of disputes more carefully (Lersch & Kunsman, 2001; Roberg & Bonn, 2004). Although previous studies generally have failed to find a relationship between the physical attributes of an officer and their propensity to use force, many police trainers claim these are some of the most important factors affecting an officer's decision to impose physical coercion (Faulkner, 1991; Hoobler & McQueeney, 1973; Swanson & Hale, 1975; White and Bloch, 1975).

***Theoretical Foundation***

Greenleaf and Lanza-Kuduce (1995, see also Lanza-Kaduce, & Greenleaf 1994) and Weidner and Terrill (2005) examined police use of force in the context of Austin Turk's (1969) theory of norm resistance, assuming an underlying conflict between authority figures and their subjects. Turk posits that overt conflict is most likely to occur between two parties when both act in accordance with the behavior that reflects their personal values. In contrast, conflict is least likely where neither party is steadfast in their ways. Between these extremes are conditions where one party is willing to "bend," and the other is not. Turk conjectured that conflict is more likely when the authority [police] are unyielding, rather than when subjects [citizens] are (Weidner & Terrill, 2005), as authorities are less likely to tolerate differences from the norm (Lanza-Kaduce, & Greenleaf 1994).

According to Turk, there are additional factors that can increase the probability for conflict. Turk speculated that conflict was more likely if a subject had group support for his negative behavior, and if the subject was sophisticated, or knowledgeable in the behaviors of the authority group [the police] (Lanza-Kaduce, & Greenleaf 1994; Weidner & Terrill, 2005). Lanza-Kaduce and Greenleaf conjectured that conflict would be more likely where a police officer witnessed a criminal act, or where an officer initiated the encounter instead of responding to a dispatched call. Additionally, they theorized that there would be less likelihood of conflict when cultural patterns of deference were followed, i.e. the authority fit a cultural norm for having influence (deference to older persons, persons of higher economic class). In their conclusion, Lanza-Kaduce and Greenleaf advise agencies against curbing officer discretion, as this could result in more norm resistance from citizens and increase the danger of conflict.

Weidner and Terrill (2005) had two hypotheses regarding Turk's norm theory that were supported by their data: 1) that conflict is more likely to occur in situations where there is greater social support for the citizen; 2) conflict would be less likely in situations where officers and subjects are more "sophisticated," or where both the police and the citizen are knowledgeable about the other's strengths and weaknesses of their position. They reported that the combination of an officer's prior knowledge, proactive encounters, and the presence and behavior of bystanders all had an impact on norm resistance, or conflict. Through this potential for conflict, researchers examine the discretion of police officers, including how and when to use force, options of force including less-than-lethal weapon options, and perceptions of resistance.

***Less-than-Lethal Weapon Options***

The terms "less lethal" and "non-lethal" are frequently and inappropriately used interchangeably. Almost anything can become lethal if used improperly or if circumstances are extremely unlucky; this category of weaponry only decreases the odds of deadly injury. The court in *Graham v Conner (1986)* addresses the use of less lethal force in the "objective reasonableness standard," where questions regarding excessive use of force are to be judged from the perspective of a reasonable officer coping with a tense, fast evolving situation. This revised standard alleviates some of the Monday morning quarterbacking that would otherwise result, and respects that officers possess sound judgment skills.

The public, raised on science fiction like Star Trek, expects phaser-like weapons that can incapacitate without causing permanent harm or death (Heal, 1999). This phenomena has created what Surette (1998) has termed a weapons cult within the entertainment media, "with weapons made increasingly more technical and sophisticated but less realistic" (p. 43). In displays of deadly force, evil criminals miss or inflict minor wounds while heroes are incredibly accurate and kill painlessly and from great distances (Surrete, 1998).

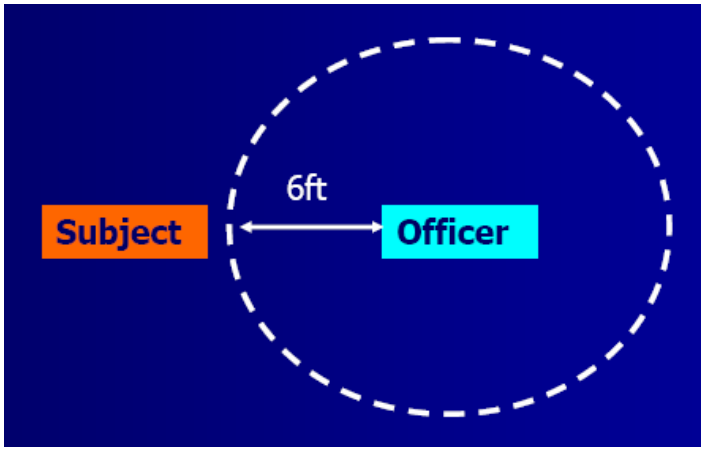
Less lethal weapons in the entertainment arena can be viewed through a similar lens. The recipient is usually rendered unconscious from a single application and recovers almost immediately. This creates a massive discrepancy between reality and the portrayal of less lethal weapons in popular media. In reality, they are as their name reflects; less than lethal. While they have the potential to cause death or serious injury, these weapons are considerably less harmful than the projectiles fired from firearms.

At the core of this study is the premise that law enforcement uses the right tool for the right job. That is, in any given scenario an officer is conditioned to react appropriately and to use the tools and techniques acquired during training. Clearly the most socially desirable outcome of these conflicts between law enforcement and the public is one in which the disturbance is quelled and no one is injured.

Not only must officers act appropriately, but they must also act quickly. The reaction time of an officer can become a critical, life saving factor, in fast evolving use of force confrontations. This reaction time has been examined in the literature and several studies tend to focus on the concept of "Reactionary Gap". This gap refers to the amount of time and frequently distance that an officer needs have to react to a suspects advances. In practice, an officer is trained to control distance in

relation to subjects, and therefore create the ability to react to the subject's actions so as to allow enough time to deploy a less lethal weapon, defensive tactic, or in some cases a deadly force reaction.

**Figure 6. Police Officer Reactionary Gap**




Note: While officers are trained varying reactionary distances, most police training emphasizes that the greater the distance, the better reaction an officer can have to subject actions. The distance depicted above, 6 feet, is a minimum representation of the reactionary gap to a subject who is considered unarmed and potentially little threat.

Current case law and extant literature suggest that officers who confront an armed suspect within 32 feet of themselves may have less than two seconds to react; two seconds is the approximate time in which a motivated suspect can cross 32 feet (Borreli, 2001). Recent Federal Case Law (2006) from the U.S. Federal District Court in Colorado, in *Estate of Larsen v. Denver (2006)*, found that officers were justified in using deadly force on a suspect who was within 21 feet of the officers. The court acknowledged the 21-foot rule and reiterated its validity in use of force scenarios.

The 21-foot rule "Tuller Drill" supports the court finding by stating that a suspect can cross 21 feet in 1.5 seconds (Mesloh & Thompson, 2006). In practice officers are acutely aware of this reactionary gap, and are trained to recognize that actions are faster than reactions. Less-lethal weapons allow officers to prepare in advance by drawing their TASER, baton, chemical spray or other less lethal and have it ready for immediate deployment.

This view on use of force is unique in that it acknowledges that officers must first select a less lethal weapon and that their decision must be appropriate or else it will result in injury to the suspect or the officer. This decision is based on the fact that officers are personally self-motivated to

not be injured or face vicarious liability should they use the inappropriate level of force. In addition to civil liability, officers that do not adhere exactly to their agency's policies and procedures may face discipline, reprimand and possible termination.

As a result, with these factors at the forefront of their minds, it is not surprising that officers use the most effective use of force that is ranked lowest on their agency's force continuum, so that they are well within the scope of their employment and appropriate law when quelling a disturbance or engaging a suspect. In these confrontations, the burden of documentation falls upon the officer and the more intrusive the level of force, the more extensive the documentation.

***TASER/Electronic Control Device (ECD)***

Electronic Control Devices (ECDs), or Conducted Energy Weapons (CEWs) as they are also known, are less-lethal weapons designed to deploy electricity throughout the body of the target to temporarily cause loss of muscle control. Over the past several years, the technology for these devices has become user-friendlier than original, more rustic devices, allowing the user to apply the device from greater distances, with more accurate application.

**Figure 7. M26 TASER and X26 TASER**


Note: Photo depicts the two types of Electronic Control Devices (ECDs) deployed by the Orange County Sheriff's Office and the Orlando Police Department, the TASER M26 (on left) and TASER X26 (on right).

TASER International is the company best known today for producing ECDs. Their product has become so well known that the name "TASER" has become synonymous with "ECD," much like "band-aid" is to a plastic bandage. The TASER (so named after the inventors science fiction interests as the "Thomas A Swift's Electric Rifle") are currently being tested or are used in over 7,200 law enforcement, military and correctional agencies throughout the United States and abroad (USGAO, 2005). TASER International continues to advertise their device as among the safest and

most effective less-than-lethal force choice available, claiming that TASER use reduces officer shootings and suspect injuries (TASER International Inc. [TASER], 2004b).

The darts fired from the TASER can reach from 15 feet (civilian model) to 25 feet (law enforcement model). Despite the length of the wire, recent best practices guides by the Police Executive Research Forum (PERF) suggest restricting targeting to less than fifteen feet (2004). This is consistent with studies, which indicate that beyond fifteen feet accurate placement of probes is difficult (Mesloh, Henych, Hougland, & Thompson, 2005). Early studies indicated this weapon's effectiveness ranged from 50% - 85% (Donnelly, 2001) when deployed. In a pilot study examining a random selection of four hundred deployments, the TASER was immediately successful in 68% of the cases (Mesloh, Henych, Hougland, & Thompson, 2005). On the other end of the spectrum, this rate has been validated in a second study by White and Ready (2007) who found that 68.6% of suspects continued to resist after a TASER deployment. Some literature shows that since the TASERs deployment in 2000, the use of deadly force by officers and the number of officers injured during arrest confrontations has been dramatically reduced (Hopkins & Beary, 2003).

In order for the TASER to be effective in gaining compliance, both probes must strike the target, preferably with spread of about one foot between the probes. In a sample of 50 cases where the TASER was found to be ineffective, 38% could be explained by the fact that both probes missed the target (Mesloh & Hougland, 2005; Mesloh, Henych, Hougland, & Thompson, 2005). In some of these cases, the probes spread out as they traveled toward the target, and at a certain point were so far apart that one probe missed. A drawback to TASER is that while the cartridges have an advertised range of 25 feet, it is not feasible to properly deploy the weapon at that distance and expect a successful outcome.

A study conducted on the spread rates of the TASER probes conducted by Mesloh and Thompson (2006) found that probes separated at a rate of approximately 2 inches for every foot of distance between the TASER and the suspect. At this drop rate, the maximum feasible distance for the TASER becomes 15 feet as any distance beyond that, even though the probes are capable of traveling further, results in too great of a spread. Consequently, ineffective TASER deployments are more related to distance factors than the suspect's ability to fight through the electricity (Mesloh & Thompson, 2006). Other failures were explained by a suspect wearing baggy clothing, or by a number of weapon malfunctions.

Both agencies in this study utilize the TASER as their electronic control device of choice. In the beginning of the study period, both OCSO and OPD carried the M26 TASER model. OCSO had first issued TASERs for testing and evaluation in October of 2000, and then 250 were purchased in 2001. By early 2006 every patrol deputy with OCSO had been issued a TASER, many specialty units also carried them. OPD first began deploying TASERs to officers in January of 2003; within six months almost every patrol officer had a TASER issued. Over the course of this project, OCSO began transitioning to the smaller X26 TASER model, OPD plans on phasing in the X26 in early 2008. While OCSO purchased warranties with their TASERs, OPD did not.

***Impact Weapons***

All impact weapons can find their basis in the club. Historically, it was probably the first human weapon, as a piece of wood was used to bludgeon its victim, somewhere around 10,000 B.C. (Meltzer, 1996). While most hard handheld objects are capable of being used in this fashion, law enforcement has tended to utilize impact weapons specifically designed for this purpose. The velocity of the end of the baton is multiplied in proportion to the increase in its distance from the pivoting body parts, such as the pelvis, shoulder, elbow and wrist (Crosby, 2002). Similar to a golf swing, proper form and execution play a major part in the creation and transfer of kinetic energy from the baton into the suspect. In order to be effective, the baton must also be swung to strike with a large force and with a fast delivery (Gervais, Baudin, Cruikshank, & Dahlstedt, 1998).

**Figure 8. Examples of Impact Weapons: Expandable Baton and Yawara**

Note: These photos depict the expandable baton and yawara weapons. OPD issues a 26" F26 expandable tactical baton and OCSO issues a 21" F21 expandable tactical baton, both manufactured by ASP. Neither OPD nor OCSO issues any type of yawara.

The police baton's primary function is to strike specific target areas of resisting offenders, to cause dysfunction or pain and gain control or compliance (Borrello, 1999; Mesloh, Henych, Hougland, & Thompson, 2005). Billy clubs, truncheons, and straight wood batons have been utilized for hundreds of years by police officers around the world.

As technology has advanced, this weapon has evolved to meet specific needs. The blackjack and sap, which are a spring-loaded lead weight encased within a leather handle, offered the ability for plainclothes officers to conceal an effective impact weapon. The side-handled baton offered the ability to add mechanical advantage and leverage to take down techniques. The expandable baton allowed the officer the ability to carry a full size baton on their duty belt in a low profile manner (Johnson, 1996). The newest generation batons have now added an enlarged plastic tip, which will create a larger amount of kinetic energy in the strike (Mesloh, Henych, Hougland, & Thompson, 2005).

High visibility nightsticks and side-handled batons seem to have gone out of style and have been replaced with smaller, collapsible straight batons which have a more positive public perception and are easier to carry (Johnson, 1996). Gervais, Baudin, Cruikshank, and Dahlstedt, (1997) found that a 26-inch ASP expandable baton created more impact pressure than a traditional full size baton.

Even smaller and lower profiles are yawaras and kubatons, which can be carried in a pocket. These small impact weapons are frequently marketed as self-defense keychains and can be used to deliver pinpoint force to nerve centers (Monadnock, 1968). In addition to impact strikes, the yawara has the ability to supplement close quarter takedown techniques through joint locks and pressure point compressions. The family of yawara type products can be found in a variety of designs, which may contain finger grooves to reduce slipping or sharp inserts to discourage the suspect from attempting to wrestling it from an officer's hand (Monadnock, 1968). The inherent weakness of the yawara weapons system is the fact that the officer and suspect are within extremely close proximity, increasing the potential that the encounter will escalate into grappling or ground fighting. Despite the fact that many officers have martial arts training, almost a third feel that defensive tactics training is insufficient and ineffective against combative suspects (Kaminski & Martin, 2000).

The faster that the baton is swung and the heavier its weight, the greater its kinetic energy potential will be. However, heavy objects tend to move slower than light ones. It can be theorized that one reason the ASP was so successful in the study by Gervais, Baudin, Cruikshank, and Dahlstedt, (1997) was that the baton was much lighter and easier to carry than the traditional baton. In addition to the velocity created by swinging the weapon, an officer stepping into a swing, or a suspect moving towards the officer as they are hit also generates increased velocity. It becomes a balancing act between weight and speed. While an agency may take a "one size fits all" approach in issuing impact weapons, it is truly a very individual science to determine the baton that best fits the

specific user by generating the greatest amount of energy. The primary approved target areas are large muscles masses and the ability of an officer to hit these targets is directly related to their success in an encounter (Gervais, Baudin, Cruikshank, and Dahlstedt, 1997). However, saps and blackjacks, due to their size and potential reach, were commonly used to strike the head. Serious injuries are a likely result if the head is targeted for an impact weapon strike (Cox, Buchholz, & Wolf, 1987).

***Chemical Weapons***

In their simplest form, chemical agents are a type of irritant that attacks the eyes, nose and skin, which disables or significantly impairs the recipient's ability to function (Lumb & Friday, 1997). While this was comically shown in the children's movie "Shrek 2", prisoners in jails and prisons have been known to carry a handful of pepper in their pockets and throw it into the face of their attacker. This method of delivery requires very close range in order to strike the target.

Commercially available chemical agents utilize some type of carrier in order to deliver the payload a greater distance. Some fire as a stream, others in a cone, and even others in a fog. Each type has a specific issue that it attempts to address (single target, large groups, or greater accuracy and distance). The primary target for chemical agents is the facial area.

**Figure 9. Chemical Agents**

Note: Depicted in this photograph are several different brands and types of chemical agents that are small enough to be carried on an individual officer for patrol purposes.

The use of chemical agents can be found throughout history. In China during 178 A.D., a peasant revolt was quelled though the use of lime dust, a severe irritant, which was used to create an early form of tear gas (Mayor, 2003). Quicklime projectiles, creating a suffocating cloud that

clouded the air and blinded the enemy, continued in the Byzantine war in 941 A.D. (Partington, 1999).

Noxious smoke from poisonous plants were also propelled from a smoke machine to rappel attempts of the Roman invaders to tunnel under the city of Ambracia's walls (Mayor, 2003). Leonardo Da Vinci later created a similar poison smoke machine in the late 1400's (Partington, 1999). Ancient Chinese writings contain literally hundreds of recipes for creating chemical agents that were able to disable or even kill enemy troops (Mayor, 2003). The earliest form of pepper spray appears in the sixteenth and seventeenth centuries by the Caribbean and Brazilian Indians who burned hot pepper seeds to create an irritant cloud against Spanish conquistadors (Mayor, 2003).

Prior to the development of oleoresin capsicum (OC), agencies relied on tear gas grenades, which dispersed the chemicals o-chlorobenzal malononitrile and 2-chloroacetophenone (abbreviated as "CS/CN" gas), but problems existed due to the delivery system's propensity to start fires (Miller, nd). Most agencies have transitioned from the use of CS/CN gas to pepper spray, an irritant spray that can disable a suspect. Most of these products are made with oleoresin capsicum oil from selected hot peppers (Reilly, 2003).

When compared with impact weapons as a less-lethal force alternative, OC spray was found to be at least as effective in stopping subject resistance, with the added benefit that the majority of suspects sprayed did not require medical treatment (Rogers & Johnson, 2000). OC was on the cutting edge less than lethal weapons of its time as it incapacitated suspects by "causing the eyes to tear and swell shut, mucus to drain profusely from the nasal passages, bronchial passages to constrict, and [make] breathing become more labored" (Morabito and Doerner, 1997, p 681). Studies from the early 1990's found OC spray to be effective over 90% of the time (Nowicki, 1993) and as a result, many agencies issue this tool. Prior literature suggests that many law enforcement agencies believe pepper spray to be the "magic bullet" to reduce officer and suspect injury as well as citizen complaints (Kaminski, Edwards, & Johnson, 1998; Rogers & Johnson, 2000). Early studies identified its effectiveness at around 90% (Kingshott, 1992; Nowicki, 1993).

