



Police use of force and the cumulative force factor

Police use
of force

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Abstract

Purpose – This paper aims to build on and contribute to earlier studies on use of force by the police, and examines both officer and suspect force levels during altercations.

Design/methodology/approach – Prior attempts to study non-lethal force have only recently begun to examine the multiple levels of force that may be used within a single encounter, advocating the use of a “force factor” approach. This study examines 4,303 “use of force” reports from the two agencies in Florida for a five-year period.

Findings – Similar to prior studies which utilized data gathered by observation, this current study finds that law enforcement officers are operating at a force deficit; officer levels of force are consistently less than suspect resistance levels.

Research limitations/implications – Data examined through police reports have certain inherent limitations, including the bias of the reporting officer. Analyses of these reports make it impossible for researchers to determine the length of each portion of a conflict. While verbal commands, threats, handcuffing, and takedowns may be important forces to review, they are not well represented in the data collected.

Practical implications – These findings have critical implications for law enforcement by continuing to examine conflicts where police force is utilized, showing the importance of officers to be prepared to use decisive force at the point where verbal techniques and force de-escalation have failed.

Originality/value – This paper is valuable to scholars and police practitioners because it continues to expand the scholarly review of police use of force, utilizing existing force continua to analyze the data, and taking into account levels of suspect resistance.

Keywords Police, Police misconduct, Complaints against police

Paper type Research paper

Introduction

While excessive force and deadly force by the police may garner the attention of the media, lower levels of force, including verbal commands, takedowns, and handcuffing, are routinely used by police without much notice. Bittner (1970), and others (e.g. Garner *et al.*, 2002; Reiss, 1971; Scharf and Binder, 1983; Sherman, 1980), claim that the



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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 and Travis, 1999). While law enforcement officers are legally justified to utilize force in many situations, police training on the use of force has no single consistent method to demonstrate the best response to subject resistance levels (Alpert and Dunham, 2004). As a result, researchers also encounter problems in the compilation and interpretation of the data available on law enforcement use of force.

Through observational studies of police work, examination of 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 other than handcuffing (Alpert and Dunham, 2004; Bazley *et al.*, 2007; Dunham and Alpert, 1995; Garner and Maxwell, 1999; Klinger, 1995; National Institute of Justice, 1999; Sykes and Brent, 1983). Judgments to use force, and decisions concerning the extent of force to be used, are within the discretion of law enforcement officers. Thus, an individual officer must decide in each situation whether to ignore, or to confront and attempt to persuade or coerce a citizen to follow his/her direction. 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. Research in the areas of use of force, and subsequent suspect injuries, has most often focused on the type of force used by the police officer and the suspect, excessive force, and officer misconduct. This current study followed a more recent approach to research in this area and examined situations that law enforcement officers used force, and the actions taken by them and citizens during the encounter. These confrontations were then decomposed at the event level into a series of iterations consisting of officer actions and reactions, and suspect actions and reactions.

This study has foundation in the prior work by Terrill (2005; see also Terrill *et al.*, 2003) and Alpert and Dunham (2004), who examined the force factor in numerous agencies. The current study builds on the prior concept of a “force factor” by examining 4,303 police use of force reports from the Orlando Police Department and the Orange County Sheriff’s Office in the ongoing attempt by researchers to better understand law enforcement response to suspect resistance. The data obtained in this current study allowed the researchers to create a sequence of iterations within each incident, breaking each police-suspect encounter down to successive suspect and police behaviors. These iterations are examined by breaking each reported action and reaction of the event into the concept of a force continuum (Alpert and Dunham, 2004; Garner *et al.*, 1995; Stetser, 2001; Terrill, 2005). Following in the footsteps of research by Terrill (2005), the current study uses a standardized use force continuum to determine the level of force utilized by officers in reported encounters.

Literature review

Law enforcement officers are legally justified and sometimes obligated to utilize force in situations to bring people to justice, protect others, and for personal defense (Patrick and Hall, 2005); the fact that citizens must submit to the legal application of force is a price paid for living in a regulated society (Stetser, 2001). Bittner (1970) went so far as to say that no matter what task the police are involved with, police intervention means

making use of the authority and ability to overpower resistance. This ability to use force and coercion in the performance of police duties has been recognized and carefully studied over the last several decades of police research (Alpert and Dunham, 1999, 2000, 2004; Bazley *et al.*, 2007; Garner *et al.*, 2002; Reiss, 1971; Scharf and Binder, 1983; Sherman, 1980; Walker and Fridell, 1993).

