EFFECT OF SUSPECT'S GENDER ON POLICE USE OF PHYSICAL FORCE

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ABSTRACT

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Police use of force has received much research attention as researchers attempt to explain various predictors of this phenomenon. This topic is of great interest to police practitioners, policy makers, researchers, scholars, and criminal justice students. Several studies have examined various predictors of this behavior, including officer education, race, experience, age, and sex. However, most of these studies focused on either the officers' or suspect's sex, while research on the interplay between suspect's sex and officer sex as a predictor of police use of force is lacking. Drawing on criminal threat theory and research on chivalry, this study will examine how the interplay between officer and suspect sex influences the likelihood and severity of police use of physical force. Further, given the influence of social norms on chivalry, the study will further investigate whether the presence of bystanders moderates the influence of officer and suspect sex on use of physical force. The study is based on data from the 1996-1997 (ICPSR 3172) study titled "Understanding the use of force by and against the police in six jurisdictions in the United States".

Now to the King eternal, immortal, invisible, the only wise God, be honor and glory forever and ever. Amen.

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Chapter 1

Introduction

The study of police use of force has been of great interest to criminal justice researchers, police practitioners, scholars, criminologists and criminal justice students (McEwen 1997; Mastrofski, & Terrill, 2002; Ariel, Farrar, & Sutherland, 2015). Police use of force has been considered from various perspectives. The most prominent of these are the sociological and psychological standpoints (Mastrofski, & Terrill, 2002). The sociological stance has focused primarily upon police use of force in relation to the suspect's social status (i.e., who the suspect is and what the suspect does including some situational element) (Mastrofski, & Terrill, 2002). The psychological perspective has been used to explain police use of force based on the officer's attitudes, views, characteristics, and experiences (Mastrofski, & Terrill, 2002). In sum, there are three major foci in the study of police use of force, the officer focused, the suspect or citizen focused, and situational focused approaches (Cohen & Chaiken 1972; Mastrofski, & Terrill, 2002; Rojek, Alpert, & Smith, 2012; 2010).

Under the officer focused approach, various officer related factors have been examined to determine the predictors of police use of force. These studies focused on the characteristics of the police officer that explain their use of force. Studies using the suspect focused approach have also explored the situational and social characteristics of the suspect, such as social status, location of the officer-suspect encounter, type of crime, and the suspect's demeanor. The possible influence of individual/personal characteristics of the suspect, specifically, suspect's sex, have received little focused attention. A small number of exploratory studies have found that suspect's sex is a significant predictor of police use of force, but the reasons for this finding have not been explored fully, as this finding has been tangential to the focus of the particular study

(see e.g., Garner & Maxwell, 2002; Crawford &Burns, 1998; Taylor et al., 2009). This neglect is surprising considering the importance of gender related issues in criminal justice, and in academia more generally. In an attempt to contribute to this area of scholarship, the present study examines the effect of suspect's sex on the use and severity of physical force by police, and further investigates whether bystanders' presence moderates the relationship between police use of force and suspect's sex with a view to explain this possible gendered interaction both theoretically and empirically.

Garner and Maxwell (2002) conducted an extensive study to investigate the predictors of use of force by and against the police. Their findings suggest that police use of force is determined by a broad range of factors including measures of the suspect's demeanor and the sex of the police officer, among others. They also recommended further studies on the effect of suspect characteristics on police use of force. Hence, in an attempt to contribute to this area, the following study will examine police use of force from the suspect focused approach. Specifically, this study aims to examine the effect of suspect's sex on police use of physical force using data collected by Garner and Maxwell (2002). This data includes police records from six jurisdictions and is used to investigate whether officer use of force is a gendered interaction, and whether bystanders' presence moderates the relationship between police use of force and suspect's sex. The next chapter will examine the theoretical framework adopted for this study.

Chapter 2

Theoretical framework

Utilizing a theoretical framework to explain police use of force remains a difficult endeavor (Hays, 2008). A primary theoretical perspective utilized in this area, however, is criminal threat theory (Hays, 2008). This study will expand upon this theoretical perspective by attempting to integrate criminal threat and chivalry theory as an exploratory approach to better understand and explain police use of physical force from a gendered perspective. After all, gender is defined by society (Covington & Bloom, 2003; Connell, 2002), and this definition forms the norms that are applicable to both males and females and how they should behave in public spaces. It is important to note the difference between sex and gender. The former is biologically influenced while the latter is a social construct (Covington & Bloom, 2003, Connell, 2002).

Chivalry theory suggest females are viewed as relatively gentle, weak, defenseless, and deserving of protection by males (Pollak, 1950; Moulds 1980; Nagel and Hagan 1983; Bishop and Frazier, 1984; Farnworth and Teske, 1995; Zatz, 2000; Curry et al., 2004; and Franklin, & Fearn, 2008). Following the logic of this theory, the police or criminal justice system in general should exercise more deference, courtesy, or politeness towards women than men. That is, police would use less physical force against women than men, the court would administer a less severe punishment or sentence for women compared to men, and parole officers would be more lenient with respect to the transgressions of women than men.

Traditionally, society has expressed clear differences between men and women with respect to the family (Eisensten, 1988), as women were considered to have greater family

responsibilities (Simon, 1975; Bernstein, Cardascia, & Ross 1979; Eaton 1987; Farrington & Morris 1983; Steffensmeier et al. 1993; Daly & Bordt 1995). This ultimately placed them in a different position from men in society, in a certain sense, a distinguished position (Epstein, 1988; Pollak, 1950; Moulds 1980; Bishop & Frazier, 1984; Farnworth and Teske, 1995; Zatz, 2000; Curry et al., 2004; and Franklin, & Fearn, 2008). To clarify, although oppressed in the past, many positive attributes came from the historical social distinctions between men and women. For example, chivalry and paternalism provided women with a form of respect that did not apply to men (Pollak, 1950; Moulds 1980; Nagel and Hagan 1983; Bishop and Frazier, 1984; Farnworth and Teske, 1995; Zatz, 2000; Curry et al., 2004; and Franklin, & Fearn, 2008; Lutze, & Symons, 2003; Kruttschnitt, & Savolainen, 2009). Some of these have had a lasting effect. The norm that will be considered for this study is that within American society, it is generally frowned upon for men to hit women (Lutze, & Symons, 2003; Frantzen, & San Miguel, 2009). It is important to note that society forbids violence in general, irrespective of gender. However, there is a different threshold of acceptability when violence is used against women (Pollak, 1950; Moulds 1980; Nagel and Hagan 1983; Bishop and Frazier, 1984; Farnworth and Teske, 1995; Zatz, 2000; Curry et al., 2004; and Franklin, & Fearn, 2008). Within our society, it is agreed that physically abusing women is an act of deviance and is abhorred. Women are considered the weaker sex, and hence there is a general desire to protect them against violence of any form (Bickle, & Peterson, 1991). Further, physical conflicts between women are more tolerated than the former dynamic between men and women (Lutze, & Symons, 2003; Frantzen, & San Miguel, 2009), indicating a nuanced gendered social process.

Social norms that support protection of women has led to laws like the Violence Against Women Act, and Mandatory Arrest Laws (VAWA, 1994) in the case of intimate partner

violence. Chivalry theory helps to explain these social norms, and thus is used as a logical guide to the study. An important hypothesis based on the concept of chivalry is that male police officers are more likely to use force, and would use a greater level of force on male suspects compared to female suspects. These social norms also sugest that the presence of a bystander is likely to further reduce police use of physical force in instances where the officer is a male and the suspect is a female given added social pressures associated with chivalry. This is most likely true for a few reasons. First, the notion of chivalry operates between males and females, not between males and other males, or between females and other females. Furthermore, due to the strong social norms discussed above, police might feel added pressure to avoid use of force when they know people (i.e., bystanders) are watching, because it is more socially appropriate for an agent to use physical force against men, which stems from societal norms that dictate acceptable actions based on gender norms (Frantzen, & San Miguel, 2009). Secondly, the Hawthorne effect is another reason bystanders may moderate this relationship. Hence, a person will most likely conform to acceptable standards when under observation (Wickström, & Bendix, 2000). The Hawthorne effect merely adds to the cultural explanation of societal norms in regards to bystanders and police use of physical force, given that the presence of bystanders can serve as a reminder to officers that their actions are being scrutinized (Paoline III, & Terrill, 2007).

Other evidence to support the hypothesis that police officers will use more force against men is derived from criminal threat theory. Criminal threat theorists argue that the recipients of police use of force are individuals or criminals who serve as a threat to the police or citizens (Hays, 2008). That is, police respond more aggressively against those they view as a more likely threat in a given situation. Scholars have suggested that women are less likely to threaten the safety of others, while men are viewed as far more dangerous (Chesney-Lind & Shelden, 2004;

Steffensmeier & Allan, 2000; Covington & Bloom, 2003; Steffensmeier et al. 1993; Daly and Bordt 1995). Thus, following the logic of criminal threat theory, police (i.e., both male and female officers) are more likely to use physical force against men. To clarify, criminal threat theory will be used as the theoretical framework guiding the selection of variables and substantial arguments found herein, while research and theory on chivalry are used to buttress criminal threat theory.