The strength of the spray is related to the heat rating and quality of the source peppers. The Scoville Heat Rating, created in 1912, assigns a value to each pepper. Pure capsaicin has a rating of 15 million, while pepper spray has a rating of 5.3 million. For comparison purposes, the bell pepper has a rating of zero, the jalapeno a rating of 5,000, and the habanera a rating of 300,000. Most OC sprays identify their specific heat rating for consumer comparison.

Recovery time after exposure is based on the percentage of capsaicin in the formulation. A 15% solution may require one and a half to two hours to recover, while 2% may require only fifteen to thirty minutes. Thus, suspects are only forced to endure to burning pain for a shorter period of time. The added benefit of lower solutions is that the solution much more easily penetrates mucus membranes and skins pores and thus acts faster.

Issues regarding cross-contamination of back-up officers and a growing number of reports that suspects were able to fight through the burning pain of the spray illustrate a few of the weaknesses of chemical agents. Additionally, a limited range of less than eight feet for most models places the officer well within the reactionary gap. The number of uses per canister depends upon the duration of each spray. Firing at a suspect at greater distances consumes a greater portion of the canister.

In a recent study, researchers found that the use of chemical agents was rapidly declining at the Orange County (FL) Sheriff's Office as officers instead chose to deploy the TASER which was effective in 88% of the deployments (Hougland, Mesloh, & Henych, 2005). While the American Civil Liberties Union has stated that at least thirty fatalities have occurred as a result of TASER use (Mesloh, Henych, Hougland, & Thompson, 2005), studies have shown similar deaths by OC deployments. Bowling, Gaines and Petty (2003) examined sixty-three deaths after oleoresin capsicum deployments and found that the overwhelming majority was due to the arrestee's drug use, disease, positional asphyxiation or a combination of these factors, similar to recent claims about TASERs (see also: Granfield, Onnen & Petty, 1994).

***Compressed Air Weapons***

The need to project a chemical agent a greater distance has led to the development of compressed air weapons. An adapter allows air bottles or reservoirs on this type of weapon to be quickly refilled from a standard SCUBA tank, and a full tank will provide 20-30 refills for most air bottles. This is significantly cheaper than using $CO^2$ and allows refilling of the SCUBA tank at a local dive shop for less than five dollars.

Manufactured by PepperBall Tecnhologies Incorporated, the PepperBall family of launchers is designed around Tippmann paintball markers and operates in the same fashion. This less-than-lethal weapon is used by both OCSO and OPD. Munitions for the PepperBall include paint marking rounds, synthetic OC rounds, and glass shattering rounds that are not to be used against human

subjects. The stated muzzle velocity for the PepperBall launcher is 300-380 feet per second and the projectiles have 8-10 foot pounds of energy. The standard air system for the PepperBall utilizes a thirteen cubic inch bottle and when charged to 3000 psi.

The hopper on the PepperBall launcher can hold 160 projectiles. The manufacturer claims that the weapon is safe to engage a target at point blank range with the PepperBall system. According to the PepperBall system instructor-training manual, "PepperBall operators must understand that thirty feet is the farthest distance to target individual suspects. The lightness of the projectiles makes the ballistic accuracy fall off dramatically past thirty feet."

**Figure 10. PepperBall Less Lethal Launcher**

The PepperBall gun, pictured here, is similar to a standard paintball gun and operates in the same fashion.

Up to distances of twenty feet, the PepperBall projectiles had a maximum difference between point of aim and point of impact of five inches. A major problem noted with the PepperBall rounds is their groupings were far from close and the projectiles would spread at the rate of 2.68 inches for every five feet of distance (Mesloh and Thompson, 2006). Unlike the FN 303 rounds, which would travel on a straight path, the PepperBall rounds were simply erratic at distances beyond thirty feet making the weapon unreliable for engaging point targets and thus increasing the risk of injury to bystanders.

The PepperBall launcher's best attribute is in the incapacitation effect of their PAVA (a synthetic OC) rounds. Mesloh and Thompson (2006) found the effects of PAVA to be "immediate and incapacitating" and created a burning sensation to any exposed skin surface.

### *Less Lethal Munitions*

Less lethal impact munitions fire a projectile that will provide a transfer of kinetic energy that will impact and potentially incapacitate a suspect. Different launchers and projectiles are on the market with many projectiles existing to fit the specific need of individual scenarios. Currently all 12 gauge munitions must be fired from a pump action shotgun in order for the ammunition to cycle correctly and the 37/40mm launchers are available in single shot and six chamber designs (Hubbs and Klinger, 2004; Kenny, Heal, & Grossman, 2001).

**Figure 11. Less Lethal Launchers and Munitions**

Note: The less lethal launchers shown above are representations of available platforms for these munitions. In addition to the launchers shown here, standard-issue pump-action shotguns can also be used for weighted munitions, pictured at the right, above.

There are wide ranges of launched munitions of a variety of compositions and with it their accuracy and maximum effective range. The twelve gauge launcher is most frequently utilized as most agencies already posses a ready supply and the user requires minimal additional training. For these, beanbag type projectiles tend to be the ammunition of choice. However, there are many other options available that include chemical agents, rubber buckshot, and solid rubber finned projectiles. Using bean bag rounds, Mesloh and Thompson (2006) tested the drop rates of the projectiles and at distances up to forty feet, the drop was an acceptable 3.78 inches. Beyond forty feet the accuracy of the rounds decreases significantly and their flight becomes erratic, again increasing the risk to bystanders. Also, at distances of forty feet, the drop was only 3.78 inches and the spread of the projectiles was 5.5 inches, thus ensuring a proper hit to the torso or any other large body mass.

For those utilizing the 37mm or 40mm grenade launcher, even a greater number of munitions choices become available. These munitions can be direct fired or skip-fired depending upon the specific need or desired effect. A degree of accuracy is lost with some of these munitions, but is

made up by the ability to saturate an area with projectiles. As the accuracy decreases, the chance of hitting bystanders increases. Launched munitions include rubber buckshot, sand filled beanbags and foam or rubber batons. A key factor with these munitions is that at close range they have the ability to inflict severe injury or death but as the range increases, the rate of injury drops off sharply (Hubbs and Klinger, 2004).

Other significant injury predictors are the hardness of the material being fired, e.g. wood v. rubber, and mass of the projectile. Both harder projectiles and those with more mass resulted in higher injury rates in a study conducted by DuBay and Bir (2000). Kenny, Heal and Grossman (2001) found that engagement methods influenced the effectiveness of the munitions; baton rounds were more effective when skip-fired while beanbags and airfoils performed better when fired directly at the subject.

***Police Dogs***

Based upon case law and the definition of deadly force, the law enforcement canine also 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 (Mesloh, 2006).

Given that a German shepherd can exert a bite force of 1500 psi (Hutson et al., 1997), the potential for serious injury is great. These injuries range from deep punctures, to large rips and crush damage (Hutson et al., 1997; Pineda, Hutson, Anglin, Flynn, & Russel, 1996). Additionally, suspects bitten by police dogs are usually bitten multiple times (Meade, 2006). Fortunately, to date only one documented death as a result of a police canine apprehension exists in the United States.

There is ample literature, scholarly and practitioner alike that completely support the use of a trained dog to locate a hidden suspect. In most cases, the dog is tethered to the handler through the use of a long leash. However, there are a number of tactical disadvantages in this arrangement, which include the potential for the leash to become entangled in heavy brush. In these cases, it becomes a handler's discretion as to whether or not the dog should be kept on lead. 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.

The use of force by the suspect (including passive resistance and flight) is a significant predictor of force by officers (Holmes, 1997). This relationship between suspect behavior and final outcomes appears to be consistent in canine deployments as well (Campbell, Berk & Fyfe, 1998). Often, a bite ratio is used as a barometer or early warning system for misconduct. 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.

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. Supporting this position is the International Association of Chiefs of Police (IACP) 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).

When dealing with a small number of cases, it is very easy for the bite ratio to be heavily influenced by even a small number of bites. A new canine handler that has made only one apprehension and is unfortunate enough to be forced to have the canine make physical contact or bite the suspect would have a 100% bite ratio, which is certainly high by any standard. Over time and with additional apprehensions, the bite ratio would likely become smaller. This is problematic for smaller agencies that may not have the level of activity to provide a sufficiently large denominator for the bite ratio to have any value. For these agencies, it becomes necessary to examine each case to determine the level of appropriateness.

While there are certainly other types of less-lethal weapons, both mainstream and not-so-mainstream, the types of weapons described above are all deployed by both OCSO and OPD. Weapon choice certainly has an affect on subject injuries, and not every less-than-than lethal weapon is appropriate for all circumstances; each weapon has different potential resulting injury, in addition to appropriate officer-suspect distances for use. The following section describes how injuries may result from blunt trauma from these weapon systems.

## Five Key Factors Related to Suspect Injuries

### *Degree of force*

Scientifically, force is the mass of the object multiplied by its speed. The larger or heavier an object is and the faster that it is moving, the more force it generates. While a car and a baseball might both be traveling at identical speeds, there is an obvious difference in their force. Kinetic Energy (KE) can be computed by taking ½ its mass and multiplying it by the square of its velocity ($KE = ½ m \times v^2$).

As velocity increases, the potential for injury increases exponentially and is known to be a primary factor in soft tissue damage from impact (Viano & Lau, 1988). The energy transfer from a less lethal weapon into the human causes either a dysfunction of that specific body part or compliance as the subject wishes to avoid further pain. As the amount of kinetic energy transferred increases, the potential for serious injury also rises (Hubbs & Klinger, 2004). Additionally, as the object increases in mass and density, higher injury rates result (DuBay & Bir, 2000).

### *Area of force application*

The size of the area impacted by a less lethal weapon is related to the potential for injury. The same amount of force applied over a wider area causes less injury than if it were to be applied over a smaller area. This can be visualized by comparing the impact of a knife-edge to that of a baseball bat. Additionally, the edge of any moving object is more damaging than its flat side. This becomes important when considering the use of improvised impact weapons, such as flashlights, where its end has the potential for creating shearing force, particularly if used to strike the head (Cox, Buchholz, & Wolf, 1987).

***Duration***

The length of time that a moving object is in contact with a human body is also a factor in the amount of kinetic energy that is transferred. Longer durations allow the tissue to absorb more of the energy. While the user has no control over the duration of launched munitions, striking through the target, thus transferring every bit of energy can substantially modify the effect of impact weapons. Immediately withdrawing the baton after a strike does not allow all of the energy to reach the target. Thus, multiple strikes may become necessary to obtain the same desired effect. This has the unintended consequence of appearing excessive, as demonstrated in the Rodney King incident where citizen attitudes toward the police were significantly lowered after the event (Lasley, 1994).

While there is a dearth of scholarly work regarding the impact weapon within the criminal justice literature, research in sports biomechanics serves to fill the gap. Using the model of bat rotation by Crisco (1997), Fallon, Collier, Sherwood and Mustone (2000) found that the energy transferred to the bat varies significantly from hitter to hitter. This is probably also the case for law enforcement impact weapons. Dissimilar to bat and baseball interaction where there is kinetic energy loss due to short contact time (Fallon, Collier, Sherwood & Mustone, 2000), impact weapons transfer a much larger amount of their potential energy, which is stored in the baton during the swing.

***Direction***

As the transfer of kinetic energy is essential to gain dysfunction or pain compliance, it is important that the impact take place fully on target. Glancing blows do not allow a complete transfer of kinetic energy. Prior research on martial arts punches has found that maximum velocity takes place at approximately 75% of the fully extended arm (Walker, 1975) with the strike stopping within the target (Gervais, Baudin, Cruikshank, Dahlstedt, 1998).

Additionally, while impacts on extremities are painful, they tend to move with the strike and are much less effective than those to the torso or body parts that cannot move. Anticipation on the part of the subject can also reduce the amount of energy transfer as they “roll with the punch.”

***Drug and Alcohol Use***

Frequently overlooked as a contributing factor in suspect injuries, drugs and alcohol can substantially change the manner in which a less lethal weapons scenario plays out. Suspects under

the influence of drugs and alcohol are much more likely to have force used against them (Terrill, 2000).

Suspects under the influence frequently have a much higher pain tolerance requiring greater amounts of force to be used against them. While ECD weapon systems and Chemical agents do not cause injury through kinetic force, there have been mixed reviews of potential for injury when dealing with subjects who are reacting to drugs. Kaminksi and Edwards (1997) have noted that some subjects under the influence of drugs and alcohol are not affected by oleoresin capsicum, forcing officers to use others mean of force. As they may not feel the pain immediately, the injuries sustained may go unreported and untreated. Alpert and Dunham (2000) found that intoxicated suspects are less likely to resist passively and are more likely to stand their ground and fight, versus sober suspects who often try to flee from the police. It was also noted that intoxicated suspects were twice as likely as sober suspects to use a firearm while resisting the police.

It is through these lenses, or varying ways of looking at use of force confrontations, that the current research was developed. Literature and prior research shaped this review of use of force reports and situational factors that shape each altercation between police and citizens.

## Research Objectives and Project Overview

This current research, grounded in the literature and theory relating to suspect and officer confrontations, seeks to identify both citizen and officer uses of force, escalations and de-escalations of force, and the subsequent outcomes on human injuries. Situational variables such as the time of day, the community characteristics in which the encounter takes place, the seriousness of the offense, the appearance of drugs or alcohol, suspect demeanor, type of call dispatched and the presence of other officers and observers at the scene were also examined to see their impact on the resultant confrontation between law enforcement and the public. The resulting injuries to officers and/or citizens (or both) were examined at the event level; the confrontations were studied as if they were a series of picture frames detailing the escalations and de-escalations of the subjects and the corresponding officers perception of danger and as an outcome the amount of force used at each event and its effectiveness or rate of success.

## Research Design and Methods

Of specific interest to this project was an examination of how prior researchers have collected data to study this topic. As seen above, the "Use of Force Report" and complimentary arrest affidavit (if applicable) are the standards in acquiring data on this subject matter. This method is not without its limitations; however, in terms of utility to the task it is appropriate. The police use of force report and accompanying documents provide a rich wealth of data. Agency policies and legal standards require officers detail events when force is used in specific detail. This use of force report then becomes part of court documents and is generally held as a document with integrity. The use of force report is written specifically to explain the use of force; they inherently include all the variables as observed and perceived by an officer in a temporal order. These forms identify the relationships between suspect actions and officer reactions, as well as the subsequent outcomes, categorized as type and severity of injury. While the Constitution is broad in it interpretation of the authority of law enforcement to use force, it limits use of force as to what is reasonably necessary to effect an arrest or quell a disturbance. This broad interpretation serves as a framework for agencies that have developed force continuums, which details specific levels within what is reasonable.

When officers are trained to use force, they are trained to interpret situational factors (variables) and respond in-kind with a level of force which has been pre-determined by the agency, its legal department, case law and interpretations of case law as reasonable. This action/reaction scenario is at the heart of the event-level confrontation. As the confrontation evolves, the officer and suspect may escalate and de-escalate up and down the force continuum in a temporal order that may be extremely fast. This process for the purpose of this project is referred to as a "Choice Model." The data collected in this current project from the use of force reports are broken down into these choice models to reflect how officers react to subject action. While these choice models may detail many derivations of escalations and de-escalations of force (referred to as "Iterations" in this project), the models generally follow an escalation of force temporally. To follow these iterations of force, the researchers analyzed the use of force reports and extracted the various level(s) of force used by the officer and the level(s) of resistance of the subject, over time (i.e., "Officer Force" Level 1, "Suspect Resistance" Level 1). This is described in more detail in the following section on Coding of variables. Ultimately, the relationships between escalations of force and resultant injuries are explored for both suspects and officers.

***Design***

This project has utilized an accepted social science research methodology wherein existing data collected from archival records were coded and analyzed using SPSS. Key independent and dependent variables were identified by the extant literature review and developed into a data collection worksheet. The data collection sheets were filled out by coders and were then the data was entered into SPSS for analysis.

***Data Collection***

"Use of Force Reports" are a regular tool that most, if not all, law enforcement agencies use in accounting for uses of force, captures much data and allows a research endeavor to begin at the event level. The data includes specific information regarding the type of force used in an encounter, whether less-lethal or deadly, and also the type of resultant injuries. Data was collected from two major participating law enforcement agencies: the Orange County (Florida) Sheriff's Office and Orlando Police Department (Florida).

The OCSO and OPD use-of-force reports were obtained by a public records request at each respective agency. Each agency was requested to provide their agencies use of force reports (defensive tactics form) and accompanying documentation to include arrest affidavits (charging affidavit) and offense reports dated from the year 2000 to the year 2005. Grant funding provided resources to comply with payment for the public records request. A total of approximately 40 banker boxes were collected and all reports were coded onto code sheets and entered into SPSS. Of the 4,303 non-duplicate reports that were compiled and reviewed, 57.2% (n = 2,460) were from the Orange County Sheriff's Office and 42.8% (n = 1,843) were from the Orlando Police Department.

***Data Coding***

Prior to the collection of data in the project, the extant literature reviewed indicated the key variables that should be include in this study. The key variables were included on data code sheets that were used to document relevant information from the agencies documents. To code the data the principal researchers trained a team of coders at Florida Gulf Coast University to review the agencies documents and code the data appropriately. The code team was trained to read the entire report and accompanying documents and then code the code sheets using a standardized coding scheme. A sample code sheet is included in the appendix. Data was collected at nominal, interval

and scaled levels. The code team was constantly managed and overseen by key researchers in the project to allow for interaction and clarification of coding and other issues. During the coding of the data, the management team routinely randomly selected cases to verify coding and coder reliability. During the collection of the data and input into SPSS, the principle researchers ran the data to expose errors in coding. This proved beneficial as complications and errors were identified early on in the coding and were, as a result, more readily resolved.

***Issues in Data Collection and Coding***

The injuries sustained by suspects from less-lethal weapons have been examined in the literature regarding police use of force, including chemical weapons (Chan, et al., 2002; Bowling, Gaines, & Perry, 2003), impact weapons (Rahtz, 2003), police canines (Mesloh & Hougland, 2004) and kinetic energy projectiles (DuBay & Bir, 2000). While each of these weapons are considered less-lethal and are utilized by police in an attempt to use a less than a deadly level of force, each has been responsible for, or have contributed to, at least some documented deaths and an undetermined number of injuries. What remains unexamined in the scholarly literature is the effect of the TASER to reduce other less-lethal weapon deployments and the subsequent reductions in suspect and officer injuries. The researchers examined these issues within this project.

During the collection of the data, it was readily discovered that the coding team was recording duplicate cases. It was determined that duplicate reports existed as a result of the documentary procedures of the law enforcement agencies. In this case, the Orlando Police Department ensured that all officers present at an event documented the incident using a unique case number as a primary key. Subsequently when filing these reports event with multiple officers present resulted in a unique case number and several reports. In order to resolve this, every case was sorted by date, month and year. They were then organized chronologically and duplicate reports were removed by hand selection.