It is important to understand and define force in the framework of law enforcement. 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). However, finding a uniform definition regarding police levels of force and what amounts to reasonable force in a police encounter is not as clear. While deadly force, or the application of force likely to cause great bodily injury or death (Fyfe, 1988; Patrick and Hall, 2005; Stock *et al.*, 1998), may be fairly simple to identify, measuring and defining other types of police force is not so easy (Alpert and Dunham, 2004). The literature defines “non-deadly force”, “non-lethal force”, or “less-than-lethal force” as the application of force that is not likely to result in death or serious bodily injury (Klinger, 1995; Pate and Fridell, 1993). Included as non-lethal force, “physical force” implies the touching, prodding, redirection, come-along techniques, or physical manipulation of a subject to comply with demands (Garner *et al.*, 1996), whereas “non-physical force” implies the use of threats or other verbalization techniques to gain compliance (Clede, 1987; Terrill, 2003).

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 (National Institute of Justice, 1999), observational accounts of police force incidents (Klinger, 1995; Terrill, 2003, 2005; Terrill and Mastrofski, 2002), analysis of official police records and use-of-force reports (Morabito and Doerner, 1997; Ross, 1999), citizen complaints about the use of force (Cao, 1999; Hickman, 2006; McCluskey and Terrill, 2005), and surveys of police officers or arrested persons (Garner and Maxwell, 1999; Garner *et al.*, 1996; Pate and Fridell, 1993). While each type of data collection has strengths and weaknesses, the review of police records may have certain advantages over other categories. Garner *et al.* (2002) explain that this type of review provides more organized data on more use of force incidents than do 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. Use of force reports may also provide a more consistent data collection strategy (Terrill, 2005) than observational studies. 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 (Alpert and Dunham, 2004; Stetser, 2001), and often lack clarity and detail in how the interaction played out. However, agency records “are usually described by more than one officer and sometimes by witnesses, which mitigates the bias somewhat, as all reports of each incident are compared” (Stetser, 2001, pp. 29-30). The other types of data collection, however, may also have inherent bias. Observational studies intrinsically may create bias in that the observer may affect the actions of the persons being observed (Stetser, 2001).

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 *et al.*, 2003, p. 157). The sequence and temporal order of actions and statements made by officers and civilians during encounters was examined by Sykes and Brent (1983). They examined nearly 5,000 encounters between the police and the public recorded through field observations, breaking those encounters down to examine sequence of statements, or "utterances" (Sykes and Brent, 1983, p. 3), made by the police during the interaction.

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 (2000) 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 *et al.*, 2003, p. 156). Alpert and Dunham (2004) re-examined this issue by looking at the sequence of events that occur from the moment the officer arrives on the scene. In this examination it was noted that while there are variations in patterns of interaction, "overall it becomes clear that the levels of police use of force do not exceed the levels of suspect resistance" (p. 91). In the vast majority of cases reviewed for that study, approximately 90 percent showed that officers reacted with "commensurate force" (p. 95), or the same amount of force as the subject, or with similar force (one step higher or lower) throughout the sequence. Alpert and Dunham found that only in about 10 percent of the cases did force fall into extremes, either positive or negative, and most extremes were officers using far less force than the subjects in the encounter.

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 *et al.*, 1995, 1996; Klinger, 1995; Terrill, 2005). The use of force continuum relies on the concept of multiple categories of increasing officer perceptions of suspect resistance linked to groupings of acceptable officer response to those perceptions. As law enforcement officers are expected to make 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. Law enforcement officers incorporate these force continua 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 continua within agency policies are not universal, they all rely on legally and publicly acceptable responses by the police (Garner *et al.*, 1995). These frameworks attempt to capture the nuances of subject resistance and police force while still acknowledging that police-suspect interactions are dynamic. Built upon Bittner's (1970) contention that police force must be a product of the situation, a force continuum proposes that officers should progressively examine and react to each situation, de-escalating once resistance has declined or stopped (Adams, 1999; Smith and Alpert, 2000; Terrill, 2005; Williams, 2002). These continua are largely based on the common

law interpretation that police officers need not retreat when confronted with resistance and the *Tennessee v. Garner* (1985) and the *Graham v. Connor* (1989) decisions by the United States Supreme Court, which held that there must be an objective reasonableness when evaluating the type of force used by the police. This reasonableness in the application of force relies heavily on the circumstances at the time of the encounter, including: if the suspect was an immediate threat to the safety of the officers or others; the severity of the crime; and whether the suspect resists police attempts to arrest. "The 'reasonableness' of a particular use of force must be judged from the perspective of a reasonable officer on the scene, and its calculus must embody an allowance for the fact that police officers are often forced to make split-second decisions about the amount of force necessary in a particular situation" (*Graham v. Connor*, 1989, p. 2).