Chapter 3

State of evidence on police use of physical force

Controversies surrounding the acceptability of police use of force is as old as policing itself (Spitzer, 1979; Johnson, 1981; Platt, 1982; Potter, 2013). The state empowers the police to legitimately use force when necessary in carrying out their designated duties (Klahm, Frank, & Liederbach, 2014; Rojek, Alpert, & Smith, 2012; 2010; Paoline & Terrill, 2011; Mastrofski, & Terrill, 2002). It is important to note that force has been defined by scholars in different ways. There is no universal or generally acceptable definition of force (Garner et al., 1995). However, common elements across studies of police use of force include some sort of physical or nonphysical violence, including contact or actions such as verbal commands or threats employed by officers in order to ensure suspect compliance (Terrill, 2005; Terrill & Reisig, 2003).

Numerous studies have examined predictors of police use of force in order to better explain the concept. These predictors can be grouped into officer focused, citizen or suspect focused, or situation focused (Crawford, & Burns, 1998; Terrill, & Mastrofski, 2002). Examples of officer focused correlates of the use of force are an officer's age, race, training, experience, and education (Cohen & Chaiken 1972; Cascio 1977; Worden, 1995; Garner et al., 1995; Mastrofski, & Terrill, 2002; Terrill, & Reisig, 2003). Terrill and Mastrofski (2002), in a study focused upon situational and officer focused determinants of police coercion, found officer education and experience to be predictors of police use of force, as less educated and inexperienced officers tended to use more force. Terrill and Mastrofski's (2002) findings agreed with the findings of Sherman (1980) and Crank (1993) to the extent that the work experience of officers is one of the best predictors of police use of force (See also Cohen & Chaiken 1972; Cascio 1977; Worden, 1995; Garner et al., 1995). With respect to situation focused correlates,

Terrill and Reisig (2003) obtained data from systematic social observations of police across two sites (i.e., St. Petersburg, Florida, and Indianapolis, Indiana) and found that police are more likely to use a higher level of force in poor neighborhoods, those with high homicide rates, as well as in situations where there is suspect resistance. In a similar vein, Crawford and Burns (1998) analyzed 1,220 arrests in Phoenix and found race of suspect, suspect chemical impairment, suspect attempt to flee, and suspect's possession of a weapon are very strong predictors of police use of force.

Scholars have argued that race, age, and sex of officers are individual characteristics that influence use of force behaviors (Fogelson 1977). Researchers and scholars have not come to consensus on the importance of these factors, based on different empirical findings across studies (Riksheim & Chermak, 1993; Mastrofski, & Terrill, 2002). Riksheim and Chermak (1993), for instance, found that individual characteristics of the officer do not have a strong effect on police use of force (see also Hoffman & Hickey, 2005; Worden, 1989). Others have found the race and gender of the officer has a significant relationship with officer use of physical force (Alpert & Dunham, 1999; Alpert et al., 1997; Cohen & Chaiken 1972; Garner et al., 1996; Sherman 1980; Horvath 1987; Grennan 1987; Rabe-Hemp, 2008). The issues of officer characteristics and use of force is complex, however. For example, Schuck and Rabe-Hemp (2005; 2007) found that female officers partnered together remain consistent with research that shows female officers use less force, while Hoffman and Hickey (2005) discovered that female officers produce lower rates of suspect injury, but not a significant difference in suspect injury warranting hospital treatment. A comparison made between Schuck and Rabe-Hemp (2005; 2007) and Hoffman and Hickey (2005) reveals differences in how researchers approach the issue of officer sex in relation to use

of physical force. This might explain the lack of consensus in the research literature, in other words the issues may relate to measurement and methodology.

3.1. Suspect characteristics

Suspect characteristics may be equally important in understanding police use of force. Garner et al. (2002) found race of suspects, suspect resistance, suspect use of force, and suspect demeanor among the most robust predictors of police use of force. Terrill and Mastrofski (2002) found that police use more force on younger suspects. More research is needed in order to sufficiently ascertain the significance and strength of these predictors. Few attempts have been made to examine the importance of the interaction between officer and suspect sex and police use of physical force. Research is needed on the dynamics of the interaction between officers and suspects by sex and police use of force. While a number of studies (Fyfe 1978; Milton et al., 1977; Robin, 1963; Reiss, 1972; Crawford & Burns, 1998; Garner et al., 2002) recorded significant effects between suspect's sex and police use of force, the reason why males would receive more force than female has not been explained thoroughly.

3.2. Gender and Chivalry

The notion of chivalry revolves around the presupposition of weakness, gentleness, defenselessness and the need for protection based on sex (Bishop and Frazier, 1984; Farnworth and Teske, 1995; Zatz, 2000; Curry et al., 2004; and Franklin, & Fearn, 2008). This phenomenon suggests certain biological, psychological, and sociological characteristics of women made them deserving of preferential treatment (Franklin, & Fearn, 2008; Visher, 1983; Glasser, 2016; Covington & Bloom, 2003, Connell, 2002). The association between gender and chivalry extends beyond the purview of the criminal justice system as it can be argued that the notion of

chivalry is generally enshrined in social norms (Flood & Pease, 2006). Social norms have been defined as "shared belief systems about what people do or what they ideally should do" (Prislin & Wood, 2005, Pg. 677). Though these underlying social norms that support chivalrous dispositions are not codified, there are policies within the realms of the criminal justice system that condemn violence against women (Flood & Pease, 2006). It can be argued that policies which emerged from these social norms have created a strong positive effect in support of chivalry towards women more generally. For instance, Salazar et al., (2003) found that criminal justice policies impact social norms with respect to domestic violence. They argued that an effective policy should affect the social norms that brought about its creation. Thus, it can be argued further that the relationship between public policy and social norms are reciprocal, as each is capable of influencing the other (Salazar et al., 2003).

It is important to note that social norms are dynamic and have shifted over time with respect to the way women are treated (Flood & Pease, 2006; Salazar et al., 2003). The norms which have generally embraced the chivalrous treatment of women can be seen across a broad spectrum of social interactions (Flood & Pease, 2006; Salazar et al., 2003). Though there is no explicit yardstick for the application of chivalry in the criminal justice system, chivalrous actions have been displayed by criminal justice agents via discretion in decision making, which has been explored through criminal justice research (Franklin, & Fearn, 2008). This wide discretion exercised by criminal justice agents puts into consideration extralegal factors that influence decision making (Zatz, 2000; Walker et al., 2004; Engen et al., 2003; Albonetti, 1998). Sex is one of the extralegal factors that studies have shown to affect criminal justice decision making processes with regards to the police, prosecution, courts, and probation/corrections in general (Chesney-Lind, 1973; Krohn, et al.,1983; DeFleur,1975; Engen et al., 2003; Nagel and Johnson,

1994). According to study findings, women have a lower likelihood of being sent to jail or prison, receive shorter periods of incarceration, and have a higher likelihood of release before trial (Engen et al., 2003; Nagel and Johnson, 1994). This lenient gesture has been viewed as a form of chivalry accorded to women by the criminal justice system (Franklin, & Fearn, 2008; Bishop and Frazier, 1984) which is not accorded to men in similar situations (Franklin, & Fearn, 2008; Moulds, 1980).

Moreover, chivalry is accorded to women who are considered to be in need of protection, but it does not extend to women who are deemed "unworthy of protection" (Franklin, & Fearn, 2008, Pg.281). That is, women who exhibit a "masculine culture" (Glasser, 2016, Pg.2), characterized by aggressive and physical behaviors (Glasser, 2016; DeFleur,1975), which are not consistent with feminine characteristics or traditional feminine roles, are not afforded the protections associated with chivalry (DeFleur,1975; Visher, 1983; Franklin, & Fearn, 2008). Thus, women who fall within this category receive a more severe treatment when compared to women who conform to traditional feminine roles (Nagel, & Hagan, 1983; Albonetti, 1998). When women commit status crimes, crimes that are inconsistent with feminine ideals, or crimes that are typically committed by men, then the actions typically offered through the norms of chivalry are less likely. Agreeing with Chesney-Lind (1978), Visher (1983) argued that "the type of alleged offense is an important factor in determining the extent of chivalry in criminal justice responses to female criminality. Female offenders arrested for property offenses may receive some preferential treatment from the police and the courts, but women suspected of crimes typically perpetrated by males (robbery and assault) are often punished more severely than female property offenders" (Pg.10). In their meta-analysis, Bontrager et al., (2013) found an overall result that women receive lesser sentences when compared to men. In an attempt to

further explain the disparity, it has been argued that male judges are often reluctant to impose harsh sentence on female offenders as they consider them weak and deserving of protection when compared to men (Nagel, & Hagan, 1983). Studies have shown that not all females enjoy chivalry, as Visher (1983) put it succinctly "the notion of chivalry provides strong insights as to the sorts of female behaviors and characteristics that protect the chivalrous relationship and those that violate the bargain" (Pg. 8). Chivalry towards women has received a lot of empirical support (Moulds, 1980; Krohn, et al., 1983; Engen et al., 2003; Nagel & Johnson, 1994) as the phenomenon continues to influence criminal justice decision making.