Another issue in the collection and coding of the data was evident when running the data for incidences of deadly force used by officers in events. As this study has focused exclusively on less lethal force, the relative few cases that did involve actual police use deadly force (shootings) were excluded from the analysis as their small sample size has low generalizability and minimal predictive value. While the researchers chose to remove these incidents, the focus remained on the pressing issue of suspect and officer injuries related to the choices they made in violent

confrontations. What is not examined within this study is the threatened use of force by officers. Use of force reports from both agencies fail to illustrate this useful variable and as a result are not captured. In order to maintain coding consistency, if the report did happen to state that a weapon was drawn, displayed, or threatened, it was coded as "No Force" as no actual force was used against the suspect.

***Measurement***

The measures utilized in this research endeavor consist of nominal, ordinal, interval level and several scaled variables. This allows for a variety of statistical techniques in predictive analysis. However, as much of the data collected during the coding of agencies forms is rich and details event level actions and reaction, much of the analysis is inherently descriptive in nature.

Researchers categorized use of force through suspect resistance and officer level of force. In developing the measures for these variables, the force continuum was utilized as a standard measure ordered from 1 (presence) to 6 (deadly force). If the confrontation was not brought to resolution, a second and third iteration captured this data. Other key variables of importance included "Officer Force" ranked from O (no force) to 14 (deadly force). This variable allows the determination of effectiveness for each less lethal weapon or use of force. A complimentary variable, "Suspect Force," was included and is ranked from 0 (no additional resistance) to 15 (vehicle).

***Overview and Descriptions of Key Variables***

To ensure the maximal predictive capabilities of the causal modeling, many variables (suspect demographics, officer demographics and situational variables) were extracted from the agencies' data sheets. This assisted with the approximation of practical (real world) factors, which surround officer uses of force, suspect resistance and resultant injuries.

Certain variables were examined wherever possible, including: mobilization type; type of incident/call; number of officers present; number of citizens present; location type; suspect demeanor; indications of alcohol or drug use and appearance; social-economic status of community; and call frequency of area and type of resistance. The justifiable use of less-lethal force is naturally agency specific, but most agencies, including the two agencies in this study, utilize a common use of force matrix system; levels one through five are indicative of force that is less-lethal, while level six

indicates force that is considered deadly. The force matrix offers an interval level of measurement of uses of force that are bi-directional.

**Table 3. Resistance Type and Level**

| Type | Level |
|---|---|
| 1. No resistance | 1 |
| 2. Verbal Resistance (yelling) | 2 |
| 3. Verbal Resistance (threat) | 2 |
| 4. Verbal Resistance (threat & posture) | 2 |
| 5. Passive Resistance (dead weight) | 3 |
| 6. Brace/Tense Up | 4 |
| 7. Pull Away | 4 |
| 8. Flight | 4 |
| 9. Concealment | 4 |
| 10. Push Away | 5 |
| 11. Wrestle | 5 |
| 12. Strike (punch or kick) | 5 |
| 13. Impact Weapon | 6 |
| 14. Edged Weapon | 6 |
| 15. Firearm | 6 |
| 16. Vehicle | 6 |

Note: These resistance levels were determined after discussion with a focus group of police experts from both the Orlando Police Department and the Orange County Sheriff's Office. These increments concur with the levels of force depicted in Figures 1, 2, 3, 4 and 5.

Tables 3 and 4 are composed from the force continuum utilized to code variables in this study. As depicted in Table 3, subject resistance, "Level 1" is considered no resistance or complete compliance by the suspect. "Level 2" is the perception of verbal resistance which occurs when the subject yells, threatens, or threatens and postures in a manner which could be perceived as pre-assaultive behavior. "Level 3" suspect resistance is when a suspect offers no physical resistance, but is non-compliant, or reacts with dead weight. "Level 4" suspect resistance occurs when a suspect braces or pulls away from an officer, flees, or conceals themselves. "Level 5" resistance occurs when a suspect is actively, physically resisting an officer; this can be done in ways such as striking, kicking or wrestling. "Level 6" suspect resistance occurs when the suspect's resistance poses a significant, immediate threat of causing bodily harm or death, whether with a weapon (or some other object), or unarmed.

Table 4 displays the opposite side of the force continuum. In this table, the officer's level of justifiable force is response to the corresponding level of perceived suspect resistance. An officer's mere presence is considered "Level 1." "Level 2" encapsulates an officer's use of holds, leg restraints, and handcuffs. "Level 3" force is considered compliance holds, use of chemical agents and takedowns. "Level 4" use of force includes TASER, empty hand strikes, impact weapons, less lethal munitions and K9 deployments. "Level 5" includes incapacitating choke holds and the Lateral

Vascular Neck Restraint (LVNR), and "Level 6" use of force is any force that may be deadly. This may include strikes to the head or neck region of a suspect.

**Table 4. Officer Force and Level**

| Type | Level |
|---|---|
| 1. Presence | 1 |
| 2. Gentle Hold | 2 |
| 3. Handcuff | 2 |
| 4. Leg Restraints | 2 |
| 5. Compliance Hold | 3 |
| 6. Takedown | 3 |
| 7. Chemical Agent | 3 |
| 8. TASER | 4 |
| 9. Empty Hand Strike | 4 |
| 10. Impact Weapon | 4 |
| 11. Pepperball | 4 |
| 12. Less Lethal Munitions | 4 |
| 13. K9 | 4 |
| 14. LVNR | 5 |
| 15. Deadly Force | 6 |

Note: These resistance levels were determined after discussion with a focus group of police experts from both the Orlando Police Department and the Orange County Sheriff's Office. These increments concur with the levels of force depicted in Figures 1, 2, 3, 4 and 5. "K9" is the abbreviation for a Police Canine, "LVNR" is the abbreviation for Lateral Vascular Neck Restraint.

## Suspect Demographics

Suspects ranged in age from 7 to 86 years of age, with a median age of 26 years of age. The mean age was 28.9 years, with 9.6 % under eighteen years of age (juvenile). Thirty-seven percent (n = 1610) were white, forty-nine percent (n = 2106) were black, and thirteen percent (n = 555) were Hispanic. Ninety-one percent (n = 3910) were males and nine percent (n = 393) were females. The below table, which breaks down the racial demographics by agency, indicates similar suspect characteristics.

**Table 5. Suspect Demographics: Race (By Agency)**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Suspect Race | White | Count | 933 | 677 | 1610 |
| | | % within Agency | 37.9% | 36.7% | 37.4% |
| | Black | Count | 1188 | 918 | 2106 |
| | | % within Agency | 48.3% | 49.8% | 48.9% |
| | Hispanic | Count | 319 | 236 | 555 |
| | | % within Agency | 13.0% | 12.8% | 12.9% |
| | Asian | Count | 7 | 6 | 13 |
| | | % within Agency | .3% | .3% | .3% |
| | Indian | Count | 13 | 6 | 19 |
| | | % within Agency | .5% | .3% | .4% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

**Suspect Demographic: Suspect's Relative Size (Body Mass)**

The size of the suspect can be an important consideration for officers when deciding how to deal with an individual. The Body Mass Index (BMI) formula is an international measure of obesity and a potential tool for quantifying physical threat. Body mass index calculation requires only two measurements, height & weight. The Body Mass Index is a measure to determine if an individual is underweight (BMI < 18.5), of normal weight (BMI = 18.5 to 24.9), overweight (BMI = 25 to 29.9), or obese (BMI > 30). The Body Mass Index is calculated using the following formula:

**Figure 12: Calculation of the Body Mass Index**

$$BMI = \frac{(\text{weight in pounds} \times 703)}{(\text{height in inches})^2}$$

In examining the means scores of the suspects in this data set, the average suspect's height was 69.2 inches (5ft 9inches) and the average weight was 174.8lbs. The average BMI was 26, which is slightly into the overweight category.

**Table 6. Suspects Height, Weight and Body Mass Index**

| | | Suspect Height (Inches) | Suspect Weight (Pounds) | Suspect's Body Mass Index |
|---|---|---|---|---|
| N | Valid | 4002 | 3954 | 3907 |
| | Missing | 301 | 349 | 396 |
| Mean | | 69.2224 | 174.8199 | 26.4973 |
| Median | | 69.0000 | 170.0000 | 25.7972 |

Note: due to rounding, percentages may not total 100%

**Suspect Demographic: Drug and Alcohol Use**

Illegal drugs were reportedly present in eighteen percent (n = 773) of the cases, in comparison with alcohol being present in fifteen percent (n = 650). Both drugs and alcohol were present in only fifty-three cases.

**Table 7. Suspects Drug or Alcohol Use/Intoxication**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Drug/Alcohol Intoxication | No | Count | 1881 | 1031 | 2912 |
| | | % within Agency | 76.5% | 55.9% | 67.7% |
| | Yes | Count | 579 | 812 | 1391 |
| | | % within Agency | 23.5% | 44.1% | 32.3% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

However, thirty-two percent (n = 1391) of suspects were impaired by either drugs alcohol, or both. Examining this factor by agency, Table 7 shows that the Orlando Police Department reports that their officers face a disproportionate number of suspects that are "under the influence."

**Suspect Demographic: Demeanor**

Sufficient information was reported and available within the use of force and offense incident reports to be able to code 90% of the cases with a suspect demeanor variable. In addition to the frequencies of suspect demeanor, the below table reflects a cross tabulation of this variable reported by agency.

**Table 8. Suspect Demeanor Variable**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Suspect Demeanor | Calm | Count | 34 | 2 | 36 |
| | | % within Agency | 1.6% | .1% | .9% |
| | Visibly Upset | Count | 60 | 62 | 122 |
| | | % within Agency | 2.9% | 3.5% | 3.2% |
| | Erratic | Count | 533 | 386 | 919 |
| | | % within Agency | 25.7% | 21.5% | 23.7% |
| | Agitated | Count | 895 | 961 | 1856 |
| | | % within Agency | 43.1% | 53.6% | 47.9% |
| | Highly Agitated | Count | 555 | 383 | 938 |
| | | % within Agency | 26.7% | 21.3% | 24.2% |
| Total | | Count | 2077 | 1794 | 3871 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

The majority of the cases represent subjects whose demeanor was predominantly in the "Erratic" to "Highly Agitated Range." This is not surprising as officers would be likely to view a suspect as erratic or agitated if they were physically resisting and force was necessary to gain compliance. Further analysis of subject demeanor shows that this variable is a high predictor of suspect resistance; this is consistent with Alpert's (2000) findings.

## Officer Demographics

### Officer Age, Tenure, Sex, and Race

Data regarding the officer demographics for officers involved in the use of force incidents was only available for the Orlando Police Department; the Orange County Sheriff's Office does not capture this data within reports. Orlando Police Department Officers involved in use of force incidents ranged in age from 21 to 59 years of age, with a median age of 32 years.

For this current study, the average length of service with the agency (the Orlando Police Department) was approximately seven years; 78% percent (n = 1030) were white, 13% (n = 169) were black, and 8% (n = 107) were Hispanic. By gender, 92% (n = 1478) were males and 8% (n = 138) were females.

**Table 9. Situational Variable, Officer Assignment**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Officer's Assignment | Patrol | Count | 1923 | 1624 | 3547 |
| | | % within Agency | 78.2% | 88.1% | 82.4% |
| | Narcotics | Count | 77 | 23 | 100 |
| | | % within Agency | 3.1% | 1.2% | 2.3% |
| | K9 | Count | 213 | 76 | 289 |
| | | % within Agency | 8.7% | 4.1% | 6.7% |
| | SWAT | Count | 7 | 0 | 7 |
| | | % within Agency | .3% | .0% | .2% |
| | CID | Count | 18 | 5 | 23 |
| | | % within Agency | .7% | .3% | .5% |
| | Other | Count | 94 | 104 | 198 |
| | | % within Agency | 3.8% | 5.6% | 4.6% |
| | TAC | Count | 128 | 11 | 139 |
| | | % within Agency | 5.2% | .6% | 3.2% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

**Situational Variable: Officer Assignment and Mobilization Type**

As shown above in Table 9 the overwhelming majority of uses of force came from officers assigned to the patrol division. Additionally, only 11% (n = 461) of the officers using force were supervisors. Officers were categorized as belonging to either "patrol," "narcotics" (narcotics investigations), "K9" (canine handler), "SWAT" (Special Weapons And Tactics), "CID" (Criminal Investigations Division: Detectives and Investigators), "TAC" (Tactical Unit/Street Crimes), or "other."

Of these incidents, 13% (n = 577) occurred when the officer was off-duty (or working an off-duty security assignment. Less than two percent (n = 56) of these involved an officer that was out of uniform and not readily identified as a law enforcement officer. Table 10, "Type of Offense Precipitating a Call for Service" shows the types of offenses that were categorizes an arrest based on the type of incident that led to a use of force.

**Table 10. Type of Offense Precipitating a Call for Service**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| NewCharge | Felony Violent | Count | 609 | 534 | 1143 |
| | | % within Agency | 24.8% | 29.0% | 26.6% |
| | Felony Drug | Count | 221 | 121 | 342 |
| | | % within Agency | 9.0% | 6.6% | 7.9% |
| | Felony Property | Count | 288 | 216 | 504 |
| | | % within Agency | 11.7% | 11.7% | 11.7% |
| | Misdemeanor Violent | Count | 227 | 120 | 347 |
| | | % within Agency | 9.2% | 6.5% | 8.1% |
| | Misdemeanor Drug | Count | 159 | 99 | 258 |
| | | % within Agency | 6.5% | 5.4% | 6.0% |
| | Misdemeanor Property | Count | 758 | 681 | 1439 |
| | | % within Agency | 30.8% | 37.0% | 33.4% |
| | Baker Act | Count | 176 | 58 | 234 |
| | | % within Agency | 7.2% | 3.1% | 5.4% |
| | Suspect Escape/Never Apprehended | Count | 22 | 14 | 36 |
| | | % within Agency | .9% | .8% | .8% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

These were coded using a pre-trial services model that categorized the incident based on the types of criminal charges filed. Those determined to be "suspect escape/never apprehended" were placed in a separate category by this model if it could not be determined what a proper charge might be. There were a total of sixty-six suspects that escaped and were never identified.

**Additional Situational Variables**

The context of confrontations between police officers and the public that become use-of-force incidents vary greatly. In the 4,303 total cases reviewed for this study, 5.8% (n = 251) involved vehicle pursuits, 8.7% (n = 375) were domestic violence incidents, and 26.9% (n = 1,159) involved "on-view violence," where the officer witnessed an act of violence by the suspect.

**Table 11. Suspect Weapon Use and Type**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Suspect Weapon Type | No Weapon | Count | 2138 | 1665 | 3803 |
| | | % within Agency | 86.9% | 90.3% | 88.4% |
| | Blunt object | Count | 142 | 66 | 208 |
| | | % within Agency | 5.8% | 3.6% | 4.8% |
| | Edged Weapon | Count | 111 | 54 | 165 |
| | | % within Agency | 4.5% | 2.9% | 3.8% |
| | Firearm | Count | 50 | 42 | 92 |
| | | % within Agency | 2.0% | 2.3% | 2.1% |
| | Vehicle | Count | 19 | 16 | 35 |
| | | % within Agency | .8% | .9% | .8% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

While 64.1% (n = 2,757) of the situations were confrontations where the officer was dealing with more than one individual, in 31.2% (n = 1,342) of the situations the officer was alone and without back-up. 500 (21.6%) of the suspects were armed with either a blunt object (n = 208), an edged weapon/knife (n = 165), a firearm (n = 92), or a vehicle (n = 35). Of the 500 cases where suspects were armed, 322 cases were from the Orange County Sheriff's Office reports (13% of all total cases), and 178 were from the Orlando Police Department reports (9.7% of all cases). Nearly

59% (n = 2529) of all use of force incidents occurred in the eight-hour period between 8 o'clock in the evening and 4 o'clock in the morning.

## Iterations of Force

The force used by the police in a police-subject encounter does not occur in a vacuum. "Virtually any inquiry concerning how or why officers use force is augmented by the inclusion of citizen resistance. Knowing an officer used force tells us very little without knowing the specific type of force used, how many times it was used, and what the citizen behavior was prior to each use" (Terrill, Alpert, Dunham & Smith, 2003, p. 157). Klinger (1995) noted that prior attempts to study non-lethal force in police encounters failed to examine that multiple levels of force may be used within a single encounter.

To overcome this issue, this study decomposed confrontations at the event level into a series of iterations, representing a single suspect action and officer reaction. If the confrontation was not brought to resolution within the first iteration, it then progressed into second and third iterations. Officers are required to make split second decisions regarding the appropriate force options and the proper tool to meet the current threat. Table 12 shows the number of force iterations by agency found in this study.

**Table 12. Number of Use of Force Levels or Events (defined as Iterations)**

| | | Number of Levels | | | |
|---|---|---|---|---|---|
| | | One Level | Two Levels | Three Levels | Total |
| Agency | OCSO | 1444 | 695 | 321 | 2460 |
| | OPD | 947 | 569 | 327 | 1843 |
| Total | | 2391 | 1264 | 648 | 4303 |

Note: due to rounding, percentages may not total 100%

Over half of the suspects (55.6%) were subdued at the end of the first iteration, which allows us to examine 2,391 cases to determine which less lethal weapons were most effective in bringing conflict to resolution. Slightly less than thirty percent (29.3%, n = 1264) of the confrontations ended at the second iteration, while 15% (n = 648) ended in the third iteration. There were no confrontations that extended beyond three iterations of force, although there were some cases where the suspect escaped and could not be identified.

**Table 13. Uses of Force Ending at the First Iteration by Agency**

| | | Agency | | |
|---|---|---|---|---|
| | | OCSO | OPD | Total |
| Ended in First Iteration | Event continued | 1016 | 896 | 1912 |
| | Event ended | 1444 | 947 | 2391 |
| Total | | 2460 | 1843 | 4303 |

Note: due to rounding, percentages may not total 100%

Obviously, not every event ends after the initial confrontation between suspect and officer. However for both the Orange County Sheriff's Office (58.8%) and the Orlando Police Department (51.4%) data collected, more than half of all events ended at that point.

Very few of the confrontations made it to three iterations, and none of the cases reviewed lasted more than three iterations. In cases that ended at the first iteration it was possible to show linkage between the injury and the choice. Of key interest to this study were the resulting injuries to both officers and suspects in their confrontations. However, it was difficult if not impossible to assign responsibility for the injury to a specific officer action as in many cases where multiple techniques or less lethal weapons were used. It was possible for an officer to use a control technique in the first iteration, a chemical agent in the second, and an electronic control device in the third.

### *Officer and Suspect Use of Force/Resistance Variables*

As noted earlier, officers in some cases are required to use force to quell disturbances or to effect arrests. The types of force that officers may use are a combination of defensive tactics, less-than-lethal weapons, and in some cases, firearms that are categorized as deadly force instruments. Officers are trained to interpret (perceive) a suspect's demeanor, body language and statements and react according to standards as set by the Fourth Amendment, case law and agency policy. Law enforcement agencies have adopted use of force matrices as training aids for officers when they are hired and receive continuing training or education as it allows for a dynamic, fluid, rapidly changing scenario. The force matrix frames an officer's set of response, which can be any of following depending on the scenario encountered.