An additional consideration regarding continuums is that some agencies, often for fear that their own policy may result in legal action against them, no longer use them or never adopted them (Peters and Brave, 2006). Williams (2002) argues that officers should not be taught force from a continuum, but agencies should train based on the parameters of force for each weapon and tactic, the imminent danger to the officer, the degree of injury the weapon or tactic may produce, and thorough knowledge of federal law, case law, and state statutes. Terrill and Paoline (2007), however, report that over 70 percent of police agencies in the USA utilize some form of continuum in their agency policies. Even when used, however, there is only general agreement on how to subdivide the categories within it (Stetser, 2001).

Figure 1 is a generally accepted and standardized use of force matrix that is a conglomeration of similar continua utilized by agencies in the State of Florida. Figure 1 shows acceptable police responses to the subject's resistance as perceived by the officer. The lower left of the figure shows suspect resistance, which is perceived by the officer to be very low; this corresponds to the officer's acceptable response to that resistance, which is also very low, on the lower right of the figure. As suspect resistance moves higher, or up the chart, the officer's acceptable force responses also increase. If a suspect increases their resistance level, the officer may respond with a legally and justifiable higher level of force; however, if a suspect de-escalates resistance, the officer is expected to decrease their use of force to the appropriate "lesser" level of force as indicated on the use of force continuum. "Lesser" in this context does not imply less force than the suspects resistance dictates; rather, the lesser level of force still uses the *Graham v. Connor* (1989) standard, or such force that is reasonable and necessary. Verbal resistance (verbally refusing to obey an order, for example) is a distinctly different level of threat than assaultive physical resistance (trying to hit or punch the officer); therefore the police should respond proportionately to the resistance level of the subject. Additionally, if an officer attempts to gain control of a subject at a proportional level of resistance, but is unable, the officer may escalate force to achieve control.

The reality is that officers must be able to make jumps up or down the force continuum, escalating or deescalating immediately to the "appropriate" level of force. As this type of linear use of force continuum could easily be interpreted to mean that an officer must use each "step" before going to a higher level, some agencies have moved away from this type of continuum (Peters and Brave, 2006). Instead, officers and citizens need to know that officers are justified in responding to perceptions of force

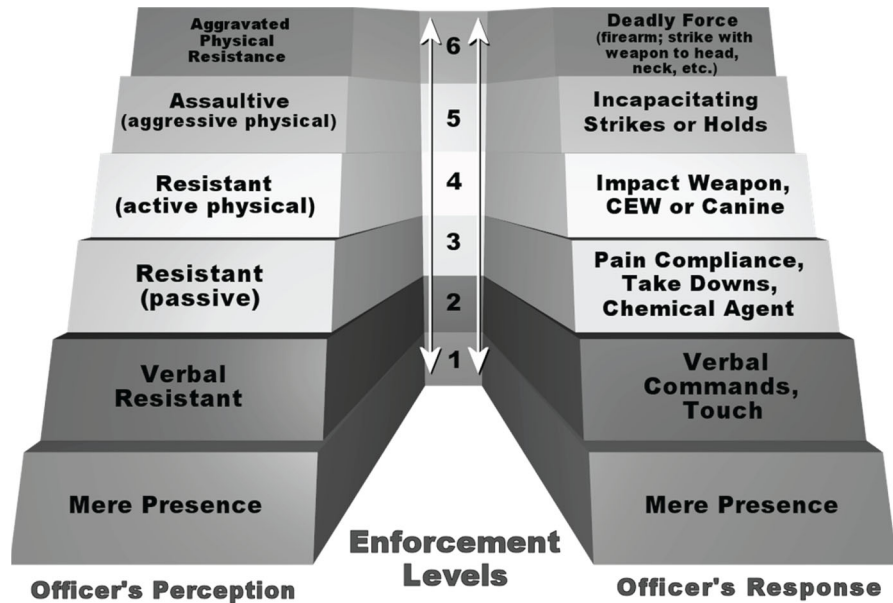


Figure 1.
Resistance/force
continuum

Notes: "CEW" is the abbreviation for Conducted Energy Weapon; TASER is the brand of CEW used by both agencies in this study

with equal reactions. Some agencies have therefore moved toward adopting non-linear or circular force continua to avoid the impression that the appropriate force response must be addressed through a stepwise progression.