3.3. Bystanders and police use of force

The effect of the presence of bystanders in police suspect encounters has been documented in a number of studies (Friedrich, 1980; Tedeschi & Felson, 1994; Worden 1995; Garner et al., 1995; Klinger, 1996; Engel et al., 2000; Garner et al. 2002; Terrill & Mastrofski, 2002; Lawton, 2007). Studies have found that presence of bystanders increases the likelihood of police use of force while less force is used in instances where there are no bystanders (Friedrich, 1980; Garner et al., 1995; 1996; 2002; Terrill & Mastrofski, 2002; Lawton, 2007). Worden (1995) made a distinction between reasonable force and improper force and found that the presence of bystanders increases the likelihood of the use of the proper amount of force, and suggested that bystander effects may influence the officer to handle the encounter in the best possible way. To explain this effect, Friedrich (1980) suggested that officers may resort to the use of force when bystanders are present in order to show their capability and also to assert that the situation is under their control (see also Sykes & Brent, 1983; Bayley, 1986; Klinger, 1996; Terrill, 2005). In as much as officers used force to show that the situation is under control, it is important to note that presence of bystanders also indicates the presence of would-be witnesses

in use of force situations (Paoline III, & Terrill, 2007). In an attempt to explain why officers may or may not use force when bystanders are present, it has been argued that officers may decide not to use force so as not to worsen the situation as the bystanders may turn aggressive and this may undermine the possible benefits of the use of force (i.e., to control the situation) (Reiss, 1971; Engel, et al., 2000; Schuck, & Rabe-Hemp, 2007). There are various factors that may drive the effect of presence of bystanders in use of force situations, however, there has not been a conclusive explanation for this effect.

The focus of this study is to examine whether the interaction between officer and suspect sex is a predictor of police use of physical force, and to ascertain whether this relationship—if it exists—is moderated by the presence of bystanders. From a theoretical stance, criminal threat theory proposed that police (irrespective of officer sex) are more likely to use physical force against male suspects than female suspects, while chivalry suggested that male officers are less likely to use physical force on female suspects compared to male suspects. Notions of chivalry would not suggest female officers are under added pressure to treat male or female suspects any differently, and thus the norms associated with chivalry would not suggest a significant difference in use of physical force across suspect sex for female officers, all else being equal. Based on the guiding theoretical framework, it is important to suggest a theoretical explanation of what the outcome would look like. If criminal threat theory alone explains the effect of suspect sex on police use of physical force, male and female police officers would be more likely to use physical force when the suspect is male compared to when suspect is female. However, with chivalry theory, only male officers would be more likely to use physical force when the suspect is male compared to when the suspect is female, while the likelihood of use of physical force by female officer would be the same irrespective of suspect sex. If both theories explain the

effect of suspect sex on police use of physical force, both male and female officers would be more likely to use physical force when the suspect is male but the gap will be more for male officers than female officers. These theoretical explanations of the expected outcome also hold for severity of force.

The above argument informed the hypotheses for this study. In other to address the relevant questions, this study examined the following hypotheses:

Hypothesis 1: Male police officers are more likely to use physical force when the suspect is male compared to when suspect is female

Hypothesis 2: Male and female police officers are more likely to use physical force when the suspect is male compared to when suspect is female

Hypothesis 3: The presence of bystanders will widen the gender gap in the likelihood of police use of physical force among suspects (interaction effect)

Hypothesis 4: Male police officers use more severe physical force on male suspects compared to female suspects

Hypothesis 5: Male and female police officers' use more severe physical force on male suspects compared to female suspects

Hypothesis 6: The presence of bystanders will widen the gender gap in severity of physical force from police among suspects (interaction effect)

Chapter 4

Data and Methods

4.1. Data

The data for the current study is drawn from the study titled *Understanding the use of force by and against the police in six jurisdictions in the United States, 1996-1997 (ICPSR 3172)*. This study was funded by the U.S Department of Justice and authored by Joel H. Garner and Christopher D. Maxwell. The data was collected from six jurisdictions in the United States. The police agencies involved were: Charlotte-Mecklenburg (North Carolina), Colorado Springs (Colorado), Dallas (Texas), St. Petersburg (Florida), San Diego (California) and the San Diego County Sheriff's Department (California). Their study was about instances of use of force by and against the police. Their study had three parts; the first part was police officer survey data, with 7,512 cases of adult custody arrests from the six jurisdictions. The second part was suspect interview data containing 1,156 cases. The third part was police officer ranking of force data containing 503 cases. The study considered arrest behavior by the police and attempted to explain use of force from the police standpoint and from the suspect's perspective.

Arrests were sampled from across the six police departments in an attempt to obtain a sample of adult custody arrests that were representative of the six departments' annual arrests. In order to get a reliable estimate of force across these jurisdictions, the goal was to obtain 900 to 1,200 instances of arrests per site. A convenience sample was used to achieve these figures. The researchers did not draw a random sample of arrest throughout the years given the complexity in data collection procedures this would entail. Instead, they collected their information through surveys and self-reports by police. The three methods they used were self-enumerated

questionnaires, personal interviews, and official records. The process of obtaining the data was divided into 3 parts. The first part used forms to record officer self-reports of incidents of arrest, including factors such as suspect characteristics, the presence of bystanders, and official behavior. They also conducted suspect interviews at the local jail to elicit much of the same information from the suspect's perspective. In part two, force was measured in four categories and officers were made aware of suspect interviews, although they did not know which suspects the researchers would interview.

Arrests were sampled for a period of two to seven weeks continuously based on the size of the department and its arrest rate. Not all suspects were interviewed because some were drunk, some refused, and some were not presented for interview by the jail officials. The study did not include use of force by either the suspects or officers that did not lead to arrest. Thus, it is limited to cases where there was an arrest. The combined data from all six jurisdictions is not a representative sample of agencies or arrests, but a large diverse sample that could effectively test the strength of predictors of police use of force. The researchers asked for about 100 experienced officers from each agency represented to participate in the officer ranking survey. The selection of participating officers in the officer ranking survey depended on presence at a training class. The current study only used the first part of the data, Police Officer Survey Data of 7,512 cases with 255 variables, because it has sufficient number of cases and relevant variables.

4.2. Measures and Scales

4.2.1. Dependent variables

There is no consistent conceptualization of police use of force. Researchers appear to have little agreement on what constitutes force (Klahm, Frank, & Liederbach, 2014). Various

agencies have their respective guiding policies on the continuum of force from verbal to lethal force (NIJ, 2012; Terrill & Paoline, 2012). This study, consistent with Garner and Maxwell (1995), adopted the definition of violence by the National Academy of Sciences to define force as an act of a police officer that intentionally and directly threatens, attempts, or acts in a manner that inflicts physical harm on others. Such acts could be physical or nonphysical.

The operationalization of force as physical or non-physical has been used by various researchers to measure force (e.g., Lumb & Friday, 1997; Alpert & MacDonald, 2001; Kop & Euwema, 2001; Engel & Calnon, 2004; Paoline & Terrill, 2004; Hoffman & Hickey, 2005; Manzoni & Eisner, 2006; Cheong & Yun 2011; Crow & Adrion 2011; Legewie, 2016). Consequently, force in this study is limited to physical force, which may or may not result in physical harm. There are two dependent variables used in the current study. The first dependent variable is a binary indicator (0 = no, 1 = yes) of whether or not police used force in a particular arrest. In this study, the first dependent variable would be referred to as "Police use of physical force". Physical force for the purpose of this study includes arrest instances where police used a severe restraint, as well as other weapon or weaponless tactics. Table 1 bellow is the distribution of police use of physical force variables.

Table 1. Distribution of police use of physical force and severity of force

		Frequency	Percent	Mean	Median	St.D	Minimum	Maximum
Police use of physical force	No	6229	82.9					
	Yes	1283	17.1					
	Total	7512						
Severity of force				29.73	29.73	8.68	.00	84.10

Furthermore, to properly capture the potential effects of the phenomenon of study and to show severity of force, this study adopted an additional measure of physical force different from

the aforementioned dichotomous measure of force. “Severity of force” represents a scale from 1 (least forceful) to 100 (most forceful), which is consistent with previous studies (Garner et al., 1995; 2002). Table 1 above shows the distribution of severity of force.

4.2.2. Independent variables

To address my first hypothesis, the main independent variable for this study includes the sex of suspect. The sex of suspect is a dichotomous variable with “1” for males and “0” for females. Twenty percent of cases from the total sample have female suspects and 80% have male suspects. In a similar vein, sex of the officer is a dichotomous variable with “1” for male and “0” for female. Sixteen percent of cases from the total sample have instances where the first officer is female while 84% are instances where the first officer is male. Another main independent variables includes the interplay between sex of the officer and sex of the suspect, with four categories: Officer female suspect female (OFSF) coded as 0=no, 1=yes, Officer female suspect male (OFSM) coded as 0=no, 1=yes, Officer male suspect female (OMSF) coded as 0=no, 1=yes, and lastly, Officer male suspect male (OMSM) coded as 0=no, 1=yes. From the total sample of cases, 4% of cases involved OFSF, 12% of cases had OFSM, 16% of cases included OMSF, while the remaining 68% of cases included OMSM. The second hypothesis concerns the presence of bystanders and police use of force. Thus to capture the effect of bystanders, another independent variable for this study is bystanders present at any time, which is a dichotomous variable with “1” for Yes and “0” for No. In 46% of cases from the total sample bystanders are present. Table 2 below presents the descriptive statistics for all study variables.