At Level 2 on the Use of Force Matrix, officers may use verbal commands or touches (come along technique) to control a suspect and order compliance. This technique is generally used when

suspects are verbally non compliant but have not been physically resistant. In cases where a suspect is passively resistant wherein they may be non-compliant, or where a suspect simply fails to move, officers may use pain compliance techniques, takedowns or chemical agents at Level 3.

A pain compliance technique may involve an officer using a joint lock (hand, arm or leg), or nerve compression method to create the sensation of pain without injury. In the same level of force, an officer may be authorized to use a takedown, which is a technique where an officer forces a suspect to the ground using a leveraging or pain compliance technique. Alternatively, an officer may simply use a chemical agent and spray the suspect, wait for the effect, and then order the suspect to comply.

At Level 4 on the force continuum officers are authorized to use Impact Weapons (baton, improvised striking tool), TASER (Electronic Control Device) in response to a subject who may be actively resisting by pulling away or try to evade an officer's grasp. A suspect who hides or conceals him or herself, or runs from police authority, is considered to be actively physically resisting within this force continuum.

In Level 5 of the force matrix and officer may use incapacitation techniques, which may include strikes, choke holds, or the lateral vascular neck restraint (LVNR) hold. At this level suspects are engaged in assaultive actions; including hitting, punching, or kicking. While incapacitating strikes are not intended to cause deadly injury, there is a possibility that death may occur (i.e., when an officer initiates a choke hold, incorrect pressure on the trachea may cause the windpipe to collapse).

At Level 6 of the force matrix, the officer perceives that the suspect's level of resistance or actions pose an imminent deadly threat to the officer or others, or that the subject's actions could cause serious bodily harm or injury to the officer or others. At this level, deadly force is legal and justified. A this level, a subject may be unarmed or armed with a knife or other edged weapon, bat or blunt object or weapons, or some other implement to include in some cases a vehicle, which has the potential to cause serious bodily harm or death. Subjects at this level may be subdued with potentially deadly strikes to the head, groin, neck, or chest, or by the discharging of a firearm. The standard of objective reasonableness in this scenario is the *Graham vs. Conner (1986)* standard as discussed earlier.

## *First Iteration*

### Suspect Resistance in First Iteration

While suspects may exhibit varying levels of resistance during an encounter, this level of resistance often changes during the confrontation between the police and subject. Of the 4,303 use of force reports reviewed for this study, most subjects showed "active physical resistance" initially (n = 2,727, 63.4%), this was followed by "aggressive physical resistance" (n = 782, 18.2%), "passive resistance" (n = 398, 9.2%), "verbal resistance" (n = 271, 6.3%), "aggravated physical resistance" (n = 121, 2.8%), and "presence" (n = 4, .1%).

**Table 14. Suspect Resistance in First Iteration**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Suspect Force | No additional Resistance | Count | 4 | 0 | 4 |
| | | % within Agency | .2% | .0% | .1% |
| | Verbal Yelling | Count | 17 | 2 | 19 |
| | | % within Agency | .7% | .1% | .4% |
| | Verbal Threat | Count | 44 | 5 | 49 |
| | | % within Agency | 1.8% | .3% | 1.1% |
| | Verbal Threat & Posture | Count | 196 | 103 | 299 |
| | | % within Agency | 8.0% | 5.6% | 6.9% |
| | Passive Resistance/Dead Weight | Count | 107 | 60 | 167 |
| | | % within Agency | 4.3% | 3.3% | 3.9% |
| | Brace/Tense Up | Count | 265 | 324 | 589 |
| | | % within Agency | 10.8% | 17.6% | 13.7% |
| | Pull Away | Count | 292 | 228 | 520 |
| | | % within Agency | 11.9% | 12.4% | 12.1% |
| | Suspect Flight | Count | 884 | 581 | 1465 |
| | | % within Agency | 35.9% | 31.5% | 34.0% |
| | Concealment | Count | 136 | 67 | 203 |
| | | % within Agency | 5.5% | 3.6% | 4.7% |
| | Push Away | Count | 59 | 56 | 115 |
| | | % within Agency | 2.4% | 3.0% | 2.7% |
| | Wrestle | Count | 35 | 64 | 99 |
| | | % within Agency | 1.4% | 3.5% | 2.3% |
| | Strike Punch Kick | Count | 364 | 317 | 681 |
| | | % within Agency | 14.8% | 17.2% | 15.8% |
| | Impact Weapon | Count | 17 | 12 | 29 |
| | | % within Agency | .7% | .7% | .7% |
| | Edged Weapon | Count | 29 | 13 | 42 |
| | | % within Agency | 1.2% | .7% | 1.0% |
| | Firearm | Count | 0 | 3 | 3 |
| | | % within Agency | .0% | .2% | .1% |
| | Vehicle | Count | 11 | 8 | 19 |
| | | % within Agency | .4% | .4% | .4% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

## Officer Force Used in First Iteration

In response to subject resistance, officers applied varying levels of force. Of the 4,303 use of force reports reviewed, 57.6% (n = 2,479) of the incidents resulted in a Level 4 response, and 37.1% (n = 1,597) were at Level 3. The remaining responses were at Level 2 (n = 154, 3.6%), Level 5 (n = 61, 1.4%), and Level 1 (n = 12, .3%). The following table details the extent of the officers' use of force that ended a confrontation at the first iteration, or "Event Ended". In addition the table reflects the type of force used and whether the confrontation continued "Event Continued." The majority of the cases 2,395 (55.7%) ended at the first iteration or first use of force. While 1,912 (44.3%) continued, TASER, chemical agents, compliance holds, takedowns, and canine deployments were the most frequently used less lethal techniques.

**Table 15. Officer Use of Force in First Iteration**

| | | | Ended in First Iteration | | |
|---|---|---|---|---|---|
| | | | Event continued | Event ended | Total |
| Officer's Force Used | No Force | Count | 143 | 1 | 144 |
| | | % within Officer's Force Used | 99.3% | .7% | 100.0% |
| | Gentle Hold | Count | 36 | 4 | 40 |
| | | % within Officer's Force Used | 90.0% | 10.0% | 100.0% |
| | Handcuff | Count | 38 | 35 | 73 |
| | | % within Officer's Force Used | 52.1% | 47.9% | 100.0% |
| | Leg Restraints | Count | 13 | 10 | 23 |
| | | % within Officer's Force Used | 56.5% | 43.5% | 100.0% |
| | Chemical Agents | Count | 182 | 329 | 511 |
| | | % within Officer's Force Used | 35.6% | 64.4% | 100.0% |
| | TASER | Count | 653 | 1460 | 2113 |
| | | % within Officer's Force Used | 30.9% | 69.1% | 100.0% |
| | Compliance Hold | Count | 333 | 64 | 397 |
| | | % within Officer's Force Used | 83.9% | 16.1% | 100.0% |
| | Takedown | Count | 307 | 215 | 522 |
| | | % within Officer's Force Used | 58.8% | 41.2% | 100.0% |
| | Empty Hand Strike | Count | 68 | 26 | 94 |
| | | % within Officer's Force Used | 72.3% | 27.7% | 100.0% |
| | FN303/PepperBall | Count | 3 | 4 | 7 |
| | | % within Officer's Force Used | 42.9% | 57.1% | 100.0% |
| | Impact Weapon | Count | 39 | 32 | 71 |
| | | % within Officer's Force Used | 54.9% | 45.1% | 100.0% |
| | Bean Bag | Count | 5 | 2 | 7 |
| | | % within Officer's Force Used | 71.4% | 28.6% | 100.0% |
| | K9 | Count | 92 | 209 | 301 |
| | | % within Officer's Force Used | 30.6% | 69.4% | 100.0% |
| Total | | Count | 1912 | 2391 | 4303 |
| | | % within Officer's Force Used | 44.4% | 55.6% | 100.0% |

Note: due to rounding, percentages may not total 100%

In examining their relative effectiveness rates in stopping confrontations in the first iteration, canines were effective 69.8% of the time, TASERs were 69% effective, chemical agents were 64% effective, and takedowns were effective 41.4% of the time. This rate of effectiveness needs to be considered also in light of the number of cases they represent. TASER deployments represented 2,113 total cases and by far exceeded the other techniques in the number of cases. While canine deployments were statistically more successful, the total number of cases (n = 301) should to be considered.

**TASER Deployment in First Iteration**

Both agencies utilized TASER as their electronic control device of choice, although during the course of this study some transition was made from the M-26 to the X-26 model. From the data collected for this study, TASERs were clearly the weapon/tactic used most. Nearly half (n = 2,113, 49.1%) of the use of force reports showed that officers used the TASER as first choice in response to suspect resistance, of those first responses that utilized a TASER, 8.3% (n = 176) were drive stuns.

In examining the effectiveness of TASER, specific attention was paid to the method for coding effectiveness, as this is highly controversial measure. It must be acknowledged that TASER International training suggests the use of multiple applications until compliance of the subject is achieved (TASER, 2004a). For the purpose of this study, a TASER deployment was coded as effective if after a five-second application a suspect became immediately compliant. To ensure clarification, this study defines a TASER deployment as a single application of the ECD (which entails pulling the trigger a single time and deploying the probes, or a drive stun). The researchers have viewed each application of a TASER as a single unique event and subsequent deployments are coded and captured as iteration II or if applied again, iteration III. In light of recent negative media coverage over multiple applications of TASER, we felt it prudent to capture the data in this manner.

It must be clear that the coding of "ineffective" in a single application does not necessarily mean that in the context of the complete encounter, TASER was ineffective rather only that a single use did not gain immediate suspect compliance. Viewed in this light, TASER may be disproportionately weighted, as a grapple or compliance hold may be applied for, in some cases, a minute or longer to gain compliance, whereas TASER was recognized only as a five-second cycle.

TASER was utilized by both agencies at a level four (active physical resistance) level. Both agencies aggressively embraced this technology, although Orlando Police Department did not issue

them until the third year of the study (2003). This provided an opportunity to examine the impact of TASER on officers' choices of force; there was a substantial transition away from chemical agents and officers quickly began to use TASER over alternative force options (Mesloh, Henych, Hougland, & Thompson, 2005). In reviewing the initial iteration alone, there were fifty-eight cases where TASER was deployed when deadly force could have been an appropriate option.

**Table 16. TASER Deployment and Relative Effectiveness**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Taser Deployment | Missed | Count | 146 | 63 | 209 |
| | | % within Agency | 9.9% | 9.8% | 9.9% |
| | Baggy Clothes | Count | 40 | 33 | 73 |
| | | % within Agency | 2.7% | 5.1% | 3.5% |
| | Probe came loose | Count | 10 | 3 | 13 |
| | | % within Agency | .7% | .5% | .6% |
| | Suspect broke wire | Count | 39 | 15 | 54 |
| | | % within Agency | 2.7% | 2.3% | 2.6% |
| | Suspected grabbed TASER | Count | 1 | 2 | 3 |
| | | % within Agency | .1% | .3% | .1% |
| | Malfunction | Count | 34 | 3 | 37 |
| | | % within Agency | 2.3% | .5% | 1.8% |
| | Cartridge Fell Off | Count | 6 | 2 | 8 |
| | | % within Agency | .4% | .3% | .4% |
| | Ineffective | Count | 283 | 169 | 452 |
| | | % within Agency | 19.3% | 26.2% | 21.4% |
| | Effective | Count | 910 | 354 | 1264 |
| | | % within Agency | 61.9% | 55.0% | 59.8% |
| Total | | Count | 1469 | 644 | 2113 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

Examining each force option, TASER was found to be the most successful tool for ending the confrontation. As shown in Table 15, TASER was immediately effective in over 69% of the cases in the first iteration. Again it should be noted that for the purposes of this study, immediate effectiveness was defined as a single deployment, followed by compliance on the part of the suspect. Likewise, if the single deployment did not gain compliance, it was coded as ineffective.

The apparent discrepancy in success rates between Table 15 and Table 16 are a result of coding methodology. Table 15 examines the success rate of each force option in ending the confrontation, while table 16 focuses solely on TASER performance. In many cases, the TASER was fired and one of the problems cited in Table 16 occurred (missed, hit baggy clothes, probe came

loose, etc.) and the suspect still surrendered. It is unclear if the firing of the weapon startled them into compliance or some other psychological mechanism was at work.

**Drive Stun (Touch Stun) in First Iteration**

The data collected in this study also captured information from the use of force reports where ECDs were deployed in a drive stun or touch stun manner. A drive stun is achieved by removing the cartridge from the ECD, activating the ECD, and then physically maintaining contact with the subject the subject and the ECD's contact points. As the name implies, a "drive stun" is where the ECD is pushed, or driven, into the subject preferably in a muscle mass. This contact can be a full five seconds, or can be less in duration, as the operator has the ability to retract the device thereby discontinuing or shortening the duration of the application. Situations included forcing belligerent, non-compliant suspects into handcuffs or into patrol cars after they were handcuffed, but remained uncooperative.

**Table 17. TASER Drive Stun (touch stun) in First Iteration**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Drive Stun 1 | No | Count | 2322 | 1805 | 4127 |
| | | % within Agency | 94.4% | 97.9% | 95.9% |
| | Yes | Count | 138 | 38 | 176 |
| | | % within Agency | 5.6% | 2.1% | 4.1% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

This application has advantages and inherent disadvantages, one advantage is that the ECD can be deployed in environments where firing the probes is inappropriate. Also the operator can reduce the duration of the charge, if the subject becomes immediately compliant, thereby reducing the need for an application of five seconds. However, officers are trained to use a full five second application to ensure that the suspect does not have a change of heart and immediately begin resisting again (TASER, 2004a).

In the data collected for this current study, a review of the number of drive stuns was completed. In the first iteration a total of 176 drive stuns (4.1% of all reported use of force actions) were made. In officer/suspect confrontations that extended into iteration 2 and 3, the drive stun

function was used 159 (3.7%) and 67 (1.6%) of the time. The following section examines data analyzed in the second iteration.

### *Second Iteration*

### Suspect Resistance in Second Iteration

In the 1,910 cases where the incident was not concluded by a use of force in the first iteration, most of the suspects that continued to resist the officer tended to either brace or tense up (n = 421; 22%), flee (n = 421; 22%), strike punch or kick (n = 367; 19.2%), pull away (n = 293; 15.3%) or wrestle (n =108; 5.7%). In a limited number of cases (4) where no additional resistance was reported, it is possible that some less lethal weapons were not immediately effective and as such the confrontation continued to the second iteration but was then resolved. Table 18 depicts the many different classifications of suspect resistance that continued into Iteration 2.

**Table 18. Suspect Resistance in Second Iteration**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Suspect Force 2 | No additional Resistance | Count | 2 | 2 | 4 |
| | | % within Agency | .2% | .2% | .2% |
| | Verbal Yelling | Count | 8 | 1 | 9 |
| | | % within Agency | .8% | .1% | .5% |
| | Verbal Threat | Count | 6 | 0 | 6 |
| | | % within Agency | .6% | .0% | .3% |
| | Verbal Threat & Posture | Count | 35 | 21 | 56 |
| | | % within Agency | 3.4% | 2.3% | 2.9% |
| | Passive Resistance/Dead Weight | Count | 38 | 12 | 50 |
| | | % within Agency | 3.7% | 1.3% | 2.6% |
| | Brace/Tense Up | Count | 158 | 263 | 421 |
| | | % within Agency | 15.6% | 29.4% | 22.0% |
| | Pull Away | Count | 155 | 138 | 293 |
| | | % within Agency | 15.3% | 15.4% | 15.3% |
| | Suspect Flight | Count | 248 | 173 | 421 |
| | | % within Agency | 24.4% | 19.3% | 22.0% |
| | Concealment | Count | 45 | 12 | 57 |
| | | % within Agency | 4.4% | 1.3% | 3.0% |
| | Push Away | Count | 41 | 49 | 90 |
| | | % within Agency | 4.0% | 5.5% | 4.7% |
| | Wrestle | Count | 49 | 59 | 108 |
| | | % within Agency | 4.8% | 6.6% | 5.7% |
| | Strike Punch Kick | Count | 213 | 154 | 367 |
| | | % within Agency | 21.0% | 17.2% | 19.2% |
| | Impact Weapon | Count | 5 | 5 | 10 |
| | | % within Agency | .5% | .6% | .5% |
| | Edged Weapon | Count | 6 | 1 | 7 |
| | | % within Agency | .6% | .1% | .4% |
| | Firearm | Count | 3 | 3 | 6 |
| | | % within Agency | .3% | .3% | .3% |
| | Vehicle | Count | 3 | 2 | 5 |
| | | % within Agency | .3% | .2% | .3% |
| Total | | Count | 1015 | 895 | 1910 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

## Officer Force in Second Iteration

As shown in Table 19, 1,264 cases ended after the officer applied a second application of force, however 648 cases still continued even after the second application of force. It is speculated that these cases represent the most motivated offenders/suspects.

### Table 19: Officer Level of Force Used in Second Iteration

| | | | Ended in 2nd Iteration | | |
|---|---|---|---|---|---|
| | | | Event continued | Event ended | Total |
| Officer's Force Used 2 | No Force | Count | 13 | 4 | 17 |
| | | % within Officer's Force Used 2 | 76.5% | 23.5% | 100.0% |
| | Gentle Hold | Count | 6 | | 6 |
| | | % within Officer's Force Used 2 | 100.0% | | 100.0% |
| | Handcuff | Count | 10 | 35 | 45 |
| | | % within Officer's Force Used 2 | 22.2% | 77.8% | 100.0% |
| | Leg Restraints | Count | 4 | 32 | 36 |
| | | % within Officer's Force Used 2 | 11.1% | 88.9% | 100.0% |
| | Chemical Agents | Count | 84 | 211 | 295 |
| | | % within Officer's Force Used 2 | 28.5% | 71.5% | 100.0% |
| | TASER | Count | 270 | 536 | 806 |
| | | % within Officer's Force Used 2 | 33.5% | 66.5% | 100.0% |
| | Compliance Hold | Count | 47 | 81 | 128 |
| | | % within Officer's Force Used 2 | 36.7% | 63.3% | 100.0% |
| | Takedown | Count | 101 | 166 | 267 |
| | | % within Officer's Force Used 2 | 37.8% | 62.2% | 100.0% |
| | Empty Hand Strike | Count | 41 | 63 | 104 |
| | | % within Officer's Force Used 2 | 39.4% | 60.6% | 100.0% |
| | FN303/PepperBall | Count | 1 | 2 | 3 |
| | | % within Officer's Force Used 2 | 33.3% | 66.7% | 100.0% |
| | Impact Weapon | Count | 39 | 41 | 80 |
| | | % within Officer's Force Used 2 | 48.8% | 51.3% | 100.0% |
| | Bean Bag | Count | 1 | 1 | 2 |
| | | % within Officer's Force Used 2 | 50.0% | 50.0% | 100.0% |
| | K9 | Count | 30 | 74 | 104 |
| | | % within Officer's Force Used 2 | 28.8% | 71.2% | 100.0% |
| | LVNR | Count | 1 | | 1 |
| | | % within Officer's Force Used 2 | 100.0% | | 100.0% |
| Total | | Count | 648 | 1246 | 1894 |
| | | % within Officer's Force Used 2 | 34.2% | 65.8% | 100.0% |

Note: due to rounding, percentages may not total 100%

In the second iteration, TASER appears to have a higher success rate as compared to the first iteration. This finding is in line with TASER International's training strategy, which teaches

multiple applications to bring a suspect into compliance. Traditionally, TASER success rates were measured looking only at the end result, regardless of the number of application. In this study, each subsequent TASER application was coded as a separate iteration so the use of the TASER could be examined in the context of multiple applications. In this second use of force iteration, there were 805 cases where TASER was used, of which 535 cases ended in this application. In examining the other less than lethal techniques employed, such leg restraints and handcuffs, it is not surprising that their respective success rates were high, as ECDs have the ability to almost completely handicap a suspect's ability to be resistant.