Understanding use of force and less-than-lethal force

The objective reasonableness constitutional legal standard allows law enforcement to have varying tactics and weapons to control behavior and to make arrests; each of which may have varying levels of effectiveness. Studies on the police use of force have focused not only on the success of a particular force application by the police (Klinger, 1995), but also on the potential for suspect and officer injuries (Smith and Petrocelli, 2002; Smith *et al.*, 2007). While many studies of police use of force include only the use of weapons as a measurement of force, others include weaponless tactics and verbal threats in their analysis (Garner *et al.*, 2002). Meyer (1992) examined not only the effectiveness of police tactics and weapons, but also the likelihood of injuries. He determined that a tactic or weapon was effective if it ended the altercation. Meyer concluded that the expanded use of non-lethal weapons could result in fewer injuries to suspects and police officers (Meyer, 1992; see also Smith and Petrocelli, 2002).

Alpert and Dunham (1999) reported that most police and suspect injuries in altercations are relatively minor. However, they reported that it was "clear that officers and suspects are most at risk for injury during relatively low-level encounters where officers use hands, arms, and legs to control suspects" (p. V-4). Of particular importance in this review was the finding that suspects were most likely to suffer injury when officers used physical force to control a suspect or when they struck a

suspect with their fists, and that officer injury is more likely to occur when the officer uses less force relative to the suspect's resistance level.

Several researchers have used these variations in force within altercations to develop measurement techniques to understand these encounters. Alpert and Dunham (1999) created a "force factor" approach to measuring the police/subject encounter by focusing on the relative amount of force applied by the police as compared to the suspect's amount of resistance. Force factor scores are derived by subtracting the highest level of suspect resistance from the highest level of police force. Terrill (2003; see also Terrill, 2005) expanded the use of force factors by computing not only the highest level of resistance and force within each incident, but all incidences of subject resistance and police force observed within an encounter.

This current research builds on both of these prior studies utilizing an overall cumulative force factor by integrating the concept of a force continuum and Alpert and Dunham's (1999, 2004) force factor with the transactional nature of suspect resistance and officer force during an encounter. This cumulative force factor, detailed further below, serves to further describe and explore event-level use of force encounters between law enforcement officers and suspects.

Methodology

This current research seeks to identify both citizen and officer uses of force at the event level. When officers are trained to use force, they are trained to interpret situational factors and respond in kind with a level of force which has been pre-determined by state and federal law, the agency, the agency's legal staff, and interpretations of case law as reasonable (Alpert and Dunham, 2004; Patrick and Hall, 2005; Stetser, 2001). Agency policy and training influence these decisions by the use of force continua, as depicted in Figure 1. This action/reaction scenario is at the heart of the event-level confrontation. As the confrontation evolves, the officer/s and suspect/s may escalate and de-escalate up and down the force continuum in a temporal order that may be extremely dynamic.

The data collected in this current project from the Orlando Police Department (OPD) and Orange County Sheriff's Office (OCSO) use-of-force reports were broken down into temporal events to reflect how both subjects acted and officers reacted in confrontations where force was used. While these temporal events may detail many derivations of resistance and force (hereafter referred to as "iterations"), the models generally follow an escalation of force temporally (Terrill, 2003).

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 percent white, 27 percent African-American, 17.5 percent Hispanic, 2.7 percent Asian, and 0.4 percent other. The median age of the population is 32.9 years, and 40.8 percent of the population owns their own home. A total of 82 percent of the 25 years-or-older population within the city limits of Orlando has a high school (or

equivalent) education or higher, 19.9 percent have a Bachelor's degree, 8.3 percent 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 percent (Goltz, 2006).

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. The Orange County Sheriff's Office serves as the primary law enforcement agency for any areas of the county that are not incorporated. Those living in unincorporated Orange County are 68.6 percent white, 18.2 percent African-American, 18.8 percent Hispanic, 3.4 percent Asian, and 0.4 percent other. The median age of the population is 33.3 years, and 60.7 percent of the population owns their own home; 81.8 percent of the 25 years-or-older population within the city limits of Orlando have a high school (or equivalent) education or higher, 18.3 percent have a Bachelor's degree, 7.9 percent 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 percent (Goltz, 2006).