Table 2. Descriptive Statistics (N=7,512)

Variables	*Categories*	*N/%*	*Mean/SD*
Police use of physical force	0=No	6,229/82.9	
	1=Yes	1,283/17.1	
Severity of force	Min. 0 - 84.10 Max.		29.73/8.68
Age of suspect	1= 16-19	750/10.0	3.80/1.87
	2= 20-24	1,474/19.6	
	3= 25-29	1,322/17.6	
	4= 30-34	1,404/18.7	
	5= 35-39	1,142/15.2	
	6= 40-44	712/9.5	
	7= 45-49	404/5.4	
	8= 50 plus	304/4.0	
Race of suspect is Black	0= No	4,587/61	
	1= Yes	2,925/39	
Race of suspect is Hispanic	0=No	6,458/86	
	1= Yes	1,054/14	
Race of suspect is other	0=No	6,869/91	
	1=Yes	185/3	
Sex of suspect	0= Female	1,480/19.7	
	1= Male	6,032/80.3	
Age of first officer	1= 20-24	331/4.4	3.15/1.33
	2= 25-29	2391/31.8	
	3= 30-34	2495/33.2	
	4= 35-39	1098/14.6	
	5= 40-44	671/8.9	
	6= 45-49	362/4.8	
	7= 50 plus	164/2.2	
Sex of first officer	0= Female	1,162/16	
	1= Male	6,350/84	
Race of first officer is black	0=No	6,698/89	
	1=Yes	814/11	
Race of first officer is Hispanic	0=No	6,934/92	
	1=Yes	578/8	
Race of first officer is other	0=No	6,897/92	
	1=Yes	209/3	
OFSF	0=No	7,245/96	
	1=Yes	267/4	
OFSM	0=No	6,617/88	
	1=Yes	895/12	
OMSF	0=No	6,299/84	
	1=Yes	1,213/16	
OMSM	0=No	2,375/32	
	1=Yes	5,137/68	

Table 2 (cont'd)

Variables	*Categories*	*N/%*	*Mean/SD*
Bystander present	0= No	4,079/54.3	
	1= Yes	3,433/45.7	
Location known for criminal activities	0= No	4,506/60	
	1= Yes	3,006/40	
Called for backup	0= No	5,620/74.8	
	1= Yes	1,892/25.2	
Priority call	0= No	6,263/83.4	
	1= Yes	1,249/16.6	
Used lights and sirens	0= No	6,742/89.7	
	1= Yes	770/10.3	
Officer dispatched	0= No	4,142/55.1	
	1= Yes	3,370/44.9	
Suspect intoxicated	0= No	4,553/60.6	
	1= Yes	2,959/39.4	
Suspect antagonistic	0= No	6,632/88	
	1= Yes	880/12	
Suspect physical resistance	0= No	6,616/88	
	1=Yes	896/12	
Violent offense	0=No	6,088/81	
	1=Yes	1,424/19	
Charlotte PD	0= No	6,198/82.5	
	1= Yes	1,314/17.5	
Dallas PD	0= No	6,056/80.6	
	1= Yes	1,456/19.4	
San Diego PD	0= No	6,565/87.4	
	1= Yes	947/12.6	
San Diego Sheriff	0=No	6,554/87.2	
	1= Yes	958/12.8	
St. Pete PD	0= No	5,965/79.4	
	1= Yes	1,547/20.6	
Colorado Springs PD	0= No	6,222/82.8	
	1= Yes	1,290/17.2	

*OFSF-Officer female suspect female, OFSM-Officer female suspect male, OMSF-Officer male suspect female, OMSM-Officer male suspect male.

It is possible that additional characteristics of the suspect and the police officer may be associated with whether a police officer uses physical force or not and the severity of force used. Hence, to capture these potential effects, some variables were included as controls. Such variables were categorized into situational elements of the arrest event, suspect characteristics, and officer related variables. One of the situational elements of the arrest events depicted the

resistance or demeanor of the suspect such as whether or not the suspect was antagonistic and whether the suspect physically resisted the officer which was measured by suspect antagonistic and suspect physical resistance coded (0 = no, 1 = yes) while suspect compliant was the reference category. Also, type of offence was identified by a variable that indicates whether or not it was a violent offense (0 = no, 1 = yes). The location where the officer-suspect encounter occurred is another important factor that can influence police use of force, especially in instances where the event took place in a location known for criminal activity which was coded (0 = no, 1 = yes). Furthermore, jurisdiction is another important situational element, as police departments can influence how, and under what conditions, police use physical force. The jurisdiction variables include Charlotte- Mecklenburg, i.e. "Charlotte" Police Department, Colorado Springs Police Department, Dallas Police Department, San Diego Police Department, and San Diego County Sheriff's Department i.e. "San Diego Sheriff", coded (0 = no, 1 = yes) while St. Petersburg Police Department was the reference category. Other situational variables include situations where the officer called for backup, used lights and sirens to respond to the call, the suspect was intoxicated, the call was officer dispatched, and whether or not it was a priority call, which were binary variables (0 = no, 1 = yes). Officer and suspect related variables include age and race of the suspect and officer. Furthermore, race is officer and suspect characteristic measured by white, black, Hispanic, and other. These was reflected with binary (0 = no, 1 = yes) variables, such as suspect is black, suspect is Hispanic, suspect is other, officer is black, officer is Hispanic and officer is other, while officer is white and suspect is white were the reference categories. Another officer and suspect related variable is age. Age of officer was characterized into 7 categories reflecting from 20 to 50plus, while age of suspect was characterized in to 8 categories from 16 to 50plus. The aim is to examine the effect of sex of suspect on police use of

physical force and the severity of physical force used by the police while controlling for all these variables discussed above. The characteristics of the first officer have been used here because it is expected that the first officer on the scene has the greatest influence on the outcome of the suspect-officer interaction.

4.3. Analytical methods

4.3.1. Preliminary analyses

For a clearer understanding of the relationships between the dependent variables and relevant independent variables, bivariate relationships were evaluated as a preliminary step to determine whether common correlates of officer use of force and the severity of force used during arrests were apparent in the data. Since all of the relevant independent variables are nominal or ordinal, chi-square was utilized as the measure of association with respect to the dichotomous outcome measuring use of physical force. In order to test for differences in mean in the continuous dependent variable across categories of the independent variables, two-way analysis of variance (ANOVA) and univariate tests were employed.

4.3.2. Generalized linear models

The traditional regression model assumes, among others, that the error terms are normally distributed and homoscedastic. However, when the dependent variable is not continuous, such as count data or dichotomous variable, the normality and homoscedasticity assumptions of a traditional regression model may not be plausible. One approach to dealing with non-continuous outcomes is to employ the generalized linear model. The generalized linear model is a modeling framework that relaxes the assumption homoscedastic and normally distributed errors by positing a linear relationship between the predictors of interest and a function of the mean of the

dependent variable, g(μ). This function of the mean is also called the link function. The link function to be used depends on the nature of the dependent variable. For instance, if the dependent variable is continuous and normally distributed, the link function used is the identity function g(μ) = μ, and for a binary dependent variable, the link function is the logit link, $g(\mu) = log\left(\frac{\mu}{1-\mu}\right)$, where μ is the probability of success. Hence, the traditional linear regression is actually a special case of generalized linear model – where the link function is identity. Given that we have different types of dependent variable for this study, the generalized linear model, with an appropriate link function, would be employed to address the hypotheses involving each type of dependent variable.

4.3.3. Logistic Regression

Binary logistic regression is appropriate whenever the dependent variable is dichotomous and interest is in evaluating the odds of belonging to any of its two categories with respect to a vector of explanatory or independent variables. As discussed above, the logistic regression is a generalized linear model, where the outcome variable is a Bernoulli random variable and the link function is the logit link. It can be used to make predictions that a person is within any of the binary categories, conditioned on the explanatory variables. The general expression of this model is:

$$log\left(\frac{P(physical\ force)}{P(no\ physical\ force)}\right) = \beta_0 + \sum \beta_p X_p$$

where

β_0 is the overall intercept, or the log-odds of using physical force from the police when all predictors have the value of 0

$\beta_p$is the change in log-odds of using physical force from the police, associated with a unit change in the pth predictor, X_p, controlling for all other predictors in the model

The model gives us log (odds) taking exponent of both sides gives us the odds of using physical force so that p(using physical force)= $\frac{odd(physical\ force)}{1+odds(physical\ force)}$. So, with appropriate transformation of its right hand side, this model provides us with the likelihood of using physical force by the police, conditioned on the predictors in the model.

For the current study I will be considering this base model

$$log\left(\frac{P(physical\ force)}{P(no\ physical\ force)}\right) = \beta_0 + \beta_1 OFSF + \beta_2 OFSM + \beta_3 OMSF + \beta_4 bystander$$
$$+\beta_5 suspect\ antagonistic + \beta_6 suspect\ use\ force + \beta_7 violent\ offense + \beta_8 suspect'age$$
$$+\beta_9 suspect\ black + \beta_{10} suspect\ Hispanic + \beta_{11} suspect\ other + \beta_{12} officer\ age$$
$$+\beta_{13} officer\ black + \beta_{14} officer\ Hispanic + \beta_{15} officer\ other + \beta_{16} officer\ male$$
$$+\beta_{17} Charlotte + \beta_{18} Colorado\ Springs + \beta_{19} Dallas + \beta_{20} San\ Diego$$
$$+\beta_{21} San\ diego\ sheriff + \beta_{22} location\ known\ for\ criminal\ activity$$
$$+\beta_{23} suspect\ intoxicated +$$
$$\beta_{24} officer\ called\ for\ backup + \beta_{25} priority\ call + \beta_{26} used\ lights\ and\ sirens$$
$$+\beta_{27} officer\ dispatched + \beta_{28} bystander * OFSF + \beta_{29} bystander * OFSM$$
$$+ \beta_{30} bystander * OMSF$$

The constant term in the model is the log odds of using physical force when all the variables in the model take the value of zero. Hence, for a meaningful interpretation of the constant term, the age of suspect and officer were centered at their medians, which are 30-34 in both cases.