Chemical agents were also very successful, 71.5% in the second iteration. This is a high success rate that must be thoughtfully considered, however, as a chemical agent used in the first iteration may have had a delayed effect, bringing the subject into compliance only after a second application.

Canines were deployed 104 times in the second iteration, and as in the first iteration also had high success rates (71.2%). The opposite was found in cases when a gentle hold was administered in the second iteration; this less lethal method appears to be completely ineffective and in every application conflicts continued. This was the case for only a few cases (6) in the second iteration.

**Table 20: TASER Deployment in the Second Iteration**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| 2nd Taser Deployment | Missed | Count | 10 | 16 | 26 |
| | | % within Agency | 1.9% | 5.5% | 3.2% |
| | Baggy Clothes | Count | 10 | 8 | 18 |
| | | % within Agency | 1.9% | 2.8% | 2.2% |
| | Probe came loose | Count | 2 | 0 | 2 |
| | | % within Agency | .4% | .0% | .2% |
| | Suspect broke wire | Count | 13 | 4 | 17 |
| | | % within Agency | 2.5% | 1.4% | 2.1% |
| | Suspected grabbed TASER | Count | 1 | 2 | 3 |
| | | % within Agency | .2% | .7% | .4% |
| | Malfunction | Count | 5 | 5 | 10 |
| | | % within Agency | 1.0% | 1.7% | 1.2% |
| | Cartridge Fell Off | Count | 4 | 1 | 5 |
| | | % within Agency | .8% | .3% | .6% |
| | Ineffective | Count | 104 | 72 | 176 |
| | | % within Agency | 20.2% | 24.8% | 21.9% |
| | Effective | Count | 366 | 182 | 548 |
| | | % within Agency | 71.1% | 62.8% | 68.1% |
| Total | | Count | 515 | 290 | 805 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

### TASER Deployments in Second Iteration

The TASER continued to be the most successful tool for ending the confrontation, even in the second iteration. As shown in Table 20, TASER was effective in 68.1% (n = 548) of the cases in the second iteration. Missed probes, baggy clothes, loose probes, broken wires, malfunctions, and the suspect grabbing the TASER only accounted for 10% (n = 81) of the TASER deployments at the second iteration.

### Drive Stun (Touch Stun) in Second Iteration

For the second iteration, a review of the number of drive stuns was also completed. In the first iteration, a total of 176 contacts (4.1% of all weapons and tactics) were made and there were nearly as many drive stun contacts in the second iteration (n = 159) accounting for a 8.3% of the tactics used in the second iteration.

**Table 21: TASER Drive Stun in Second Iteration**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Drive Stun 2 | No | Count | 307 | 233 | 540 |
| | | % within Agency | 74.9% | 80.6% | 77.3% |
| | Yes | Count | 103 | 56 | 159 |
| | | % within Agency | 25.1% | 19.4% | 22.7% |
| Total | | Count | 410 | 289 | 699 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

## *Third Iteration*

### Suspect Resistance in Iteration 3

In the third iteration, that is cases that were not concluded by a use of force in the second or first iteration, there were 646 cases where the suspects continued to resist or failed to comply with officer's orders. Most of the suspects that continued to resist the officer tended to either brace or tense up (n = 185; 28.6%), flee (n = 421; 22%), strike punch or kick (n = 149; 23.1%) or wrestle (n = 65; 10.1%). While the cases are naturally lower in number, the type of resistance is very much the same as the types of resistance in Iterations 1 and 2.

In this level of suspect of resistance, it needs to be stated that conflicts that evolve into the full course of three iterations in this data set are not the norm. In law enforcement practices, it is

relatively uncommon for a suspect to resist, and the police to use force, during an encounter (Klinger, 1995; National Institute of Justice, 1999). An offender that escalates or deescalates conflict wherein officers use in time order several levels of the force continuum is a "one percenter" and should be considered the most highly motivated of suspects/offenders.

**Table 22. Suspect Resistance in Third Iteration**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Suspect Force 3 | Verbal Yelling | Count | 1 | 0 | 1 |
| | | % within Agency | .3% | .0% | .2% |
| | Verbal Threat | Count | 4 | 0 | 4 |
| | | % within Agency | 1.3% | .0% | .6% |
| | Verbal Threat & Posture | Count | 7 | 4 | 11 |
| | | % within Agency | 2.2% | 1.2% | 1.7% |
| | Passive Resistance/Dead Weight | Count | 11 | 5 | 16 |
| | | % within Agency | 3.4% | 1.5% | 2.5% |
| | Brace/Tense Up | Count | 57 | 128 | 185 |
| | | % within Agency | 17.8% | 39.3% | 28.6% |
| | Pull Away | Count | 33 | 25 | 58 |
| | | % within Agency | 10.3% | 7.7% | 9.0% |
| | Suspect Flight | Count | 52 | 52 | 104 |
| | | % within Agency | 16.3% | 16.0% | 16.1% |
| | Concealment | Count | 12 | 2 | 14 |
| | | % within Agency | 3.8% | .6% | 2.2% |
| | Push Away | Count | 15 | 15 | 30 |
| | | % within Agency | 4.7% | 4.6% | 4.6% |
| | Wrestle | Count | 30 | 35 | 65 |
| | | % within Agency | 9.4% | 10.7% | 10.1% |
| | Strike Punch Kick | Count | 92 | 57 | 149 |
| | | % within Agency | 28.8% | 17.5% | 23.1% |
| | Impact Weapon | Count | 1 | 1 | 2 |
| | | % within Agency | .3% | .3% | .3% |
| | Edged Weapon | Count | 5 | 1 | 6 |
| | | % within Agency | 1.6% | .3% | .9% |
| | Firearm | Count | 0 | 1 | 1 |
| | | % within Agency | .0% | .3% | .2% |
| Total | | Count | 320 | 326 | 646 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

In Table 23, the officer's level of force in response to suspect's resistance is decomposed. Again, as in the second iteration, the less-than-lethal weapons that were most frequently utilized were TASERs and chemical agents. While coding the data in this study, the research team did not find any of the 4,303 cases that extended past three distinct time-intervals, or iterations, during the confrontation.

**Table 23. Level of Office Force Used in Third Conflict Iteration**

| | Frequency | Percent |
|---|---|---|
| No Force | 1 | .2 |
| Handcuff | 16 | 2.5 |
| Leg Restraints | 24 | 3.7 |
| Chemical Agents | 108 | 16.7 |
| TASER | 272 | 42.2 |
| Compliance Hold | 35 | 5.4 |
| Takedown | 64 | 9.9 |
| Empty Hand Strike | 47 | 7.3 |
| Impact Weapon | 43 | 6.7 |
| Bean Bag | 2 | .3 |
| K9 | 32 | 5.0 |
| LVNR | 1 | .2 |
| Total | 645 | 100.0 |

Note: due to rounding, percentages may not total 100%. "K9" is an abbreviation for Police Canine, and "LVNR" is an abbreviation for the Lateral Vascular Neck Restraint hold.

On a cursory review, it would seem that the level of force used in this iteration was in all cases successful. However, this is overly simplistic as it does not take into account the prior levels of force used and their cumulative effect on gaining compliance from the suspects. A suspect who has been "TASERed" and sprayed with chemical agents and then wrestles with an officer may have become exhausted tired, disoriented and at that point either chooses to become compliant or is simply overpowered.

Thus, the added effects of force, and in some cases, multiple applications of use of force, as the conflict moves forward in time has a cumulative or total sum effect on gaining compliance. This concept is addressed in the following sections on "Force Factor" and "Cumulative Force Factors."

## TASER Effectiveness in Third Iteration

The TASER, as shown in Table 24, was effective in 81.51% (n = 221) of the cases in the third iteration. Missed probes, baggy clothes, loose probes, broken wires, malfunctions, and the suspect grabbing the TASER only accounted for 5.1% (n = 14) of the TASER deployments at the third iteration. Despite these issues, TASER was still responsible for the apprehension of 271 suspects.

**Table 24: TASER Deployment and Effectiveness in Third Iteration**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| 3rd Taser Deployment | Missed | Count | 0 | 5 | 5 |
| | | % within Agency | .0% | 4.2% | 1.8% |
| | Baggy Clothes | Count | 1 | 0 | 1 |
| | | % within Agency | .7% | .0% | .4% |
| | Suspect broke wire | Count | 4 | 1 | 5 |
| | | % within Agency | 2.6% | .8% | 1.8% |
| | Malfunction | Count | 2 | 0 | 2 |
| | | % within Agency | 1.3% | .0% | .7% |
| | Cartridge Fell Off | Count | 1 | 0 | 1 |
| | | % within Agency | .7% | .0% | .4% |
| | Ineffective | Count | 18 | 18 | 36 |
| | | % within Agency | 11.8% | 15.1% | 13.3% |
| | Effective | Count | 126 | 95 | 221 |
| | | % within Agency | 82.9% | 79.8% | 81.5% |
| Total | | Count | 152 | 119 | 271 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

## TASER Drive Stuns (Touch Stuns) in Third Iteration

Drive stuns were also reviewed for the third iteration. While the first and second iterations had very small uses of the drive stun tactic (4.1%, 8.3% respectively), the third iteration showed the highest percentage of all weapons and tactics used consisted of the drive stun (29.1%).

**Table 25: TASER Drive Stuns in Third Iteration**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Drive Stun 3 | No | Count | 67 | 96 | 163 |
| | | % within Agency | 60.4% | 80.7% | 70.9% |
| | Yes | Count | 44 | 23 | 67 |
| | | % within Agency | 39.6% | 19.3% | 29.1% |
| Total | | Count | 111 | 119 | 230 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

At the core of this study is the effectiveness of less-than-lethal weapons. The researchers, when proposing this study to the National Institute of Justice were mindful of the current debate over TASER. This less lethal weapon has caused much controversy and subsequently, research about a number of TASER related issues; many of which have been discussed previously in this report. In collecting over 4,300 use of force reports from two major law enforcement agencies that have whole heartedly introduced and placed TASERS into service, this research would not be complete without a detailed review of their impact on policing in central Florida. Over 50% of the coded use of force reports included TASER use, whether in Iteration I or later. This section addresses the TASER and examines it from a variety of perspectives.

**Table 26: Effectiveness of TASERs at Various Iterations**

| | Iteration 1 | | Iteration 2 | | Iteration 3 | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Missed | 209 | 9.9 | 26 | 3.2 | 5 | 1.8 |
| Baggy clothes | 73 | 3.5 | 18 | 2.2 | 1 | 0.4 |
| Probe came loose | 13 | 0.6 | 2 | 0.2 | 0 | 0 |
| Wire broke | 54 | 2.6 | 17 | 2.1 | 5 | 1.8 |
| Suspect grabbed | 3 | 0.1 | 3 | 0.4 | 0 | 0 |
| Malfunction | 37 | 1.8 | 10 | 1.2 | 2 | 0.7 |
| Cartridge fell off | 8 | 0.4 | 5 | 0.6 | 1 | 0.4 |
| Ineffective | 452 | 21.4 | 176 | 21.9 | 36 | 13.3 |
| Effective | 1264 | 59.8 | 548 | 68.1 | 221 | 81.5 |
| Total | 2113 | | 805 | | 271 | |

***TASER Analysis***

As stated earlier, the effectiveness of the ECD was coded depending on whether if, after a five-second application, a suspect became immediately compliant. It is important to review the use of the ECD throughout the multiple iterations of a conflict, as multiple applications of the TASER are often used to gain suspect acquiescence to police authority. As a percentage of use of the device, the TASER became more effective after multiple applications.

In the first iteration, the TASER was 59.8% effective, in the second, the device was 68.1% effective, and in the third iteration the device was 81.5% effective. Again, these effectiveness percentages reflect the direct effectiveness based upon a deployment of electrical charge into the suspect and not surrenders based upon a "startle reflex". In viewing the TASER as a means of ending confrontation, these percentages are significantly higher. When comparing the use of the TASER in the drive stun tactic to the deployment of probes through firing of the weapon, the drive stun was more effective in the initial iteration, although barely so in the second. Both the drive stun tactic and the probe deployment tactic gained (became more effective) in effectiveness in multiple iterations.

**Table 27. Comparison of Probe Deployment and Drive Stun Effectiveness**

| | Probe | | Drive Stun | |
|---|---|---|---|---|
| | N | % | N | % |
| Iteration 1 | 1151 | 59.4 | 113 | 64.2 |
| Iteration 2 | 365 | 67.7 | 108 | 67.9 |
| Iteration 3 | 131 | 80.4 | 56 | 83.6 |

The increase in both probe and drive stun performance of the TASER over iterations is consistent with the marketing and training by the parent company, TASER International (TASER, 2004a). Their training never suggests that a single application will always be sufficient to overcome suspect resistance. To the contrary, TASER International has maintained that multiple applications may be necessary and the individual officer must decide whether additional force is required. Despite negative media coverage touting abuse, multiple TASER deployments (delivered by probes or drive stun) may be necessary to obtain the effectiveness that agencies are seeking.

## Suspect and Officer Injuries

From a macro-view, substantially more suspects sustained injury than law enforcement officers. Twenty three percent (23%) of suspects were injured during force encounters, in comparison with only three percent (3%) of officers. Injuries to both officers and suspects tended to occur during traffic stops and disturbances, with the majority of injuries comprised of bruises and abrasions. However, a trend emerged once the data was deconstructed at the event level; as shown in Table 28, injuries to both suspects and officers increased in proportion to the length and duration of the confrontation. This in itself is not startling; it is common sense to expect that more injuries would occur in longer confrontations. Force, wielded by either officer or suspect, is cumulative and the more applications substantially increase the possibility of injury to either or both.

With reference to Table 28 "Suspect Injury Decomposed by Agency," suspects received injuries in 1,001 (23.3%) of the 4,303 cases. The most common type of injury was a bruise/abrasion (52%), followed by puncture wounds (29%). Although TASER deployments where probes are fired create small punctures, they were not coded as such in this analysis. Consequently, punctures coded herein are a result of canine bites or the suspect falling upon another object. It is important to note that almost all of the suspect injuries are the result of a fall during the course of forcible arrest.

**Table 28. Suspect Injury Decomposed by Agency**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| New suspect injury | Bruise/Abrasion | Count | 142 | 379 | 521 |
| | | % within Agency | 39.4% | 59.1% | 52.0% |
| | Sprain/Strain | Count | 9 | 8 | 17 |
| | | % within Agency | 2.5% | 1.2% | 1.7% |
| | Laceration | Count | 41 | 104 | 145 |
| | | % within Agency | 11.4% | 16.2% | 14.5% |
| | Puncture | Count | 158 | 133 | 291 |
| | | % within Agency | 43.9% | 20.7% | 29.1% |
| | Broken Bone/ Fracture | Count | 9 | 17 | 26 |
| | | % within Agency | 2.5% | 2.7% | 2.6% |
| | Internal Injury | Count | 1 | 0 | 1 |
| | | % within Agency | .3% | .0% | .1% |
| Total | | Count | 360 | 641 | 1001 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

### Suspect Injury by Levels/Iterations of Conflict

As the confrontation continues from iteration to iteration, the likelihood of injury rises. In the first iteration, suspects were injured in 11% (n = 469) of the cases. This number rises to 25% (n = 1,264) in the second iteration, and 33% (n = 648) in the third and final iteration. The most frequent call types involving suspect injuries were traffic stops, disturbances, and burglaries. Injuries related to burglaries were primarily a result of a canine deployment into a building to locate a hidden suspect.

Officers were injured in 136 cases (3.2%) and the most common injury was a bruise/abrasion (65%). The next most likely injury was a laceration (16%). Similar to suspects, officers were likely to be injured from falls while attempting an apprehension. The most frequent call types resulting in officer injury were traffic stops and disturbances.

**Table 29. Suspect Injury Analyzed by Number of Levels/Iterations**

| | | | Number of Levels | | | |
|---|---|---|---|---|---|---|
| | | | One Level | Two Levels | Three Levels | Total |
| New suspect injury | Bruise/Abrasion | Count | 237 | 162 | 122 | 521 |
| | | % within Number of Levels | 50.5% | 50.9% | 57.0% | 52.0% |
| | Sprain/Strain | Count | 8 | 8 | 1 | 17 |
| | | % within Number of Levels | 1.7% | 2.5% | .5% | 1.7% |
| | Laceration | Count | 58 | 47 | 40 | 145 |
| | | % within Number of Levels | 12.4% | 14.8% | 18.7% | 14.5% |
| | Puncture | Count | 160 | 88 | 43 | 291 |
| | | % within Number of Levels | 34.1% | 27.7% | 20.1% | 29.1% |
| | Broken Bone/ Fracture | Count | 6 | 12 | 8 | 26 |
| | | % within Number of Levels | 1.3% | 3.8% | 3.7% | 2.6% |
| | Internal Injury | Count | 0 | 1 | 0 | 1 |
| | | % within Number of Levels | .0% | .3% | .0% | .1% |
| Total | | Count | 469 | 318 | 214 | 1001 |
| | | % within Number of Levels | 100.0% | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

### Officer Injuries Examined by Agency and Level/Iteration

Tables 30 and 31 examine the rates of officer's injuries as compared to the employing agency, and then by the iteration of conflict in which they are engaged. In Table 30, both agencies are fairly equally represented in the number of injuries their officers sustained during confrontations.

The majority of injuries that occur are bruises and abrasions, which most commonly occur in scuffles where the suspect and the officer go to the ground and wrestle.