Data collection

"Use of force" reports are a regular tool that many law enforcement agencies use in accounting for force utilized by their officers. They are an extension of an incident report in that they attempt to capture information related to an officer's use of force during an encounter as a sub-component of a larger incident. For both of the participating agencies in this study, use-of-force report data included specific information regarding the type of force used in an encounter, whether less lethal or deadly, the type of resultant injuries, and a narrative with qualitative data. In addition to use-of-force reports, this research endeavor utilized agency offense reports, for additional qualitative and time-line (temporal) data. Both OCSO and OPD require that officers complete use-of-force reports only for those incidents where a weapon was used by the officer or where the subject may have been injured as a result of the force applied. Therefore, while punches and strikes would be captured, simple handcuffing techniques, grabs, weapon displays, and verbal commands would not have been recorded unless a larger level of force was also used by the officer, or if the subject sustained some type of injury.

The OCSO and OPD records were obtained by a public records request at each agency under provisions in Florida law. Each agency was requested to provide their agency's use-of-force reports and accompanying documentation to include arrest affidavits (or "charging affidavits") and offense reports dated inclusively from the years 2000 to 2005. Grant funding provided resources to comply with payment for the public records request. Of the non-duplicate reports ($n = 4,303$) that were compiled and reviewed, 57.2 percent ($n = 2,460$) were from the Orange County Sheriff's Office and 42.8 percent ($n = 1,843$) were from the Orlando Police Department.

Researchers coded and categorized use of force data through suspect resistance and officer level/s of force utilizing the standardized use of force continuum developed for this study. Officer levels were coded against a standard measure ordered from

1 (presence) to 6 (deadly force), as were suspect resistance levels. If the confrontation was not brought to resolution immediately, a second and third iteration captured this data. Other key variables of importance included the resistance type, or “suspect force”, ranked from 0 (no additional resistance) to 15 (vehicle), and the complimentary variable “officer force” ranked from 0 (no force) to 14 (deadly force).

During the collection of the data, it was determined that analogous reports existed as a result of the documentary procedures of the law enforcement agencies. The police agencies used for this study ensured that all officers present at an event documented the incident using a unique case number as a primary key. Subsequently when multiple officers were present during an event, there were several case numbers and several reports for the same incident. In order to resolve this, every case was sorted by date, month and year. They were then organized chronologically and duplicate reports were combined by hand selection into one event report. In single incidents that had multiple officers and multiple suspects, each of those were treated as separate events. In cases where there were multiple officers and a single suspect, the officer who responded at any particular time with the most force was interpreted to be the police response.

Method

The police use-of-force report and accompanying documents provide a large amount of data. Both OPD and OCSO agency policies and legal standards require that officers detail events when force is used. The use-of-force report is written specifically to explain the officer’s 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.

It is important to note that there is no universally accepted specific rank order of either police use of force or suspect resistance levels, or of actions within each level of resistance or reaction. To overcome this obstacle, the researchers of this current study held a focus group meeting of police trainers and administrators, developing a continuum structure that was consistent with both the OCSO and OPD policies (see Table I). Using methodology similar to both Terrill (2005) and Alpert and Dunham (1999), the researchers measured and ranked police force in relation to suspect resistance. The researchers relied heavily on the work of Alpert and Dunham (1999) by examining the sequential process (or iterations) of the encounters. A single “iteration” was defined as any occurrence of suspect resistance coupled with police force. Again, similar to the methodology of Alpert and Dunham (1999), each iteration paired suspect behavior with that of the police officer, resulting in a coded sequence or force factor.

Table I shows the force actions and continuum/matrix levels utilized to code variables in this study. Depicted on the left side of the table are subject resistance types and the corresponding matrix/continuum levels. To understand the effects of force and its relation to injuries to suspects and officers, the researchers utilized both concepts of force factor and cumulative force factor (Alpert and Dunham, 2004). Calculating a raw score was 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, as used by Alpert and Dunham (2004) to reflect the entire event, or as used in this current study to

Resistance type (matrix level)	Officer force reaction (matrix level)
0. No resistance (1)	0. Presence (1)
1. Verbal resistance: yelling (2)	1. Gentle hold (2)
2. Verbal resistance: threat (2)	2. Handcuff (2)
3. Verbal resistance: threat/posture (2)	3. Leg restraints (2)
4. Passive resistance: dead weight (3)	4. Compliance hold (3)
5. Brace/tense up (4)	5. Takedown (3)
6. Pull away (4)	6. Chemical agent (3)
7. Flight (4)	7. CEW (4)
8. Concealment (4)	8. Empty hand strike/punch (4)
9. Push away (5)	9. Impact weapon (4)
10. Wrestle (5)	10. Pepperball (4)
11. Strike: punch/kick (5)	11. Less lethal munitions (4)
12. Impact weapon (6)	12. K9 (4)
13. Edged weapon (6)	13. LVNR (5)
14. Firearm (6)	14. Deadly force (6)
15. Vehicle (6)	