In line with the theoretical framework above, and based on a social norms explanation of why females are less likely to experience physical force from the police compared to males, the model above is set up to capture possible gender difference in police use of physical force. β_1 to β_3 captures this difference in the model and would be tested for significance, to evaluate this theory.

The presence of bystanders is also used to test this theory, to the effect that police, being part of the larger society, will be more likely to comply with the relevant social norms when bystanders are present. That is, the likelihood of the use of physical force by male police officers against female suspects will be reduced to a greater degree when bystanders are present compared to when the suspect is male. Though the research literature suggested that the presence of bystanders would increase the use of force, based on the social norms associated with chivalry, I expect that the presence of bystanders will reduce the likelihood of the use of physical force by the police when the suspect is female. This effect would be reflected in a significant interaction in a negative direction between presence of bystander and sex of both officer and suspect, captured as β_{28} to β_{30} in the model above. That is, a negative coefficient would suggest that these categories have a lesser likelihood of police use of physical force in the presence of bystander than when both officer and suspect is male in presence of bystander.

4.3.4. Multivariate linear regression

The second measure of the dependent variable captures the severity of force used by the police in the arrest, (i.e., "Severity of force"), and is a continuous variable. Multivariate regression is an appropriate method of statistical analysis to identify the influence the independent variables have on the dependent variable, holding constant the other variables in the model. Again, the multivariate regression model derives from a generalized linear model, in which the dependent variable is continuous and normally distributed, and the link function is identity. The general expression of this model is:

$$Y = \beta_0 + \sum \beta_p X_p + \varepsilon$$

β_0 is the overall intercept, or the average severity of physical force from the police when all predictors have the value of 0

$\beta_p$is the change in severity of physical force from the police, associated with a unit change in the p[th] predictor, X_p, controlling for all other predictors in the model

For the current study I will be considering this base model:

$$Y = \beta_0 + \beta_1 OFSF + \beta_2 OFSM + \beta_3 OMSF + \beta_4 bystander$$
$$+\beta_5 suspect\ antagonistic + \beta_6 suspect\ use\ force + \beta_7 violent\ offense + \beta_8 suspect'age$$
$$+\beta_9 suspect\ black + \beta_{10} suspect\ Hispanic + \beta_{11} suspect\ other + \beta_{12} officer\ age$$
$$+\beta_{13} officer\ black + \beta_{14} officer\ Hispanic + \beta_{15} officer\ other + \beta_{16} officer\ male$$
$$+\beta_{17} Charlotte + \beta_{18} Colorado\ Springs + \beta_{19} Dallas + \beta_{20} San\ Diego$$
$$+\beta_{21} San\ diego\ sheriff + \beta_{22} location\ known\ for\ criminal\ activity$$
$$+\beta_{23} suspect\ intoxicated +$$
$$\beta_{24} officer\ called\ for\ backup + \beta_{25} priority\ call + \beta_{26} used\ lights\ and\ sirens$$
$$+\beta_{27} officer\ dispatched + \beta_{28} bystander * OFSF + \beta_{29} bystander * OFSM$$
$$+ \beta_{30} bystander * OMSF + \varepsilon$$

In agreement with the theoretical framework above, and based on social norms as an explanation of why female suspects receive less severe force from male police officers compared to male suspects, the model above is set up to capture possible gender difference in the severity of force used by the police. The model captures the influence independent variables have on the dependent variable to evaluate this theory. Again, the presence of bystanders by both officer and suspect sex interaction is also used to determine if the presence of bystanders widens the gender gap in severity of physical force from police among suspects. This effect would be reflected in a significant negative interaction between presence of bystander and sex of both officer and suspect, captured as β_{28} to β_{30} in the model above. That is, a negative interaction would suggest less severity of force in situation where bystander is present for each of the included variables as opposed to the reference group which is when both officer and suspect is male.

The aim of this model is to produce a more nuanced test of the guiding theoretical framework, as just looking at suspect sex does not adequately address the notion of chivalry. Exposition of how male officers treat female suspects compared to when both officers and suspects are male provides a better test of the notion of chivalry. As argued earlier, the notion of chivalry does not operate between males, thus, in this study; it is more applicable between male police officers and female suspects. Officer-suspect sex combinations allow further exploration of this phenomenon. This officer-suspect sex combination will also be tested in concert with the presence of bystanders, for possible moderation effects. To begin, however, a model will be introduced to see the general effects of officer and suspect sex before the combination of officer-suspect sex and the interaction of officer-suspect sex and presence of bystander with respect to use of physical force and the severity of force.

4.4. Missing Data

Due to the missing cases in the data set (highest missing-458 cases for race of suspect and lowest missing-370 cases for sex of first officer), multiple **i**mputation was done using the Amelia package (Honaker, King, & Blackwell, 2011) in R studio version 0.99.903. "The main idea of multiple imputation is that plausible values may be used in place of the missing values in a way that allows (1) parameter estimates to be unbiased, and perhaps more importantly, (2) the uncertainty of parameter estimation in the missing data case to be estimated in a reasonable way" (Graham, Olchowski, & Gilreath, 2007, p. 206). To address the possible effects of the missing values in the data, five multiple imputed data sets were created. It has been argued that 3- 5 imputations provide the intended effects of imputation (Schafer & Olsen, 1998; Rubin, 1987; Graham, Olchowski, & Gilreath, 2007). The five imputed data sets were combined and exported

to SPSS where the analysis for this study was done. The SPSS version used is “IBM SPSS Statistics 22”.

Chapter 5

Findings

5.1. Bivariate Results

The main dependent variables of focus with respect to this study are the prevalence of police use of physical force and the severity of force used by police. With respect to independent variables, the interaction of officer and suspect sex and the presence of bystanders are of primary focus. As shown in the chi-square tests in Table 3 below, there is a significant association between sex of suspect and police use of physical force ($\chi^2_{(1)} = 23$, p-value=0.000). When the suspect is female, police used physical force in 12.8% of arrests, while they used physical force in 18.1% of arrests when the suspect was male. This means that police use of physical force tends to be more prevalent for male suspects than female suspects. The table also shows that police use of physical force occurred in 12.8% of incidents when there were no bystanders present and 22.1% of arrests when a bystander was present. These results indicate a significantly higher probability of physical force used by the police when a bystander is present than when no bystander is present ($\chi^2_{(1)} = 112.9$, p-value=0.000).Table 3 below further shows the association between the sex of the officer by sex of the suspect, and the association between this social interaction and the likelihood of the use of force. When the officer is female and the suspect is female, police used physical force in 13.1% of arrests. When the officer is female and the suspect is male, use of physical force by police occurred in 13.6% of arrests. When the officer was male and the suspect was female, the use of physical force by police occurred in 12.8% of cases. When both officer and suspect were male, the police used physical force in 18.9% of arrests. This implies that female officers were just as likely to use physical force while arresting either male or female suspects, while male officers were less likely to use force on female

suspect than male suspects. This pattern of results was significant ($\chi^2_{(3)} = 38.4$, p-value=0.000), suggesting it was not by chance alone.

Table 3. Bivariate Relationships Between Police Use of Force Common Covariates

Independent Variable		**Dependent Variable (Physical)**		**Value**	**Df**	**Sig.**
		No	Yes			
Bystander Present	No	87.2%	12.8%	112.9	1	.000
	Yes	77.9%	22.1%			
Suspect resistance	Compliant	91.7%	8.3%	11648.92	2	.000
	Antagonistic	77.2%	22.8%			
	Physical resistance	32.5%	67.5%			
Suspect sex	Female	87.2%	12.8%	23	1	.000
	Male	81.9%	18.1%			
Sex of officer by Sex of suspect	OFSF	86.9%	13.1%	38.4	3	.000
	OFSM	86.4%	13.6%			
	OMSF	87.2%	12.8%			
	OMSM	81.1%	18.9%			
Compliant	No Bystander	93%	7%	17.5	1	.000
	with Bystander	89.9%	10.1%			
Antagonistic	No Bystander	81.1%	18.9%	8.2	1	.003
	with Bystander	73%	27%			
Physical resistance	No Bystander	40.8%	59.2%	18.8	1	.000
	with Bystander	27%	73%			
Suspect is Female	No Bystander	89.7%	10.3%	9.44	1	.001
	with Bystander	84.4%	15.6%			
Suspect is Male	No Bystander	86.6%	13.4%	107.4	1	.000
	with Bystander	76.2%	23.8%			
Jurisdiction	Charlotte PD	83%	17%	57.7	5	.000
	Colorado Springs PD	87.3%	12.7%			
	Dallas PD	84%	16%			
	St. Petersburg PD	77.1%	22.9%			
	San Diego PD	84.4%	15.6%			
	San Diego Sheriff's D	83.4%	16.6%			

*OFSF-Officer female suspect female, OFSM-Officer female suspect male, OMSF-Officer male suspect female, OMSM-Officer male suspect male.

With respect to the association between suspect resistance and police use of physical force, when the suspect is compliant, use of physical force by police occurred in 8.3% of arrests,

while police used physical force in 22.8% of arrests when the suspect was antagonistic, and 67.5% of arrests when the suspect physically resisted. Thus, suspects are significantly ($\chi^2_{(2)}$ = 11648.92, p-value=0.000) more likely to receive physical force when antagonistic or when they physically resist.