**Table 30. Officer Injuries by Agency**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Officer Injury | Bruise/Abrasion | Count | 45 | 43 | 88 |
| | | % within Agency | 65.2% | 64.2% | 64.7% |
| | Sprain/Strain | Count | 6 | 6 | 12 |
| | | % within Agency | 8.7% | 9.0% | 8.8% |
| | Laceration | Count | 11 | 11 | 22 |
| | | % within Agency | 15.9% | 16.4% | 16.2% |
| | Bite | Count | 4 | 4 | 8 |
| | | % within Agency | 5.8% | 6.0% | 5.9% |
| | Puncture | Count | 2 | 0 | 2 |
| | | % within Agency | 2.9% | .0% | 1.5% |
| | Broken Bone/ Fracture | Count | 0 | 3 | 3 |
| | | % within Agency | .0% | 4.5% | 2.2% |
| | Internal Injury | Count | 1 | 0 | 1 |
| | | % within Agency | 1.4% | .0% | .7% |
| Total | | Count | 69 | 67 | 136 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

In examining Table 31, it becomes immediately clear that the largest number of injuries occur at the third iteration. This iteration, as previously in this report, was captured from the third escalation, or in some cases, de-escalation of use of force and the resultant injuries. As the suspect/officer conflict continues forward in time (temporally), officers tend to be injured more frequently. In the first iteration, officers were injured 24 times, creating an injury rate of one percent (1%).

In conflicts where use of force and resistance ended at the second iteration, a total of 43 officers were injured (3% injury rate). In officer/suspect confrontations, which ended at the third iteration, 69 officers were injured (11% injury rate). The overall percentage of injuries (number of uses of force per iteration) increases substantially as the suspect and officer encounter continues. Overwhelmingly, the majority of injuries in all iterations were bruises/abrasions. This is not

surprising as conflicts where officers and suspect fight tend to mostly involve grappling, ground fighting, kicking, punching, biting, and blunt objects (i.e., sticks, bricks and any other object that can be thrown or swung) and injuries most often sustained come from contacts from the aforementioned scenarios. In over half of the cases where an officer was injured, the suspect also received an injury.

**Table 31. Officer Injuries by Iteration**

| | | | Number of Levels | | | |
|---|---|---|---|---|---|---|
| | | | One Level | Two Levels | Three Levels | Total |
| Officer Injury | Bruise/Abrasion | Count | 18 | 27 | 43 | 88 |
| | | % within Number of Levels | 75.0% | 62.8% | 62.3% | 64.7% |
| | Sprain/Strain | Count | 1 | 7 | 4 | 12 |
| | | % within Number of Levels | 4.2% | 16.3% | 5.8% | 8.8% |
| | Laceration | Count | 2 | 4 | 16 | 22 |
| | | % within Number of Levels | 8.3% | 9.3% | 23.2% | 16.2% |
| | Bite | Count | 1 | 3 | 4 | 8 |
| | | % within Number of Levels | 4.2% | 7.0% | 5.8% | 5.9% |
| | Puncture | Count | 0 | 2 | 0 | 2 |
| | | % within Number of Levels | .0% | 4.7% | .0% | 1.5% |
| | Broken Bone/ Fracture | Count | 2 | 0 | 1 | 3 |
| | | % within Number of Levels | 8.3% | .0% | 1.4% | 2.2% |
| | Internal Injury | Count | 0 | 0 | 1 | 1 |
| | | % within Number of Levels | .0% | .0% | 1.4% | .7% |
| Total | | Count | 24 | 43 | 69 | 136 |
| | | % within Number of Levels | 100.0% | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

Knowing what type of force was used, when injuries occurred, and the effectiveness of force is extremely important for examining police use-of-force encounters. However, the researchers of this study also determined that it was important to determine if officers were using force levels appropriate (too much or too little) based on suspect resistance.

## Force Factor and Cumulative Force

The force used by the police in a police-subject encounter, however, does not occur in a vacuum. "Virtually any inquiry concerning how or why officers use force is augmented by the inclusion of citizen resistance. Knowing an officer used force tells us very little without knowing

the specific type of force used, how many times it was used, and what the citizen behavior was prior to each use" (Terrill, Alpert, Dunham, & Smith, 2003, p. 157). Klinger (1995) noted that prior attempts to study non-lethal force in police encounters failed to examine that multiple levels of force may be used within a single encounter. Alpert and Dunham (1999) advocated the use of a "force factor" approach to measuring these encounters.

This force factor was calculated by subtracting officer force from suspect resistance. In their study, they found that police in Metro-Dade used force at a slightly higher level of force than the resistance provided by subjects. However, their examination used only the highest level of force by each the officer and the subject, and failed to take into account the possibility and likelihood of "multiple and successive citizen and police behaviors throughout each encounter" (Terrill, Alpert, Dunham, & Smith, 2003, p. 156). Further, the force factor created by Alpert and Dunham, utilized a constructed force matrix, which differed from a standard force continuum.

***Force Factor***

To understand the effects of force and its relation to injuries to suspects and officers, the researchers utilized a concept referred to as force factor and cumulative force. The concept of a "force factor" was used by Alpert and Dunham (1997) and was calculated by examining the differences in suspect resistance (suspect force) and officer force in response. While Alpert and Dunham devised an index measure to calculate these differences, the researchers in this study used the raw score as reflected on the use of force continuum which was standardized across the data collected from the two agencies. In this concept, a score of zero shows that officers met suspect's resistance on the same level on the use of force continuum (being mindful that the force continuum is designed so that officers use equal if not slightly higher force than that of the subject).

The concept is reflected in this example: police force takedown (level 3) – suspect resistance flight (level 4) = (- 1) force factor. However in the broader context of a complete incident, possibly consisting of several iterations, this measure becomes inherently less informative in that it only reflects the differences in one use of force encounter (iteration).

For this current study, the Florida Department of Law Enforcement (FDLE) Force Continuum was used as a reference, and force was coded to create a force factor for each iteration in the confrontation. This standardized the force continuums utilized by both agencies. The force

continuum provides guidance to the officer as to the maximum appropriate level of force to a given level of suspect resistance.

Overall officers within this study chose to use much less force than the resistance levels perceived. At first glance, this might to appear to be a positive finding, as officers are trained to use the least amount of force necessary to affect the arrest. However, there may have been an unintended consequence of this force choice, in that there were longer duration confrontations in the form of additional iterations. When the force factor of those cases where confrontation ends at the first iteration are compared with those that continue to second and third iterations, we found that there was a significant difference in their force factors (this is detailed in more detail later in this study).

**Table 32. Force Factor One Descriptive Statistics by Agency**

| Agency | Mean | N | Std. Deviation | Median |
|---|---|---|---|---|
| OCSO | -.3228 | 2460 | .95565 | .0000 |
| OPD | -.6283 | 1843 | .91862 | -1.0000 |
| Total | -.4536 | 4303 | .95195 | .0000 |

In examining descriptive statistics on the distribution of the data for Force Factor One, it is clear that in this respect the Orange County Sheriffs Office is negatively skewed, while the Orlando Police Departments Force Factor is positively skewed. A t-test (means analysis) of the differences between the two agencies force factors resulted in a significant difference (Sig. = .000; F = 111.34; d.f. = 4301). There is an explanation to explain this difference. OCSO originally placed TASER at a level three on the force continuum. However, for consistency, our analysis placed it at a level four, since this appears to be the location adopted by the majority of agencies and the location that both OPD and OCSO have since placed it. It is important to note that despite this issue, OCSO is consistently using less force than subject resistance levels.

**Table 33. Force Factor One Distribution by Agency**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Force factor 1 | -4.00 | Count | 7 | 0 | 7 |
| | | % within Agency | .3% | .0% | .2% |
| | -3.00 | Count | 19 | 30 | 49 |
| | | % within Agency | .8% | 1.6% | 1.1% |
| | -2.00 | Count | 260 | 253 | 513 |
| | | % within Agency | 10.6% | 13.7% | 11.9% |
| | -1.00 | Count | 592 | 742 | 1334 |
| | | % within Agency | 24.1% | 40.3% | 31.0% |
| | .00 | Count | 1271 | 676 | 1947 |
| | | % within Agency | 51.7% | 36.7% | 45.2% |
| | 1.00 | Count | 219 | 105 | 324 |
| | | % within Agency | 8.9% | 5.7% | 7.5% |
| | 2.00 | Count | 92 | 36 | 128 |
| | | % within Agency | 3.7% | 2.0% | 3.0% |
| | 3.00 | Count | 0 | 1 | 1 |
| | | % within Agency | .0% | .1% | .0% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

Table 33 reflects the score differences in the force factors between the officer's use of force and suspect's resistance for each unique case or force encounter at the first iteration. A large percentage of officers used an equivalent level of force compared to their perception of the subject's resistance as calculated on the force continuum (45.2% of the cases). However, what was surprising was that almost the same percentage of officers used less force than was allowable under the force continuum guidelines. Categories –1 and –2 are examples of officers in both agencies using one and two levels less than what would have been legal and justifiable according to the State of Florida and local agency use of force matrices.

**Table 34. Force Factor One Examined by Suspect Demeanor**

Force factor 1

| Suspect Demeanor | Agency | Mean | N | Std. Deviation |
|---|---|---|---|---|
| Calm | OCSO | -.2353 | 34 | .92307 |
| | OPD | -1.0000 | 2 | .00000 |
| | Total | -.2778 | 36 | .91374 |
| Visibly Upset | OCSO | -.0500 | 60 | .94645 |
| | OPD | -.2419 | 62 | .80338 |
| | Total | -.1475 | 122 | .87832 |
| Erratic | OCSO | -.1051 | 533 | .86071 |
| | OPD | -.2902 | 386 | .89370 |
| | Total | -.1828 | 919 | .87900 |
| Agitated | OCSO | -.2592 | 895 | .91584 |
| | OPD | -.6264 | 961 | .85445 |
| | Total | -.4494 | 1856 | .90320 |
| Highly Agitated | OCSO | -.5874 | 555 | 1.07357 |
| | OPD | -1.0313 | 383 | .95120 |
| | Total | -.7687 | 938 | 1.04784 |
| Total | OCSO | -.3009 | 2077 | .96543 |
| | OPD | -.6276 | 1794 | .91747 |
| | Total | -.4523 | 3871 | .95735 |

Note: Sig. = .000; F = 9.66; d.f. = 576

In this study, the variable "Suspect Demeanor" was highly predictive of officer use of force and a statistically significant difference was found. This is no surprise as a suspect's demeanor is a key indicator on an officer's focus to determine compliance. While not all cases are presented here, that is largely as a result of the data coder being unable to find details or evidence of a suspect's demeanor when reviewing incident and use of force reports. Table 34 shows the relationship of "Force Factor" to "Suspect Demeanor."

**Table 35. Force Factor Two Examined by Agency**

| | Agency | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Force factor 2 | OCSO | 999 | -.5626 | .92496 | .02926 |
| | OPD | 890 | -.6910 | .84584 | .02835 |

In examining Force Factor Two of each of the two agencies in this study in the second iteration, a statistically significant difference was found between them (Sig. = .002; T = 3.15; d.f =

1887). Again, in this force iteration, the actual differences in the force factor were numerically small but were nonetheless significantly different.

As in Force Factor One, the majority of officers in both agencies appeared to have used a level of force factor of (0) that is equal with the suspect's perceived resistance. However, as seen in the first force factor, officers again appeared to use less force than was legal or justifiable in this iteration. This is evidence in the distribution of score being weighted towards the negative score which, as indicated earlier, is evidence of officers using force that is on a lower tier or level on the force continuum. This appears to be the case for both agencies.

**Table 36. Force Factor Two Examined by Agency Distribution**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Force factor 2 | -4.00 | Count | 1 | 0 | 1 |
| | | % within Agency | .1% | .0% | .1% |
| | -3.00 | Count | 11 | 12 | 23 |
| | | % within Agency | 1.1% | 1.3% | 1.2% |
| | -2.00 | Count | 138 | 123 | 261 |
| | | % within Agency | 13.8% | 13.8% | 13.8% |
| | -1.00 | Count | 356 | 382 | 738 |
| | | % within Agency | 35.6% | 42.9% | 39.1% |
| | .00 | Count | 406 | 337 | 743 |
| | | % within Agency | 40.6% | 37.9% | 39.3% |
| | 1.00 | Count | 67 | 25 | 92 |
| | | % within Agency | 6.7% | 2.8% | 4.9% |
| | 2.00 | Count | 20 | 9 | 29 |
| | | % within Agency | 2.0% | 1.0% | 1.5% |
| | 3.00 | Count | 0 | 2 | 2 |
| | | % within Agency | .0% | .2% | .1% |
| Total | | Count | 999 | 890 | 1889 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

Significant differences in the force factor were found in the "Suspect Demeanor" variable for the second Force Factor calculation, as shown in

Table 37. This again is no surprise as the officer's use(s) of force are in many cases predicated on the officer's perception of the suspect demeanor which would be reflected in the report.

**Table 37. Force Factor Two Examined by Suspect Demeanor**

Force factor 2

| Suspect Demeanor | Agency | Mean | N | Std. Deviation |
|---|---|---|---|---|
| Calm | OCSO | -.5714 | 14 | .93761 |
| | OPD | .0000 | 2 | .00000 |
| | Total | -.5000 | 16 | .89443 |
| Visibly Upset | OCSO | -.2105 | 19 | 1.08418 |
| | OPD | -.6316 | 19 | .76089 |
| | Total | -.4211 | 38 | .94816 |
| Erratic | OCSO | -.3958 | 144 | .87081 |
| | OPD | -.4651 | 129 | .82012 |
| | Total | -.4286 | 273 | .84640 |
| Agitated | OCSO | -.4514 | 370 | .90110 |
| | OPD | -.6479 | 480 | .78809 |
| | Total | -.5624 | 850 | .84429 |
| Highly Agitated | OCSO | -.7860 | 271 | .96530 |
| | OPD | -.8938 | 226 | .92725 |
| | Total | -.8350 | 497 | .94876 |
| Total | OCSO | -.5489 | 818 | .93651 |
| | OPD | -.6834 | 856 | .84133 |
| | Total | -.6177 | 1674 | .89139 |

Sig. = .000; F = 12.12; d.f. = 1673

At the third force factor calculation, there was no statistically significant difference between agencies and the level of force they employ as a result of the suspects resistance. (Sig. = .590; d.f. = 642).

**Table 38. Force Factor Three by Agency**

| | Agency | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Force factor 3 | OCSO | 318 | -.6384 | .98796 | .05540 |
| | OPD | 326 | -.6779 | .86856 | .04811 |

In Force Factor Three, the majority of the officers in both agencies appear to have used a level of force factor of zero (0), that is equal with the suspect's perceived resistance. However, as seen in the first and second force factors, officers in both agencies reviewed again appeared to use less force than was legal or justifiable in this iteration.

In examining the force factor at the third iteration and comparing the distribution of the cases, over 90% of the force used by officers were on the same level of the force continuum as the suspects' resistance; however, as in the other force factor calculations, a disproportionate amount of the use of force falls at one or two levels below the suspects perceived resistance levels. This again indicates that in this data set the officers used less force than legally justifiable.

**Table 39. Force Factor 3 Distribution by Agency**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Force factor 3 | -3.00 | Count | 6 | 7 | 13 |
| | | % within Agency | 1.9% | 2.1% | 2.0% |
| | -2.00 | Count | 56 | 46 | 102 |
| | | % within Agency | 17.6% | 14.1% | 15.8% |
| | -1.00 | Count | 107 | 126 | 233 |
| | | % within Agency | 33.6% | 38.7% | 36.2% |
| | .00 | Count | 124 | 131 | 255 |
| | | % within Agency | 39.0% | 40.2% | 39.6% |
| | 1.00 | Count | 17 | 14 | 31 |
| | | % within Agency | 5.3% | 4.3% | 4.8% |
| | 2.00 | Count | 7 | 2 | 9 |
| | | % within Agency | 2.2% | .6% | 1.4% |
| | 3.00 | Count | 1 | 0 | 1 |
| | | % within Agency | .3% | .0% | .2% |
| Total | | Count | 318 | 326 | 644 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

As in force factors one and two, the demeanor of the suspect was a significant predictor in the third force factor calculation. Significant relationships were found between the suspect's demeanor and the level of force used; it is not surprising that the majority of the data points indicated subjects who were at "Erratic," "Agitated," or "Highly Agitated," while only a few subjects were either calm or visibly upset.

**Table 40. Force Factor Three Examined by Suspect Demeanor**

Force factor 3

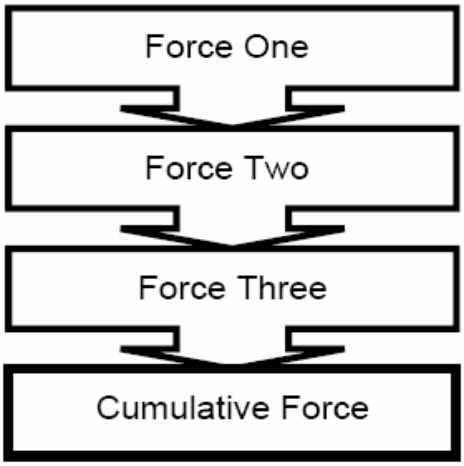
| Suspect Demeanor | Agency | Mean | N | Std. Deviation |
|---|---|---|---|---|
| Calm | OCSO | -1.0000 | 8 | .92582 |
| | OPD | | | |
| | Total | -1.0000 | 8 | .92582 |
| Visibly Upset | OCSO | -.6667 | 6 | 1.63299 |
| | OPD | .5000 | 4 | .57735 |
| | Total | -.2000 | 10 | 1.39841 |
| Erratic | OCSO | -.4783 | 46 | .78143 |
| | OPD | -.6098 | 41 | .70278 |
| | Total | -.5402 | 87 | .74404 |
| Agitated | OCSO | -.4519 | 104 | 1.02284 |
| | OPD | -.5556 | 153 | .80204 |
| | Total | -.5136 | 257 | .89748 |
| Highly Agitated | OCSO | -.8704 | 108 | .95792 |
| | OPD | -.8796 | 108 | .97365 |
| | Total | -.8750 | 216 | .96358 |
| Total | OCSO | -.6434 | 272 | .98776 |
| | OPD | -.6634 | 306 | .87278 |
| | Total | -.6540 | 578 | .92790 |

Sig. = .000; F = 5.93; d.f. = 577

### *Cumulative Force Factor*

Law enforcement confrontations often have an "ebb and a flow" as suspect resistance increases or decreases, while officer force changes to meet that immediate threat. Based upon the force factors created for each iteration, a cumulative force factor for the entire event was created. Force factors from the three iterations are combined and range from a score of -9 to +5. This cumulative score represents an overall picture of the confrontation and views force used by and against the police as a cumulative concept. A single application of force may or may not cause injury, but repeated applications are much more likely to create an injury to either suspect or officer.