Note: These resistance levels, ordered from least resistance to most resistance, and officer force reactions, ordered from least force to most force, 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 Figure 1. "CEW" is the abbreviation for Conducted Energy Weapon; TASER is the brand of CEW used by both OPD and OCSO. "K9" is the abbreviation for a police canine; "LVNR" is the abbreviation for lateral vascular neck restraint, a hold that places pressure on the blood vessels of the neck

Table I.
Ordered resistance type
and ordered officer force
reaction

reflect a single temporal event (being mindful that the force continuum is designed so that officers use equal if not slightly higher force than that of the subject).

Force factor

For this current study, a generalized force continuum was created from review of both OPD and OCSO use of force policies and discussions with a focus group. Subject resistance and officer force were coded to create a force factor for each iteration within the confrontation. This standardized the force continua utilized by both agencies.

Over half of the confrontations ($n = 2,391$, 55.5 percent) ended in the first iteration, slightly less than 30 percent ($n = 1,264$, 29.4 percent) of the confrontations ended at the second iteration, while approximately 15 percent ($n = 648$) ended in the third iteration (see Table II). Contrary to research by Terrill (2005) in which observers recorded as many as 17 sequences (defined differently than an iteration, as any

		Number of levels						Total
		One		Two		Three		
		<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	
Agency	OCSO	1,444	58.7	695	28.3	321	13.0	2,460
	OPD	947	51.4	569	30.9	327	17.7	1,843
Total		2,391	55.5	1,264	29.4	648	15.1	4,303

Note: Due to rounding, percentages may not total 100 percent

Table II.
Number of use of force
levels or events (defined
as iterations)

occurrence of suspect resistance, police force, or both), and Alpert and Dunham's (2004) research where observers recorded as many as ten actions (described as one side, either the suspect or officer, of an iteration) in an encounter, the current review of police use of force reports did not reveal any confrontations that extended beyond three iterations of force, although there were some cases where the suspect escaped and could not be identified. It should be noted, however, that Terrill's research revealed that most (80.3 percent) encounters involved only one ($n = 2, 258$) or two sequences ($n = 588$), and 96 percent of encounters ($n = 3, 406$) involved less than five sequences. Certainly a factor which could have resulted in fewer iterations reported would be the nature of the measurement for this current study, using officer-written reports, compared to the aforementioned observational studies. Unquestionably officer reports may be more summarizing in content and would have been the product of officers' recollection of the event. While an observer may be able to break down a confrontation to additional actions, an officer recalling the event in official record might not remember every step in the interaction.

Overall, officers within this study chose to use less force than the resistance levels perceived. This result is in support of Alpert and Dunham's (2004) earlier findings that officers did not tend to use excessive levels of force. At first glance, the results of this current study might 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. The longer the conflict continues between the officer and suspect, there is "more likely [to] be use of force, even with only nonviolent resistance from the suspect" (Alpert and Dunham, 2004).

In examining descriptive statistics on the distribution of the data for Force Factor One, it is clear that in this respect OCSO's Force Factor is negatively skewed, while OPD's is positively skewed. A t -test of the differences between the two agencies force factors resulted in a significant difference ($t(4, 301) = 10.55, p < 0.001$). However, there may be a justification for this difference. OCSO originally placed TASER at level three on the force continuum. However, for consistency, our analysis placed it at 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 force levels were consistently less than subject resistance levels.

Table III 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. The first iteration shows that 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 percent 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 continua.