The above table also reveals a significant association between suspect resistance, bystander presence, and police use of physical force. When suspects were compliant and there was no bystander, the likelihood of physical force by the police is low (7%), while when the suspect is compliant and there is a bystander present, police used physical force at a higher rate (10.1%; $\chi^2_{(1)}$ = 17.5, p-value=0.000). On the other hand, when the suspect is antagonistic and in the absence of a bystander, police used physical force 18.9% of the time, while they used physical force 27% of the time when suspects were antagonistic and in the presence of a bystander ($\chi^2_{(1)}$ = 8.2, p-value=0.003). Lastly, when suspects physically resist and bystanders are not there, police used physical force 59.2% of the time, while force was used in 73% of incidents where the suspect physically resisted officers in the presence of a bystander. The table shows there is a significant association between suspect physical resistance, bystander presence, and police use of physical force ($\chi^2_{(1)}$ = 18.8, p-value=0.000). From the associations above, presence of bystanders increased the likelihood of physical force across the categories of suspect resistance. The chi-square results above also show there is a significant association between jurisdiction and police use of physical force ($\chi^2_{(5)}$ = 57.7, p-value=0.000). This indicates that of all the jurisdictions, St. Petersburg recorded the highest percentage of physical force per arrest incident. There is also a significant association between suspect sex, presence of a bystander, and police use of physical force. When the suspect is female and there is no bystander, police used physical force in 10.3% of instances, whereas they used physical force in 15.6% of cases when

the suspect was female and there was a bystander present ($\chi^2_{(1)} = 9.44$, p-value=0.000). However, when the suspect is male and there is no bystander, police used physical force 13.4% percent of the time, but 23.8% of the time when the suspect was male and there was a bystander ($\chi^2_{(1)} = 107.4$, p-value=0.000). In line with the proposition of criminal threat theory, which asserts that males are more aggressive than female, the bivariate association between suspect sex and suspect resistance is explored. Furthermore, because there are strong social norms against violence, it is expected that suspects would also be more likely to be compliant in the presence of bystanders. To explore the relationships among my main independent variables – suspect's resistance, suspect sex, and presence of bystander, a chi-square test of association was conducted for these variables. Results are shown in Table 4 below. The table below shows the association.

Table 4. Chi-square test of association: Suspect resistance, suspect sex and bystander present

		Suspect sex		**Value**	**Df**	**Sig.**
		Female	Male			
Suspect Resistance	Compliant	79%	76%			
	Antagonistic	10%	12%	8.37	(2)	.015
	Physical resistance	11%	12%			
		Bystander Present				
		No	Yes			
Suspect Resistance	Compliant	80%	72%			
	Antagonistic	11%	12%	99.2	(2)	.000
	Physical resistance	9%	16%			

As can be seen from the above table, 79% of female suspects in the sample were compliant while 76% of male suspects in the sample were compliant. Overall, female suspects have a higher likelihood of being compliant, and are less likely to be antagonistic or physically resist compared to male suspects. These differences are statistically significant, ($\chi^2_{(2)} = 8.37$, p-value=0.015), but it is important to note that these differences are not large in magnitude. Furthermore, the above results show that 80% of suspects were compliant when there was no

bystander present while 72% of suspects were compliant when bystanders were present. Eleven percent of suspects were antagonistic when there was no bystander and 12% were antagonistic in the presence of bystanders. Nine percent of suspects physically resisted when there was no bystander present while 16% physically resisted in the presence of bystanders. Thus, from the results above, the presence of bystanders was associated with a reduced likelihood of suspect compliance while it was associated with an increased probability of suspects being antagonistic or physically resisting ($\chi^2_{(2)} = 99.2$, p-value=0.000).

For the continuously valued dependent variable, which measures the severity of physical force used by the police, two-way analysis of variance (ANOVA) tests were used to examine the bivariate relationships existing between the dependent variable and independent variables. Table 5 below shows that when suspect was female the average value for severity of force was 28.59, while it was 30 when the suspect was male. The average value for severity of force was 30.72 when there was a bystander and 28.89 when there was no bystander. Table 5 below further shows the ANOVA results of severity of force across suspect sex and presence of bystander.

Table 5. ANOVA and Distribution of severity of force by suspect's sex and presence of bystander

	Df	Mean Square	F	Sig	N	Min	Max	Mean	SD
Female					1480	.00	81.60	28.59	8.02
Male					6032	.00	84.10	30.01	8.81
No bystander present					4079	.00	84.10	28.89	8.74
Bystander present					3433	.00	84.10	30.72	8.49
BG Suspect sex	1	2583.45	34.86	.000					
BG bystander	1	3422.93	46.18	.000					
BG bystander by Suspect sex	1	81.08	1.09	.296					

BG means between groups

The result above shows that there is a significant difference in average severity of force between suspect sex ($F_{(1, 7508)} = 34.86$, p-value < 0.000). Also, there is a significant difference in

average severity of force between presence of bystander ($F_{(1, 7508)} = 46.18$, p-value < 0.000), but there is no significant interaction effect between suspect's sex and presence of bystander.

Table 6 below shows that when both officer and suspect were female, the average value for severity of force was 28.20, while it was 28.52 when the officer was female and the suspect was male. The average value for severity of force was 28.67 when the officer was male and the suspect was female, while it was 30.26 when both officer and suspect were male. Table 6 below further shows the ANOVA results of severity of force across officer-suspect sex and presence of bystander.

Table 6. ANOVA and Distribution of severity of force by Officer-suspect's sex and presence of bystander

	Df	Mean Square	F	Sig	N	Min	Max	Mean	SD
OFSF					267	.00	81.60	28.20	9.32
OFSM					895	.00	82.60	28.52	9.35
OMSF					1213	.00	71.60	28.67	7.70
OMSM					5137	.00	84.10	30.26	8.69
No bystander present					4079	.00	84.10	28.89	8.74
Bystander present					3433	.00	84.10	30.72	8.49
BG Officer-suspect sex	3	1471.11	19.91	.000					
BG bystander	1	1982.31	26.83	.000					
BG bystander by Officer-suspect sex	3	40.40	.547	.650					

BG means between groups

It can be seen from the result above that there is a significant difference in average severity of force across suspect-officer sex combination groups ($F_{(3, 7504)} = 19.91$, p-value < 0.001). Also, there is a significant difference in average severity of force between presence of bystander ($F_{(1, 7504)} = 26.83$, p-value < 0.001). Again, as in Table 5, we observe no significant interaction effect between bystander presence and officer-suspect sex combinations. The table 7

below is the multiple comparison of result of officer-suspect sex with Bonferroni correction, to see the sex combinations that were significantly different from the others.

Table 7. Multiple comparison of result of officer-suspect sex with Bonferroni correction

sex of officer by sex suspect	sex of officer by sex suspect	Mean	Mean Difference	SE
	OFSM	28.20	-.32	.60
OFSF	OMSF		-.48	.58
	OMSM		-2.07*	.54
	OFSF	28.52	.32	.60
OFSM	OMSF		-.15	.38
	OMSM		-1.75*	.31
OMSF	OFSF	28.67	.48	.58
	OFSM		.15	.38
	OMSM		-1.59*	.28
OMSM	OFSF	30.26	2.07*	.54
	OFSM		1.75*	.31
	OMSF		1.59*	.28

OFSF-Officer female suspect female, OFSM-Officer female suspect male, OMSF-Officer male suspect female, OMSM-Officer male suspect male. *p < .05.

From the results of multiple comparisons above, the average severity of force is significantly higher when the officer and suspect are both males compared to other sex combination groups. Table 8 below shows the univariate analysis of variance results for the interaction of each officer-suspect sex combination group and presence of a bystander, on the severity of physical force.

Table 8. Univariate Analysis of Variance

	Df	Mean square	F	Sig.
OFSF	1	1117.02	15.12	.000
OFSM	1	1741.20	23.57	.000
OMSF	1	2576.81	34.88	.000
Bystander present	1	436.99	5.92	.015
OFSF*bystander present	1	24.92	.34	.561
OFSM*bystander present	1	53.22	.72	.396
OMSF*bystander present	1	26.93	.37	.546

a* R Squared = .019 (Adjusted R Squared = .018)

The results in Table 8 above show that there is a significant difference between each of the officer-suspect sex combination groups and the OMSM group, as well as between bystander present and not present. However, the results of significance tests for the interaction effects support the findings in Table 6 - that the difference between each of the sex combination groups (OFSF, OFSM, and OMSF) and the OMSM group remains the same, irrespective of whether or not bystander is present.

5.2. Logistic Regression Results

Table 9 shows the results of the logistic regression models used to assess the hypotheses while controlling for a number of suspect, officer, and situation characteristics. In Table 9, Model 1 to Model 3 represents results from the imputed data. For comparison purposes, Appendix A provides the results of the same series of logistic regressions as in Models 1 to 3, while using listwise deletion from the original, un-imputed, data. This comparison helps us to examine possible variation in results between the two versions of the data. Comparing both results from the imputed and the un-imputed data, we observe that there is no substantive difference in parameter estimates or pattern of results of significance tests.

Given the similarity of results between the original and imputed data sets, interpretation of model results proceeds using estimates from the imputed data sets. Model 1 is the model without the combination of officer-suspect sex and interactions of presence of bystanders; Model 2 is the base model with officer-suspect sex combination without an interaction with the presence of a bystander; Model 3 is the model with officer-suspect sex combinations and their interaction with the presence of a bystander.