**Figure 13: Cumulative Force Model**

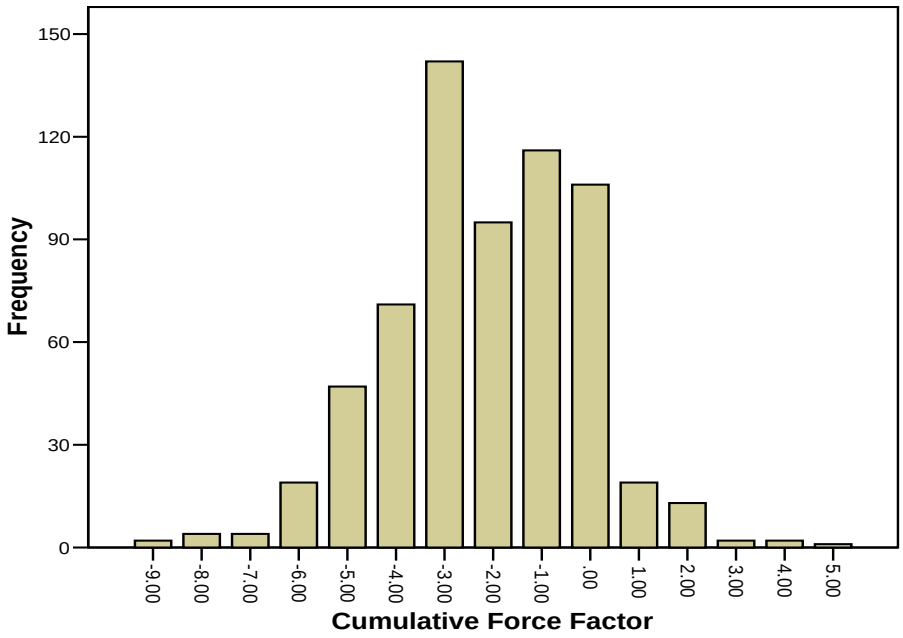



As such, the researchers utilized this concept and applied it in an aggregate manner in an attempt to capture three iterations and the outcomes on injuries for suspects and officers at the end of an altercation; whether one, two or three iterations. Cumulative Force Factor is calculated by Force Factor 1 (+/-FF1) + Force Factor 2 (+/-FF2) + Force Factor 3 (+/-FF3) = Cumulative Force (CFF). The concept of the Cumulative Force is detailed in Figure 14, above.

In this current study, the researchers found that overall it appears that law enforcement officers are operating at a ***force deficit***; the cumulative force factor in the cases examined was overall negative, indicating that consistently lower police levels of force (as standardized on the force matrix), are being used.

In examining Figure 15, the Cumulative Force Factor ranges from negative nine (–9) to positive five (5). For example, a –9 score is evidence of a large cumulative difference in officer and suspect resistance, in this case indicative of police using far less force than authorized. A positive five score would indicate the contrary, that the officer used far more force than was authorized based on perceptions of the subject's actions. Over the course of the conflicts, officers used extremely less force than the suspect, which in later analysis is highly correlated with higher officer and suspect injury rates.

**Figure 14. Cumulative Force Factor**




Additionally, the longer the conflicts continue from iteration to iteration, the more statistically significant the cumulative force factor becomes as a predictor for both suspect and officer injuries. Officers who consistently use less force than suspects therefore lead to longer confrontations and more injuries. This is clearly seen in Table 41, where the majority of use of force incidents show a negative cumulative force factor, reiterating that officers are consistently using less force than that of the suspects they are apprehending. This table and Figure 15, above, only reflect cases that went the full three iterations.

**Table 41. Cumulative Force Factor Examined by Agency**

| | Agency | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Cumulative Force Factor | OCSO | 317 | -2.0126 | 2.14944 | .12072 |
| | OPD | 326 | -2.2730 | 1.84032 | .10193 |

No statistical difference between the agencies (Sig. = .10; d.f = 641) and their cumulative force factors were noted; in the cumulative model, the two agencies used about the same amount of force over the course of confrontations that go through the iterations. Officers used less force than

suspects in 500 incidents (78.2%) and matched their force in 106 incidents (16.5%). In only 37 incidents (5.3%) officers used cumulatively greater force than suspects.

**Table 42. Cumulative Force Factor Examined by Agency**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Cumulative Force Factor | -9.00 | Count | 1 | 1 | 2 |
| | | % within Agency | .3% | .3% | .3% |
| | -8.00 | Count | 3 | 1 | 4 |
| | | % within Agency | .9% | .3% | .6% |
| | -7.00 | Count | 2 | 2 | 4 |
| | | % within Agency | .6% | .6% | .6% |
| | -6.00 | Count | 7 | 12 | 19 |
| | | % within Agency | 2.2% | 3.7% | 3.0% |
| | -5.00 | Count | 26 | 21 | 47 |
| | | % within Agency | 8.2% | 6.4% | 7.3% |
| | -4.00 | Count | 37 | 34 | 71 |
| | | % within Agency | 11.7% | 10.4% | 11.0% |
| | -3.00 | Count | 63 | 79 | 142 |
| | | % within Agency | 19.9% | 24.2% | 22.1% |
| | -2.00 | Count | 37 | 58 | 95 |
| | | % within Agency | 11.7% | 17.8% | 14.8% |
| | -1.00 | Count | 53 | 63 | 116 |
| | | % within Agency | 16.7% | 19.3% | 18.0% |
| | .00 | Count | 63 | 43 | 106 |
| | | % within Agency | 19.9% | 13.2% | 16.5% |
| | 1.00 | Count | 13 | 6 | 19 |
| | | % within Agency | 4.1% | 1.8% | 3.0% |
| | 2.00 | Count | 8 | 5 | 13 |
| | | % within Agency | 2.5% | 1.5% | 2.0% |
| | 3.00 | Count | 1 | 1 | 2 |
| | | % within Agency | .3% | .3% | .3% |
| | 4.00 | Count | 2 | 0 | 2 |
| | | % within Agency | .6% | .0% | .3% |
| | 5.00 | Count | 1 | 0 | 1 |
| | | % within Agency | .3% | .0% | .2% |
| Total | | Count | 317 | 326 | 643 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

In examining the outliers in this cumulative model there are several cases where the officer consistently operated at great force deficits. An example of this is listed below detailing an incident that could develop and result in such a negative force factor, or cumulative force deficit. The below table describes the formulation of a cumulative force factor based upon a hypothetical scenario as follows:

*During a traffic stop, a suspect flees during the arrest process. The officer gives chase and tackles the suspect. Immediately, the suspect attempts to take flight again and pushes the officer away. The officer grabs one of the suspect's arms and attempts to place a wrist lock on the suspect. Finally, the suspect breaks free of the hold by striking the officer in the face with his fist. The officer counters with a chemical agent deployment and the suspect is brought under control.*

As shown, the officer was operating at least one level below that of the suspect throughout all three iterations. Based upon the sum of the force factors for each of the iterations, a cumulative force factor can be created. For this hypothetical scenario, a -4 force factor would be produced (see Table 43, below).

**Table 43. Hypothetical Cumulative Force Factor Deficit**

| Suspect Resistance | Officer Force | Force Factor |
|---|---|---|
| 1) Flight (4) | Takedown (3) | (3) – (4) = -1 |
| 2) Push (4) | Control hold (3) | (3) – (4) = -1 |
| 3) Strike (5) | Chemical agent (3) | (3) – (4) = -2 |
| | Cumulative Force | -4 |

## Choice Models

Law enforcement has always sought the "phaser on stun" tool, which would allow an officer the ability to overcome suspect resistance quickly and without permanent injury. Officers are frequently required to make decisions within a fraction of a second, where the outcomes may be scrutinized for years by administrators, judges, and juries. These choices directly impact the way in which a confrontation plays out and the resulting duration of conflict. Table 44 compares each of the less lethal weapons across all three iterations in this study.

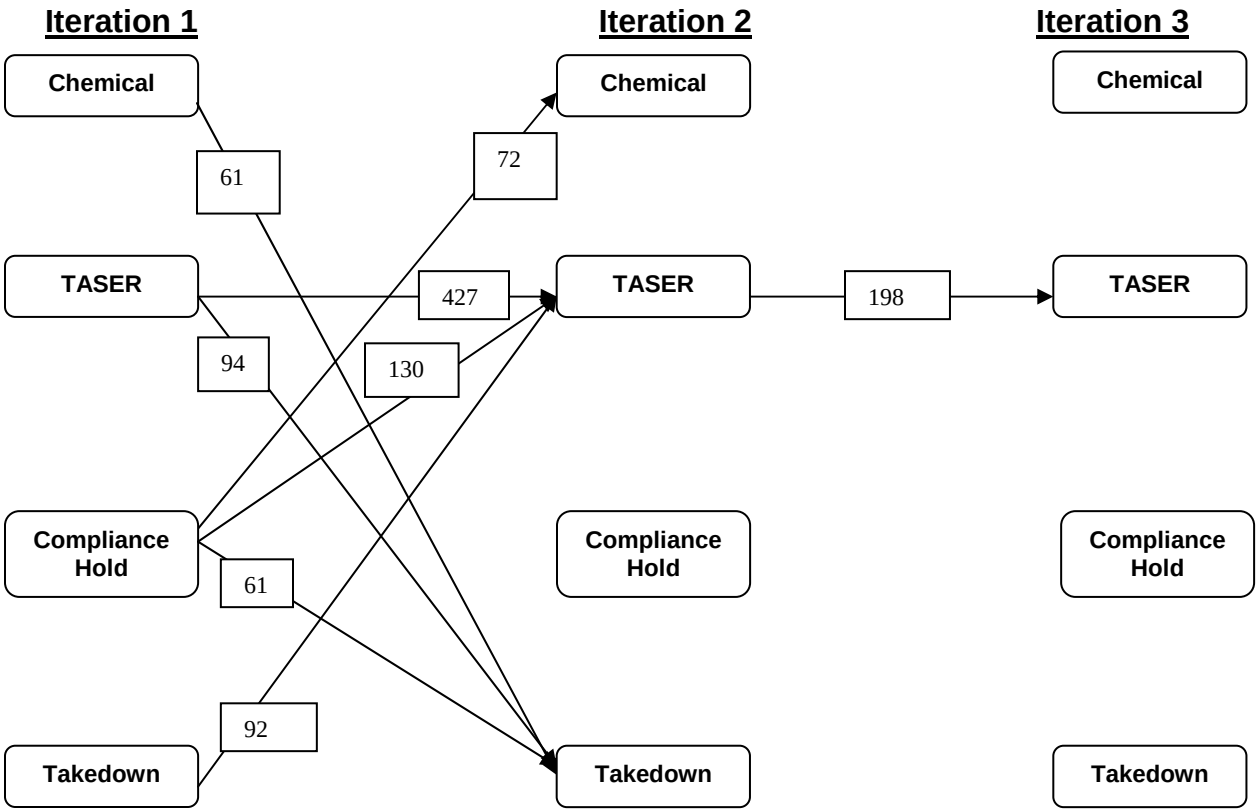
**Table 44. Less Lethal Weapon Success Rates by Iteration**

| | Iteration 1 | Iteration 2 | Iteration 3 |
|---|---|---|---|
| **Chemical agent** | 329 (64%) | 211 (72%) | 108 |
| **TASER** | 1460 (69%) | 536 (67%) | 270 |
| **Compliance hold** | 64 (16%) | 81 (63%) | 35 |
| **Takedown** | 215 (41%) | 166 (62%) | 64 |
| **Empty hand strike** | 26 (28%) | 63 (61%) | 47 |
| **Impact weapon** | 32 (45%) | 41 (51%) | 43 |
| **Pepperball** | 4 (57%) | 2 (67%) | 0 |
| **12 gauge beanbag** | 2 (29%) | 1 (50%) | 2 |
| **K9** | 209 (69%) | 74 (71%) | 32 |

Note: As all confrontations ended in the third iteration, no success rate is provided as it is assumed to be 100%.

TASER, chemical agents, and police dogs are clearly the leaders in bringing conflict to a close. However, as shown in the following Table 45 distinct pathways between the iterations can be seen in four force options.

**Table 45. Path of Choices in Confrontations**




Note: Pathways constructed with minimum of 50 events per pathway.

To develop Table 45, depicting a path model of confrontation, an arbitrary cut-off of fifty cases was used to create the pathway choices. Despite other interesting and potentially useful relationships being present, it was necessary to limit the number of pathways to a manageable number. Two distinct pathways between the first and second iteration are immediately noticeable. Multiple choices/paths lead to TASER, but surprisingly also to takedowns. It is surmised that once a tool or technique did not have the desired effect, officers may resort to hands-on techniques to force an immediate conclusion. This may be a result of training, prior experiences, or simply a lack of other options available at the time.

The pathway from second to third iteration is equally intriguing. While there were numerous force options between these iterations, only one met the fifty case cut-off point. This link between TASER in the second and third iterations is not surprising and is consistent with current ECD weapon training. What is surprising is the lack of consistency in the other force options available. When the temporal order in Table 46 is examined, multiple TASER deployments are clearly the most preferred option.

**Table 46. Temporal Order**

| Pathway | n |
|---|---|
| TASER-TASER-TASER | 98 |
| Compliance Hold-TASER-TASER | 42 |
| Takedown-TASER-TASER | 19 |
| Compliance Hold-Takedown-OC | 16 |
| OC-OC-OC | 16 |
| TASER-TASER-Takedown | 15 |

Note: (n = 645) represents all force pathways with more than 50 cases leading to outcome.

***Cumulative Force Factor and Injuries***

The following tables, Table 47, 48, and 49 examine the outcomes of the types of decision that took place during a use of force encounter. The cumulative force factor and the outcomes on injuries addressed the in the tables to follow details this concept.

Table 47 shows the difference in cumulative force factor of suspects and officers that are injured in the third iteration. An independent samples t-test was used to test the effects of force choices on outcomes. First, we examined the differences in force factor for officers that are injured ($M = -3.69$, $SD = 2.06$) or not injured ($M = -1.95$, $SD = 1.91$), which shows statistical significance, $t(641) = 7.07$, $p < .001$. The negative coefficient denotes a force deficit on the part of the officers.

Police officers are operating at a level below that of the suspects and it is mostly likely leading to their injuries.

**Table 47. Cumulative Force Factor by Officer Injuries: Descriptive Statistics**

| | Officer Injury Yes No | N | Mean | Std. Deviation |
|---|---|---|---|---|
| Cumulative Force Factor | No | 574 | -1.9582 | 1.91303 |
| | Yes | 69 | -3.6957 | 2.06016 |

The second analysis examined force factor and suspect injuries. Similarly, we found a significant difference, t (641) = 3.75, p <.001 between suspects that are injured (M = -2.57, SD = 2.16) or not injured (M = -1.93, SD = 1.88). This would appear to be counterintuitive; officers using a lower level of force causing more injuries. However, this same lower cumulative force level creates the need to use repetitive force in the form of iterations. When officers fail to subdue a suspect with a lesser form of force, they are again forced to respond to the suspect's resistance, which may cause some form of injury.

**Table 48. Cumulative Force Factor by Suspect Injuries: Descriptive Statistics**

| | Suspect Injured Yes No | N | Mean | Std. Deviation |
|---|---|---|---|---|
| Cumulative Force Factor | No | 429 | -1.9277 | 1.87878 |
| | Yes | 214 | -2.5794 | 2.16692 |

Greater amounts of force tended to bring conflict to resolution quicker, but it should be noted that officers were still using less force than the resistance level of the suspects. Additionally, in over 25% of the cases that extended beyond the first iteration, the suspect escalated their level of resistance.

In examining the escalation or de-escalation of force in a confrontation, Table 49 was developed in an attempt to quantify the number of times a subject escalated or deescalated any given scenario in cases that continued from Iteration One to Iteration Two. The majority of the cases that went from iteration one to iteration two saw suspect continue in the behavior set that precipitated Iteration one.

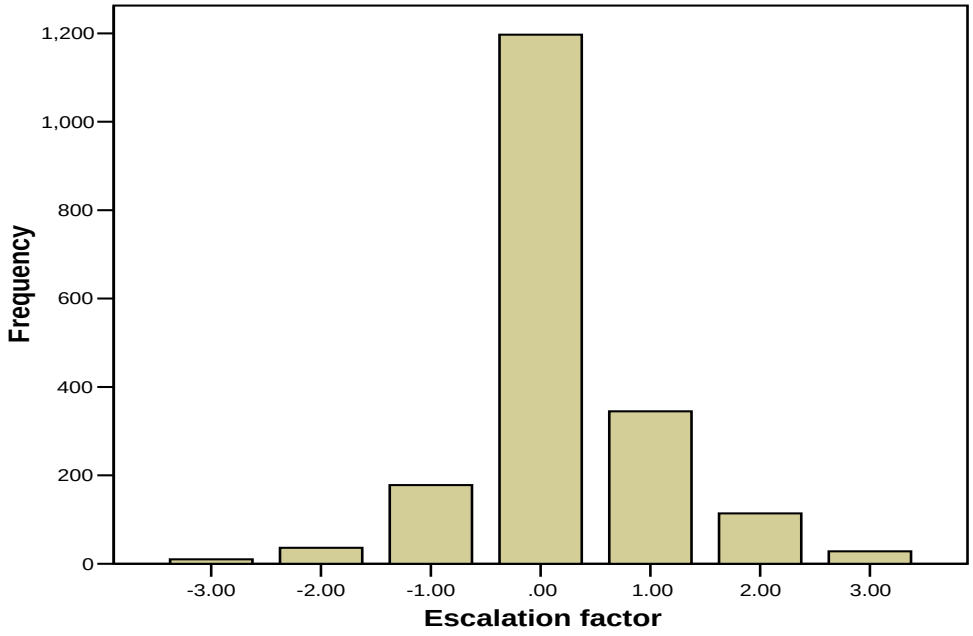
**Table 49. Escalation of Force from Iteration One to Iteration Two by Agency**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Escalate2 | De-escalate | Count | 98 | 126 | 224 |
| | | % within Agency | 9.7% | 14.1% | 11.7% |
| | Remain same | Count | 625 | 572 | 1197 |
| | | % within Agency | 61.7% | 63.9% | 62.7% |
| | Escalate | Count | 290 | 197 | 487 |
| | | % within Agency | 28.6% | 22.0% | 25.5% |
| Total | | Count | 1013 | 895 | 1908 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

Almost 63% of the suspects remained non compliant in the same manner as they initially were. A fair percentage of suspects actually escalated the confrontation; over 25% of the suspect escalated their level of resistance. A review of the distribution of the data examined on force escalation shows a relatively normal distribution, as seen in Figure 16 below.

**Figure 15. Escalation of Force by Factor**



**Deadly Force and Liability**

Any study about police use of force would be remiss without a discussion on deadly force and the outcomes this may have on liability for the agency and civil liability for all involved parties. Vicarious liability claims are frequent and can have big impacts on an agency and their policies and procedures. In the current legal environment, it is common for lawsuits to be filed against the police and it appears that the number of filings of 1983 claims (violation of civil rights) is on the rise. According to Ostrom (2001) the number of such claims in Florida has doubled between 1975 and 2000 (Ostrom, 2001).

The effects of the increased litigation on agencies are profound. Agencies tend to respond by increasing training for their cadets and others on the job, and they also most commonly write increasingly restrictive and more specifically defined policies. This trend stems from the expectation by society, which expects law enforcement to be more transparent and accountable. According to Fyfe (1997), officers should be held more accountable for errors made in judgments, which could have reasonably prevented the use of deadly force.

Also at the heart of this discussion is the financial cost to all parties involved. According to Christensen (2001) the City of Miami expended more than $19 million in civil liability claims since 1990 in trying to resolve more than 110 federal and state lawsuits; with a number still pending.