Cumulative force factor

As suspect resistance increases or decreases during a confrontation, officer force should change to meet the shifting immediate threat. Based upon the force factors

Table III.
Force factor one
distribution by agency

Force factor	Iteration 1		Iteration 2		Iteration 3		Total	
	OCSO n	OPD n (%)	OCSO n	OPD n (%)	OCSO n	OPD n (%)	Total n	Total n (%)
-4	7	0.3	1	0.1	0	0	1	0.1
-3	19	0.8	11	1.1	12	1.3	23	1.2
-2	260	10.6	138	13.8	123	13.8	261	13.8
-1	592	24.1	356	35.6	382	42.9	738	39.1
0	1,271	51.7	406	40.6	337	37.9	743	29.3
1	219	8.9	67	6.7	25	2.8	92	4.9
2	92	3.7	20	2	9	1	29	1.5
3	0	0	0	0	2	0.2	2	0.1
Total	2,460	100	999	100	890	100	1,889	100
							318	100
							326	100
							0	0
							13	2.1
							102	14.1
							233	38.7
							255	40.2
							31	4.3
							9	0.6
							1	0
							644	100

Note: Due to rounding, percentages may not total 100 percent

created within each iteration, a cumulative force factor for each event or confrontation was created. Force factors from the total iterations were combined, and ranged in score from -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. The researchers utilized this notion and applied it in an aggregate manner in an attempt to capture the possible three iterations and the outcomes at the end of an altercation. The cumulative force factor was calculated as Force Factor 1(\pm FF1) + Force Factor 2(\pm FF2) + Force Factor 3(\pm FF3) = Cumulative Force Factor (CFF). This cumulative force factor can be used as a comparative tool for the total force levels used by different officers in different situations.

In examining the outliers in this cumulative model, there are several cases where officers 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. Table IV describes the formulation of a cumulative force factor based upon the following scenario:

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 wristlock 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 take-down maneuver 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 V).

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 largely negative, indicating that consistently lower police levels of force (as standardized on the force matrix), are being used. Both Terrill (2005) and

	Officer		Suspect	
	M	SD	M	SD
Not injured	-1.96	1.91	-1.93	1.88
Injured	-3.7	2.06	-2.58	2.17
<i>t</i>	7.07*		3.75*	

Table IV.
Cumulative force factor
by suspect and officer
injuries

Notes: * $p < 0.0001$ (one tailed); SD, standard deviation; M, mean

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)	Takedown (3)	(3) - (5) = -2
	Cumulative force	-4

Table V.
Example of cumulative
force factor deficit

Alpert and Dunham (2004) found similar results in their studies. When dealing with resistant suspects, Terrill (2005) found that officers were operating at a force deficit in three out of every four cases. In Alpert and Dunham's (2004) review of force in Miami, Florida ($\bar{x} = -0.14$) and Prince George's County, Maryland ($\bar{x} = -0.12$), they found that officers used slightly less force than the level of suspect resistance they encountered overall.

As can be seen in Figure 2, the Cumulative Force Factor ranges from negative nine (-9) to positive five (5). A cumulative force factor score of -9 would suggest an extremely large cumulative difference in officer and suspect resistance, in this case indicative of police using less force than authorized in each iteration of an encounter. The cumulative force factor score of +5, however, would indicate the contrary, i.e. that the officer used more force than was authorized in each iteration of an encounter. Over the course of the conflicts, officers tended to use extremely less force than the perceived suspect resistance level. Officers used less force than suspects in 500 incidents (78.2 percent) and matched their force in 106 incidents (16.5 percent). In only 37 incidents (5.3 percent) did officers use cumulatively greater force than suspects.

Table IV represents the cumulative force factors for all conflicts involving three iterations. A negative coefficient denotes a force deficit on the part of the officers. Table IV indicates that as officers operated at an increased force deficit they were more likely to be injured, as were suspects. Operating at a use of force level below that of the suspect is therefore a likely contributor to suspect and officer injuries.

Discussion and implications

This research therefore contributes to the larger study of police use of force by utilizing methodology similar to both Terrill (2005) and Alpert and Dunham (1999), measuring