5.2.1. Model 1

Model 1 examines the direct effects of all variables, with results representing the pooled effects across 5 imputed data sets. For ease of discussion, results are discussed by type of variable, including situational, suspect, and officer related variables, as the case maybe. Situational related variables include suspect resistance, violent offense, jurisdiction, whether the location of the police-suspect encounter was known for criminal activities, suspect intoxication, officer called for backup, priority call, used lights and sirens, officer dispatched, and bystander present. Given that suspect resistance was created using two separate dummy variables, antagonistic suspect and suspect physical resistance, it is necessary to discuss results in comparison to the reference category of compliance. Antagonistic suspects and suspects physically resist were significant at the .001 level. These variables both explain that if a suspect was antagonistic or physically resisted, it would increase the odds of physical force by the police officer. If a suspect was antagonistic, the odds of physical force by the police officer increased by a factor of 2.809 compared to when a suspect was compliant, holding all other variables constant. On the other hand, if a suspect physically resisted, the odds of physical force by the police increased by a factor of 20.574 compared to when suspects were compliant, holding all other variables constant. Violent offense is another situational variable that was significant at the .05 level. This means that arrest events for a violent offense increased the odds of physical force by a factor of 1.202 compared to a non-violent offense.

The Table 9 below presents the result of the logistic regression for the binary dependent variable "physical force"

Table 9. Imputed data Logistic Regression Summary for Physical Force (N = 7,512).

	Model 1		Base Model 2 w/o Inter.		Base Model 3 with inter	
	Exp(B)	*SE*	*Exp(B)*	*SE*	*Exp(B)*	*SE*
Suspect Resist. (Compliant ref.)						
Antagonistic suspect	2.809***	.098	2.812***	.098	2.812***	.098
Suspect physically resist	20.574***	.092	20.573***	.092	20.714***	.092
Violent offense	1.202*	.092	1.203*	.092	1.203*	.092
Age of suspect (30-34)[1]	.991	.020	.991	.020	.992	.020
Age of officer (30-34)	.912**	.030	.911**	.030	.911**	.030
Suspect Race (White ref.)						
Other	1.616*	.230	1.613*	.231	1.613*	.228
Black	1.147	.088	1.148	.088	1.150	.088
Hispanic	1.188	.120	1.189	.120	1.195	.120
Officer Race (White ref.)						
Black	1.039	.118	1.038	.118	1.035	.118
Hispanic	1.520**	.135	1.513**	.135	1.518**	.135
Other	1.020	.229	1.017	.229	1.012	.229
Jurisdiction (St. Pete ref.)						
Charlotte PD[2]	.582***	.118	.581***	.118	.583***	.119
Colorado Springs PD	.564***	.134	.566***	.134	.568***	.134
Dallas PD	.572***	.117	.572***	.117	.574***	.117
San Diego PD	.665**	.137	.667**	.137	.664**	.137
San Diego Sheriff's Dept.	.606***	.142	.605***	.142	.607***	.142
Location known for criminal activity	1.338***	.077	1.338***	.077	1.338***	.077
Suspect intoxicated	1.228**	.079	1.230**	.079	1.229**	.079
Officer called for backup	1.780***	.080	1.779***	.080	1.785***	.080
Priority call	1.534***	.104	1.529***	.104	1.529***	.104
Used lights and sirens	1.342**	.114	1.339*	.114	1.338*	.115
Officer dispatched	.759***	.084	.759***	.084	.759***	.084
Officer is male	1.567***	.111				
Suspect is male	1.470***	.101				
Bystander present	1.566***	.076	1.562***	.076	1.656***	.087

1 Centered at median age group
2 PD = police department
*p < .05. **p < .01. ***p< .001.

Table 9 (cont'd)

	Model 1		Base Model 2 w/o Inter.		Base Model 3 with inter	
	Exp(B)	*SE*	*Exp(B)*	*SE*	*Exp(B)*	*SE*
Officer-Suspect sex (OMSM[3] ref.)						
OFSF[4]			.549**	.220	.892	.306
OFSM[5]			.591***	.126	.649*	.174
OMSF[6]			.641***	.111	.682*	.166
Bystander by OFSF					.411*	.433
Bystander by OFSM					.830	.249
Bystander by OMSF					.894	.221
Nagelkerke's R-squared	.353		.353		.353	

3 OMSM = Officer Male Suspect Male; 4 OFSF = Officer Female Suspect Female
5 OFSM = Officer Female Suspect Male 6 OMSF = Officer Male Suspect Female.
*p < .05. **p < .01. ***p< .001.

With respect to jurisdiction, jurisdiction is coded into five separate dummy variables Charlotte PD, Colorado Springs PD, Dallas PD, San Diego PD, San Diego Sheriff's Department. St Petersburg PD was made as reference group because it has the highest percentage of use of physical force compared to other jurisdictions. Charlotte PD, Colorado Springs PD, Dallas PD, and San Diego Sheriff's Department were all significant at the .001 level, while San Diego PD was significant at the .01 level. The five jurisdiction variables explain that if jurisdiction is any of those five, it would decrease the odds of physical force by police. For example, if the arrest occurred in Charlotte, the odds of physical force by the police decreased by a factor of .582 compared to when is the arrest occurred in St. Petersburg, holding all other variables constant. When the jurisdiction was Colorado Springs, the odds of physical force by the police decreased by a factor of .564 compared to when the jurisdiction was St. Petersburg, holding all other variables constant. In a similar vein, when the jurisdiction was Dallas, San Diego PD, or the San Diego Sheriff's Department, the odds of police use of physical force decreased by a factor of .572, .665, and .606, respectively, compared to St. Petersburg. Location known for criminal activity was significant at the level of .001. That means, when the location was known for

criminal activity, it would increase the odds of physical force by police. The odds of physical force increased by a factor of 1.338 holding all other variables constant.

Another situational variable is suspect intoxication. When the suspect was intoxicated, it increased the odds of physical force by police by a factor of 1.228, holding all other variables constant. In a similar vein, officer called for backup is significant at the .001 level. This indicates that when an officer called for backup, it would increase the odds of physical force by the police by a factor of 1.780, holding all other variables constant. Similarly, when it was a priority call, it increased the odds of police use of physical force by a factor of 1.534, holding all other variables constant. Another important situational variable is officer used lights and sirens when responding to a call. The odds of physical force in such instances increased by a factor of 1.342 ($p < .01$) holding all other variables constant. Furthermore, Officer dispatched was significant at the .001 level. This means that when it was an officer dispatched call, the odds of physical force decreased by a factor of .759 holding all other variables constant. Lastly, if there was a bystander present at any time it increased the odds of physical force by the police by a factor of 1.566, holding all other variables constant.

The other variables grouping of suspect and officer related variables includes officer age, officer race, sex of officer, suspect race, and sex of suspect. With respect to age of officer, age of officer was significant at the .01 level. This indicates that a unit increase in the age of officer leads to a decrease in the odds of physical force by a factor of .912. In a similar vein, race of officer was measured using three separate dummy variables, including officer is black, officer is Hispanic, and officer is other. The reference category is officer is white. Officer is Hispanic was significant at the .01 level, which means, when the officer was Hispanic, it increased the odds of physical force by a factor of 1.520 compared to when the officer was white. With respect to sex

of officer, sex of officer was significant at the .001 level. This implied that when the officer was male, the odds of physical force by the police increased by a factor of 1.567.

Given that suspect race was created into three separate dummy variables, suspect is other race, suspect is black, and suspect is Hispanic. It is prudent to interpret the results in comparison to the reference category of "white" (suspect is white). Suspect is other race was significant at the .05 level. This means that when suspect is a race other than those identified individually it would increase the odds of physical force from the police. When suspect is other race, the odds of physical force from the police increased by a factor of 1.616 compared to when suspect was white, holding other variables constant. With respect to sex of suspect, sex of the suspect was significant at the .001 level. This means that when the suspect was male, the odds of physical force increased by a factor of 1.470. It is important to point out that while Model 1 in the original data was very similar to Model 1in the imputed data, Hispanic suspect was significant in model 1 of the original data; it was not significant in Model 1 in the imputed data.

5.2.2. Model 2

Model 2 is enhanced by adding the three variables that better identify the sex of the officer and suspect in the arrest event. In model 2 nearly all the variables that composed Model 1 are still significant, and have similar odds ratio estimates. It is important to note that two of the variables in Model 1 regarding officer sex (Officer is male) and suspect sex (suspect is male) were taken out in Model 2. The reason is because the three new variables added to Model 2 already capture the officer and suspect sex groupings. Officer-suspect sex was created into three dummy variables, Officer female Suspect female (OFSF), Officer female Suspect male (OFSM), Officer male Suspect female (OMSF), and these three categories are compared to Officer Male Suspect male (OMSM), which is the reference category. OFSF is significant at the .01 level,

when both the officer and suspect were female, the odds of physical force by police was reduced. The odds reduced by a factor of .549, compared to when the officer and suspect were male. OFSM is significant at the .001 level. That is, the odds of physical force by the police was reduced by a factor of .591 compared to when officer and suspect is male. OMSF is significant at the .001 level. That is, when the officer was male and the suspect was female, the odds of physical force by the police was reduced. The odds reduced by a factor of .641, compared to when officer and suspect was male, holding all other variables constant.