Recent literature indicates that a single case that is brought to the courts has potential financial impact of $85,000 to $95,000 (Connely, 2004). According to the Orange County Sheriff's Office, as of 2004 the cost for preparation of a significant deadly force incident is at least $100,000. This dollar amount accounts only for courts costs, not any judgments awarding damages. This dollar amount also does not account for individual costs by the officer or others involved, who may also have retained personal counsel.

**Deadly Force Cases Examined**

In the data examined, a number of cases existed wherein a level 6 suspect resistance was encountered. This is represented in the following, Table 50, which depicts suspects who had any type of weapon that could be considered deadly. Blunt objects 42% (n = 208), Edged Weapons 33% (n= 165), Firearms 18% (n = 92), and vehicles 7% (n = 35), accounted for 500 total cases out of 4,303 of suspect deadly resistance. These 500 cases represent 12% of all use of force reports

captured in this study. Most suspects (208) appeared to use blunt objects, which speculatively are objects of convenience for the suspect to pick up and wield as a weapon at the time of the incident.

**Table 50. Suspect Weapon Type**

| | | | Agency | | |
|---|---|---|---|---|---|
| | | | OCSO | OPD | Total |
| Suspect Weapon Type | No Weapon | Count | 2138 | 1665 | 3803 |
| | | % within Agency | 86.9% | 90.3% | 88.4% |
| | Blunt object | Count | 142 | 66 | 208 |
| | | % within Agency | 5.8% | 3.6% | 4.8% |
| | Edged Weapon | Count | 111 | 54 | 165 |
| | | % within Agency | 4.5% | 2.9% | 3.8% |
| | Firearm | Count | 50 | 42 | 92 |
| | | % within Agency | 2.0% | 2.3% | 2.1% |
| | Vehicle | Count | 19 | 16 | 35 |
| | | % within Agency | .8% | .9% | .8% |
| Total | | Count | 2460 | 1843 | 4303 |
| | | % within Agency | 100.0% | 100.0% | 100.0% |

Note: due to rounding, percentages may not total 100%

As this data was collected over a period of 5 years, the 500 potential deadly force incidents averaged to 100 such confrontations per year. However, in the cases reviewed, the officers did not respond with deadly force. Additionally, the data collected in this study focused exclusively on less lethal weapons, and as such no police shootings were captured or coded.

This being the case, the data collected supports the statement that in 500 cases officers were justified in using deadly force, but opted for an alternative. The alternatives were discussed in the above sections on choice models and less lethal deployments at Iterations 1 through 3. Thus, 500 people were not subjected to deployments of deadly force (firearms) when officers may have been legally justified in doing so; consequently in sparing those lives, the social costs were also spared. Additionally, the resources that would ultimately be expended in a use of deadly force investigation and potential litigation were also spared. Through this data it appears as though the officers for the Orange County Sheriff's Office and the Orlando Police Department have, through the use of less

lethal weapons and tactics, and possibly their cumulative force deficits, actually spared the lives of numerous suspects where they may have been legally justified in using deadly force.

## Conclusions and Implications

A police officer has discretionary power whenever he or she chooses 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. Thus, it is the ability to properly choose between these options, while weighing various factors that are at the heart of officer discretion. However, while the dynamics of the citizen/officer encounter and the law may constrain an officer's choices, they do not dictate the officer's response (Brown, 1988). 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 is a significant predictor of force by officers (Holmes, 1997) and the actions of the suspect may also determine the types of force that are used against them.

This study has a number of important implications related to TASER, less lethal weapons, and police use of force. TASER has emerged as a popular tool to gain immediate suspect compliance and there are a number of unresolved issues regarding its application and effectiveness.

Originally, TASER was placed at a level 3 (passive resistance), leading to considerably more deployments, as its use was considered discretionary. Recent in-custody deaths have prompted many agencies to re-evaluate the TASER's position in the force continuum and place additional restrictions upon its use. The Orange County Sheriff's Office was one of the last in the region to move TASER to a level 4 (active physical resistance), as they were hesitant to limit its use. A study commissioned by OCSO found a substantial reduction in officer injuries and Workers Compensation claims that were directly related to TASER deployments (Hopkins & Beary, 2003).

When examining conflicts at the event level, this research focused on TASER's ability to end officer and suspect confrontations. This ability is inherently a measure for their effectiveness. A total of 2395 use of force reports reported conflict ending at the first iteration. In the first iteration, TASERs were deployed 2113 times. Out of these deployments, 1459 ended the conflict at this level representing a 69% success rate at conflict resolution. In comparison, other less lethal weapon such as impact weapons represented 45% success rate, and compliance holds were successful 16% of the time, takedowns were successful in 41% of the cases, and chemical agents were 65% effective in

stopping conflicts before they escalated to a higher level, or an alternative was used. While the success rates for the other less lethal may appear high, they represent fewer than does TASER.

**Cumulative Force**

Prior research on use of force tends to examine the highest level of suspect resistance and officer force, while frequently ignoring the varying interactions of the confrontation. This study has attempted to dissect these interactions by pealing them away layer by layer (iterations). As a result, it was possible to view the ebb and flow of suspect resistance and corresponding officer force. Further, it views force by officers and suspects as cumulative in nature. While a single application of force may or may not cause injury, repeated applications certainly are more likely to cause harm. This has certainly been true in this study, as has been supported by the data. The injuries of both officers and suspects rose correspondingly with the length of the confrontations.

Unfortunately, it is nearly impossible to assign a true time value to these interactions, as each iteration may last only a few seconds to several minutes. This may correspond to the delay in perceived effectiveness for each less lethal force option, as instantaneous effects are rarely seen. For compliance holds and similar techniques, suspects may continue to fight through the pain for some time prior to submitting. A delayed effect has also been noted in chemical agent deployments and is compounded by drug or alcohol intoxication (Mesloh & Hougland, 2004). Electric weapons, like TASER, do not rely upon pain compliance and effects are realized much sooner. However, current training in TASER emphasizes the use of multiple applications until all resistance has ceased. Consequently, suspects that fail to immediately comply through placing themselves face down in handcuffing position may receive additional applications of the TASER. Further, this changes the way that officers operate as they can place the suspect in the position that puts the officer at the least risk for attack.

This research has identified a phenomenon, which the researchers refer to as a "Force Deficit." That is, in examining the cumulative force after three iterations, it appears as though the officers are consistently using less force than may be justifiable or necessary to subdue the suspect and end the confrontation. Thus, the use of decisive force early on in active suspect officer confrontations appears to be the solution in ending conflict quickly and thereby statistically reduce the likelihood of additional injuries whose rates increase as iterations 2 and 3 are examined.

**Choice Models**

Through the procurement of different less lethal weapon systems, an agency provides each officer with a range of options to overcome suspect resistance. Each agency controls and guides its personnel through its policies and the placement of the individual less lethal weapon within the force continuum. Despite this guidance, a great deal of discretion is left to the officer on the street. While an officer may have a fraction of a second to make a choice, it is clear that decision may be scrutinized for years to come.

Within "Level 4" (active physical resistance) of the force continuum, there are six less lethal tools/options from which the officer can select. Force continuums do not provide a rank-order for these weapons based upon severity of force or likelihood of causing injury. The officer is left to choose the best tool for the job, and this decision is most likely based upon their prior experiences and the availability of the weapon. Regardless of a particular weapon's effectiveness, if the officer does not have immediate access to it, he or she will probably opt for whatever else they do have at that particular time. Consequently, the most accessed less lethal weapons are those that are on the officer's duty belt and less likely to be those locked in the trunk of the patrol vehicle.

After deciding which weapons to carry on their person, the second choice an officer must make is the response to the suspect's initial resistance. In some cases, this decision has been limited by the actions of the suspect who may flee or fight and the officer must respond accordingly. However, in some cases, the suspect may resist and the officer has a broad range of discretion in determining his or her response. Starting at the police academy, the officer has been told to use the least amount of force necessary to affect the arrest. As a result, officers are understandably hesitant to immediately move to the higher end of the acceptable response options and may first try lower level techniques. The unintended consequence of this choice is that many of these techniques do not have high success rates for ending a confrontation and may serve to aggravate this situation through an escalation in resistance by the suspect. Additionally the confrontation may extend for longer periods of time, during which the likelihood of injury to both suspects and officers, according to this study, increases.

Consequently, it must be carefully stated that officers should be prepared to use *decisive force* at the point where verbal techniques of de-escalation have failed. This does not mean the deployment of a weapon against a passive suspect, but the preparation to use such a weapon if and when the situation calls for it. Once the suspect breaks the barrier of "Level 4" by becoming

actively resistant, an immediate deployment of a chemical agent or TASER is the most reasonable method for quickly ending the confrontation. Further, TASER deployments should not be ended prematurely (less than the recommended application of five seconds) and the officer should be prepared to deploy the weapon a second or third time if necessary. Although we did not encounter more than three TASER deployments within any case in this dataset, news media coverage indicates that four or more deployments against suspects can and do occur. As with other less lethal weapons, the limitation of TASER to a specific number of deployments may be difficult, as each case and circumstances should be viewed individually to determine its appropriateness. What can be said without reservation is that after a number of deployments that are not effective, an officer should start to consider other force options.

Probably the most surprising finding of this study was the value of the police working dog. Anecdotally, police dogs have always had a superior deterrence rate to many of the force alternatives. For the first time, their value in ending a confrontation can be quantified. In the initial stage of the confrontation (Iteration 1), their success in ending the confrontation was greater than both TASER and chemical agents. This is remarkable, as this form of force has been left relatively untouched by the extant literature in less lethal force options.

Clearly, the presence of a K9 team on the scene has the value of both deterrent and effective force option, leading to faster resolution of conflict. The police dog may be one of the few less lethal weapons that tend to receive support from both the public and the media, where the image of the vicious crime control dog of the 1960's has been recast as the "four footed community police officer of the 21st Century" (Mesloh & Surrete, 2002).

## Implications for Future Research

### Display of Force

Through an examination of the extant literature, the researchers have identified several areas for future study. First and foremost, an area is almost completely unstudied is the area of "Use of Force and Deterrence". Anecdotally, we know that certain less lethal weapons are more likely to gain suspect compliance simply by displaying them. As this is not captured in use of force reports, the data is not readily available for study and has consequently been ignored. An example of this compliance effect could be the drawing and displaying of a TASER device, then activating the laser sight; while not researched, police officers often report this alone causes suspect compliance.

Another example is through the police canine, police officers report that suspects rarely continue to resist once a police dog has been dispatched and arrives on scene. While officers report that these two options alone end a majority of confrontations, there has been no research in this area.

It is theorized that suspects do not gain street credibility by engaging officers armed with TASERS or police dogs in the same manner as they would if they engaged in a physical confrontation with multiple officers. In central Florida, there is reports of the criminal subculture having developed anecdotes to describe their confrontations with officers who were armed with TASERS. Statements like "two guns, don't run" refers to the pistol-like qualities of the TASER on an officer's gun belt, in addition to their issued firearm. This deterrent effect of less-lethal options is of much interest, and is worthy of future study.

**Temporal Analysis of Law Enforcement and Suspect Confrontations**

While this study creates a time-order of events through the coding of numerous iterations during a confrontation, further study is warranted to examine the duration of each iteration within the entire conflict event. The researchers are not aware of any other scholarly research that examines the various escalations and de-escalations of force on the force matrix that assigns a temporal component. While this current study begins to address this issue through the creation of a cumulative force factor, clearly more research in this area is needed to further expand upon the iterations and examine the actual amount of time spent in each iteration. Obviously each iteration could last anywhere from a fraction of a second to several minutes in length.

One possible method to capture the data needed to accomplish this type of study would be one in which all police and suspect confrontations were recoded on video media in real-time from start to finish. Researchers would then be able to review film media and compare all iterations and assign the exact time for each as a variable. In the current digital world, the costs of high quality digital cameras and data media storage devices is relatively inexpensive and as such makes the recording of these events more feasible.

**Conclusion**

TASERs play an important role in law enforcement. This research and this report show that electric weapons are deployed more frequently than other less-lethal weapons and tactics, but they also appear to enjoy higher success rates in conflict resolution. This success in bringing

officer/suspect confrontations to an end is invaluable as it has the effect of reducing injuries to all persons in the conflict. When officer and suspect confrontations continue into multiple iterations, the result is a much higher injury rate for both suspects and officers. This immediately begets the conclusion that the law enforcement community has a duty to use sufficient levels of less lethal force (and in some cases deadly force), at a legally acceptable level (equal or greater to that of the subject's level of resistance), quickly and decisively at the onset of a conflict. This may cause concern to some, especially if there is community distrust in the police; however, when properly administered in the hands of a legitimate police organization they may in fact be reducing injuries to all parties.

The fact that TASERs offer society the best "set phasers on stun" solution currently available makes them extremely appealing to police in use-of-force situations. Added to this are the many safeguards implemented by TASER International to identify when and where a TASER has been discharged. These electronic and physical tracking safeguards highly discourage improper use. In a police use of force confrontation, the most humane weapon or tactic would be one in which the resultant injury would be the least severe. While TASERs are not injury free (puncture wounds from dart probes, or skin burns from drive stuns), the alternative (broken bones from batons, burning pain from pepper spray, and potential death from firearm) makes them a preferential choice. Clearly this research has shown that electric weapons are very effective at ending conflict situations quickly, this in turn leads to less injuries to both suspects and officers.

# Appendix

## *Code Sheet, page 1*

**Agency**
0: OCSO
1: OPD

**Date**
123456

**Time**
Actual time

**Case #**

**Vehicle Pursuit**
1: Yes
0: No

**Off Duty**
0: Off Duty
1: On Duty

**In Uniform**
1: Yes
0: No

**Initial Incident**
1: Narcotics
2: Domestic Violence
3: Burglary
4: Robbery
5: Battery
6: Trespass
7: Suspicious Person
8: Outstanding Warrant
9: Alcohol Related
10: Agg Battery
11: Theft
12: Auto Theft
13: Baker Act
14: Prison Escape
15: Sexual Assault
16: Traffic
17: Runaway
18: Stalking
19: Deadly missile
20: Prostitution
21: Disturbance
22: Murder
23: 911 Hang-Up
24: Home Invasion
25: Uttering forged ID
26: Shooting

**Charge**
See Pre-trial Services

**Suspect Weapon**
1: Blunt Object
2: Edged Weapon
3: Firearm
4: Car

**Drugs Present**
1: Yes
0: No

**Alcohol Present**
1: Yes
0: No

**Drug/Alcohol Intox**
1: Yes
0: No

**Juvenile**
1: Yes
0: No

**Domestic Violence**
1: Yes
0: No

**Presence of Others**
1: Yes
0: No

**Backup Present**
1: Yes
0: No

**On View Violence**
1: Yes
0: No

**Suspect Demeanor**
1: Calm
2: Visibly Upset
3: Erratic
4: Agitated
5: Highly Agitated

**Officer Race**
1: White
2: Black
3: Hispanic
4: Asian

**Officer Gender**
0: Male
1: Female

**Officer Age**
In years

**Years on the Forc**
At time of incident

**Suspect Race**
1: White
2: Black
3: Hispanic
4: Asian

**Suspect Gender**
0: Male
1: Female

**Suspect age**
At time of incident

**Suspect Height**
Inches

**Suspect Weight**
Pounds

**Suspect BMI**

**Officer Badge #**
Numeric

**Assignment**
1: Patrol
2: Narcotics
3: K9
4: SWAT
5: CID
6: Other

**Officer Supervisor**
1: Yes
0: No

***Code Sheet, page 2***

**Officer Force Level**
1: Presence
2: Verbal Commands
3: DT, Pain, OC
4. Impact, TASER, K9
5: Incapacitating Strikes
6. Deadly Force

**Officer Force**
0: No force
1: Gentle Hold
2: Handcuff
3: Leg Restraint
4: Chemical Agents
5: TASER
6: Compliance Hold
7: Take Down
8: Empty Hand Strike
9: FN303/PepperBall
10: Impact Weapon
11: Beanbag
12: K9
13: LVNR
14: Deadly Force

**Suspect's Resistance**
1: Presence
2: Verbal Resistance
3: Passive Resistance
4: Active Physical Resis
5: Aggressive Physical
6: Aggravated Physical

**Suspect Force**
0: No additional resist
1: Verbal Yelling
2: Verbal Threat
3: Verbal Thrt/Posture
4: Passive/Dead weight
5: Brace/Tense Up
6: Pull Away
7: Suspect Flight
8: Concealment
9: Push Away
10: Wrestle
11: Strike, Punch/Kick
12: Impact Weapon
13: Edged Weapon
14: Firearm
15: Vehicle

**Suspect Injury Type**
1: Bruise Abrasion
2: Sprain/Strain
3: Laceration
4: Bite
5: Puncture
6: Broke bone/ fracture
7: Internal injury
8: Gunshot

**Officer Injury Type**
1: Bruise Abrasion
2: Sprain/Strain
3: Laceration
4: Bite
5: Puncture
6: Broke bone/ fracture
7: Internal injury
8: Gunshot
9: Fatality

**TASER Variables**
1: Missed
2: Baggy clothes
3: Probe came loose
4: Suspect broke wire
5: Grabbed TASER
6: Malfunction
7: Cartridge fell off
8: Ineffective
9: Effective
10: Suspect surrendered at sight of TASER

**Drive Stun**
0: No
1: Yes

***Code Sheet, page 3***

| | |
|---|---|
| **Agency**..... | **Suspect Height**..... |
| **Date**..... | **Suspect Weight**..... |
| **Time**..... | **Suspect BMI** ..... |
| **Case #** ..... | **Officer Badge #**..... |
| **Vehicle Pursuit** ..... | **Assignment**..... |
| **Off Duty** ..... | **Officer Supervisor**..... |
| **In Uniform** ..... | **Suspect's Resistance**.... |
| **Initial Incident**..... | **Suspect Force**..... |
| **Charge**..... | **Officer Force Level** ..... |
| **Suspect Weapon** ..... | **Officer Force**..... |
| **Drugs Present** ..... | **TASER1**..... |
| **Alcohol Present**..... | **Drive Stun1**..... |
| **Drug/Alcohol Intox** ..... | **Suspect's Resistance 2**.. |
| **Juvenile** ..... | **Suspect Force 2**..... |
| **Domestic Violence** ..... | **Officer Force Level 2** .. |
| **Presence of Others** ..... | **Officer Force 2**..... |
| **Backup Present**..... | **TASER2**..... |
| **On View Violence**..... | **Drive Stun2**..... |
| **Suspect Demeanor**..... | **Suspect's Resistance 3** |
| **Officer Race**..... | **Suspect Force 3**..... .... |
| **Officer Gender**..... | **Officer Force Level 3** .. |
| **Officer Age**..... | **Officer Force 3**..... |
| **Years on Force**..... | **TASER3**..... |
| **Suspect Race**..... | **Drive Stun3**..... |
| **Suspect Gender**..... | **Suspect Injury Type** |
| **Suspect age**..... | **Officer Injury Type** .... |

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