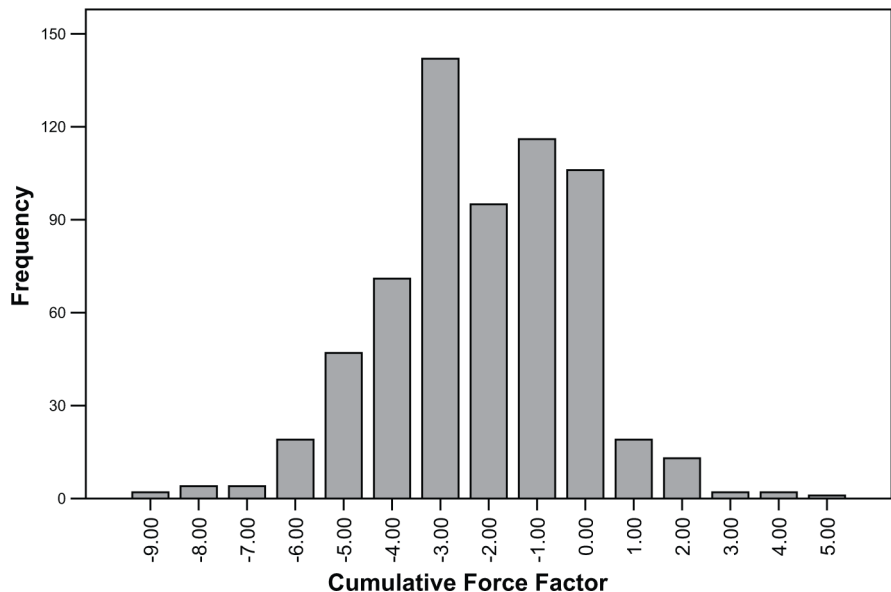


Figure 2.
Cumulative force factor

and ranking police force in relation to suspect resistance. However, this current study utilized a standardized use-of-force matrix that is a conglomeration of similar continua utilized by agencies in the State of Florida, differing in this regard from prior research.

Over half of the confrontations in this current study ended in the first iteration with a single use of force. This is important because injuries increase as a conflict continues in duration. As reported by Wolf *et al.* (2008), 11 percent of suspect injuries occur in the first iteration, as a conflict continues, there is a greater likelihood for increased officer and suspect injury. Additionally, officers in this study operated at a *force deficit*. As shown in Table IV, the greater the force deficit, the more likely for suspect and officer injuries. Clearly, American policing has changed in the decades of police research on use of force. Early studies on police use of force claimed that the police were quick to use violence to quell a disturbance or manage subject resistance (Toch, 1969). However, more recent studies have reported that the police “held back” on the amount of force used to counter subject resistance. Studies by Fyfe (1988), Alpert and Dunham (2004), and Terrill (2003, 2005) indicate that the police could legally have used more force than was applied during a confrontation, but instead chose to be less aggressive.

Potential explanations for this reduction in force are plentiful. Although impossible to measure, well-trained professional officers, when faced with a resistant subject, may fear the legal ramifications of using too much force. Police officers may also rely too heavily on conducted energy weapons for subject compliance, even if the threat is at a much higher level than the device is legally accepted. Lastly, better educated and trained officers may feel that they can talk their way out of situations in which additional tactics might be legally justified.

Starting at the police academy, and as confirmed by this study’s focus group, officers are told to use the least amount of force necessary to affect an arrest. As a result, officers are understandably hesitant to move immediately 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. Consequently, it must be carefully stated that officers should be prepared to use decisive force at the point where verbal techniques and force de-escalation have failed. This does not mean the deployment of a weapon against a passive suspect, but rather the preparation to use such a weapon immediately if and when the situation calls for it.

This study has continued to build on earlier research on force continua and the force factor approach. Terrill (2005) recommended combining a consistent data collection strategy, such as use of force reports, with specific force continuum policy to provide administrators the ability to track and evaluate force used by individual officers, units, or entire departments. This study utilized a cumulative force factor, which could easily be incorporated by managers, administrators, and trainers when reviewing and considering use of force incidents and policy decisions. Building on the foundation of use of force studies discussed earlier, this current study expands the understanding of police confrontations by reviewing the relationship between suspect resistance and officer force, focusing on the amount of resistance demonstrated by a suspect within an established number of categories, and how police officers respond.

Limitations

However, this study also has several limitations. While the researchers assigned values to reported force in each encounter, it is nearly impossible to assign a true temporal value to these interactions, as each 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. Conducted energy weapons, like TASER, do not rely upon pain compliance and effects are realized much sooner.

An additional limitation to this study is the fact that neighborhood characteristics would have been extremely useful to understanding the police use of force in each event. While police use-of-force reports often contain addresses, the ability to connect each with neighborhood characteristics became unwieldy in such diverse communities. Finally, while verbal commands, threats, and simple handcuffing and takedowns may be important forces to review, unless the police response resulted in a use-of-force report, those cases were not included in this study. This research has recognized a phenomenon, referred to as a “force deficit”, that supports prior research in this area. That is, in examining the cumulative force after three iterations, it appears as though the officers are consistently using less force than may be legally justifiable or necessary to subdue the suspect and end the confrontation.

Note

1. The concept is reflected in this example: In a confrontation, a suspect takes flight from a police officer, and the officer grabs the subject and takes him to the ground. The force factor for this example would be: police force takedown (level 3) – suspect resistance flight (level 4) = (-1) force factor.

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