5.2.3. Model 3

Model 3 was enhanced by interactions between bystander present and the sex of officer and suspect categories (i.e., OFSF, OFSM, and OMSF). Nearly all the variables that composed of Model 2 are significant at the same significance levels, with similar odds ratio estimates as in Model 3. However, OFSF is not significant in Model 3, while OFSM and OMSF were significant at the .05 level in Model 3. The interaction of bystander present by officer and suspect are females was significant at the .05 level. That is, when a bystander was present, and the sex of officer and suspect is female (OFSF), the odds ratio of using physical force was reduced by a factor of 0.411, holding all other variables constant. The other interaction terms were not significant. It is important to note that the models had the same explained variance, which means that the interactions did not increase the explained variance across models. The Nagelkerke R Square for the Models is 35%, meaning 35% of physical force variation is explained by the predictors in the Models.

In models 2 and 3, OMSM was used as the reference group, to which OMSF, OFSF and OFSM were compared. Since they were dummy variables their coefficient could only be compared to the reference group. One cannot compare any other group with each other. Hence,

the second hypothesis – that male and female officers are more likely to use force on male suspects – is only partially addressed by the result in model 3. In other words, the result shows the comparison of OMSF with OMSM but not that of OFSF with OFSM. To make a similar comparison for female officers in this hypothesis, OFSM must be compared to OFSF. This can be achieved via a pairwise comparison from the prediction model, such that any of the groups can be compared to each other controlling for all the other variables in the model. By this, the hypothesis on female officers would be captured/answered. Pairwise comparison tests, with Bonferroni correction was conducted to compare the log odds of physical force between each pair of sex combination groups. The log odds for each category was computed at fixed values of all other predictors in model 3 presented in Table 9 above. Results for these comparisons were computed for each of the imputed data sets and averaged across the five imputations to obtain the final estimates, which are presented in Table 10 below.

Table 10. Imputed data pairwise comparisons of estimated marginal means based on the linear predictor of dependent variable police use of physical force

		Log odds Difference (I-J)	Std. Error
OFSF	OFSM	-.003	.243
	OMSF	-.087	.237
	OMSM	-.521	.218
OFSM	OFSF	.003	.243
	OMSF	-.084	.157
	OMSM	-.518***	.126
OMSF	OFSF	.087	.237
	OFSM	.084	.157
	OMSM	-.434**	.113
OMSM	OFSF	.521	.218
	OFSM	.518***	.126
	OMSF	.434**	.113

OMSM = Officer Male Suspect Male; OFSF=Officer Female Suspect Female, OFSM=Officer Female Suspect Male, OMSF=Off. Male Suspect Female. **p < .01. ***p< .001.

As can be seen from the multiple comparison results above, controlling for the variables in the model, there is no difference in the log odds of physical force when officer and suspect are

both females (OFSF) compared to when officer is female and suspect is male (OFSM). Meaning female officers use the same force irrespective of suspect sex. Furthermore, there is no difference in the log odds of physical force when officer and suspect is female (OFSF) compared to when officer is male and suspect is female(OMSF). Meaning, with respect to use of physical force, there is no difference in the way female officers treat female suspect when compared to male officer and female suspect category. The log odds of physical force are the same when sex of officer and suspect match. That is, there is no difference in the likelihood of use of physical force when both officer and suspect is female (OFSF) compared to when both officer and suspect is male (OMSM). Also, there is no difference in the log odds of use of physical force when officer is female and suspect is male (OFSM) compared to when officer is male and suspect is female(OMSF). However, the log odds of the use of physical force is significantly lower when officer is female and suspect is male (OFSM) compared to when officer is male and suspect is male(OMSM). Furthermore, the log odds of the use of physical force is significantly lower when officer is male and suspect is female (OMSF) compared to when both officer and suspect is male(OMSM). Finally, from the above result the log odds of physical force are significantly higher when the officer and suspect are both males (OMSM) compared to other officer and suspect sex combination groups (OFSF, OFSM, OMSF).

5.3. Multivariate Regression Results

Table 11 below provides the results for 7,512 respondents using a multivariate regression. This method was used because the dependent variable was operationalized as a continuous dependent variable measuring the severity of physical force used by the police, as opposed to the binary dependent variable in the previous analyses. Multicollinearity diagnostics measured through tolerance and VIF levels, suggested no concerns related to multicollinearity, as all

measures were well within acceptable standards. There were three models used for this statistical analysis. This was done for the same reason as explained in the logistic regression analysis. Similar to the logistic regression analysis, the explanation of this table will start from Model 1

5.3.1. Model 1

In Model 1 below, the following variables were significant at .001 level: antagonistic suspect, suspect physically resist, violent offense, age of officer, Charlotte PD, Colorado Springs PD, Dallas PD, San Diego PD, San Diego Sheriff's Department, officer called for backup, priority call, used lights and sirens, location known for criminal activity, bystander present, suspect is male and officer is male. Furthermore, suspect intoxicated was significant at the .01 level. For example, for every unit increase in suspect antagonism resulted in a 1.290 unit increase in severity of force holding all other variables constant. Variables with positive B coefficient in Model 1 in the table above have similar effects on the severity of force holding all other variables constant. Consistent with expectations, suspect behavior exerts the largest impact on the level of force used by the police in the model, as suspects who physically resisted experienced a large increase in the severity of physical force relative to those who were compliant ($B = 7.619$, $p<.001$). Model 1 demonstrates that the presence of a bystander, male officer, and male suspect resulted in increases in the severity of force of 0.693, 1.440, and 1.013respectively, holding all other variables constant. On the other hand, age of officer has a negative B coefficient, meaning every unit increase in the age of an officer results in a .366 unit decrease in the severity of force, holding all other variables constant. Variables with negative B coefficients in Model 1 have similar effects on the severity of force holding all other variables constant. The table below presents the results of the multivariate regression for the continuous dependent variable "severity of force."

Table 11. Imputed data Multivariate Regression Summary for Severity of force (N = 7,512).

	Model 1		Base Model 2 w/o Inter		Base Model 3 with Inter.	
	B	SE	B	SE	B	SE
Suspect Resist. (Compliant ref.)						
Antagonistic suspect	1.290***	.268	1.293***	.268	1.301***	.268
Suspect physically resist	7.619***	.270	7.617***	.270	7.615***	.270
Violent offense	.875***	.224	.873***	.224	.876***	.224
Age of suspect (30-34)[1]	-.066	.046	-.066	.046	-.065	.046
Age of officer (30-34)[1]	-.366***	.066	-.368***	.066	-.368***	.066
Suspect Race (White ref.)						
Other	.307	.750	.303	.747	.309	.748
Black	.185	.202	.185	.202	.190	.202
Hispanic	.474	.276	.476	.276	.481	.276
Officer Race (White ref.)						
Black	-.388	.276	-.385	.276	-.387	.276
Hispanic	-.506	.325	-.520	.325	-.523	.325
Other	.100	.525	.096	.526	.090	.527
Jurisdiction (St. Pete ref.)						
Charlotte PD[2]	-9.804***	.281	-9.809***	.281	-9.810***	.281
Colorado Springs PD	-8.990***	.297	-8.980***	.297	-8.979***	.297
Dallas PD	-5.586***	.275	-5.582***	.275	-5.584***	.275
San Diego PD	-5.248***	.319	-5.245***	.319	-5.245***	.319
San Diego Sheriff's Dept.	-4.022***	.334	-4.021***	.334	-4.023***	.334
Location known for criminal activity	.655***	.180	.656***	.180	.656***	.180
Suspect intoxicated	.519**	.185	.522**	.185	.519**	.185
Officer called for backup	1.875***	.200	1.872***	.200	1.871***	.200
Priority call	2.028***	.254	2.022***	.254	2.020***	.254
Used lights and sirens	2.114***	.287	2.106***	.287	2.101***	.287
Officer dispatched	-.346	.188	-.349	.188	-.351	.188
Bystander present	.693***	.175	.688***	.175	.693***	.209
Officer is male	1.440***	.234				
Suspect is male	1.013***	.213				

1 Centered at median age group. 2 PD = police department; *p < .05. **p < .01. ***p< .001.

Table 11 (cont'd)

	Model 1		Base Model 2 w/o Inter		Base Model 3 with Inter.	
	B	SE	B	SE	B	SE
Officer-Suspect sex (OMSM[3] ref.)						
OFSF[4]			-1.959***	.457	-1.649**	.629
OFSM[5]			-1.624***	.265	-1.778***	.342
OMSF[6]			-1.156***	.234	-1.077***	.321
Bystander by OFSF					-.658	.913
Bystander by OFSM					.397	.539
Bystander by OMSF					-.165	.465
R-squared	.303		.303		.304	

3 OMSM = Officer Male Suspect Male; 4 OFSF = Officer Female Suspect Female
5 OFSM = Officer Female Suspect Male 6 OMSF = Officer Male Suspect Female.
*p < .05. **p < .01. ***p< .001.

5.3.2. Model 2

Model 2 was enhanced by adding the three sex of officer by sex of suspect variables. In Model 2 nearly all the variables that composed Model 1 were the same significant levels and similar B coefficient. Two variables in Model 1 regarding officer sex (officer is male) and suspect sex (suspect is male) were taken out of Model 2. The reason is because the three new variables added to Model 2 already capture the officer and suspect sex groupings. Officer suspect sex is created into three dummy variables, Officer female suspect female (OFSF), Officer female suspect male (OFSM), Officer male suspect female (OMSF). These three categories are compared to Officer male suspect male (OMSM) which was the reference category. The three new variables added to Model 2: OFSF, OFSM, OMSF were significant at the .001 level, meaning that the severity of physical force decreases by 1.959 units when the officer was female and suspect female (OFSF), compared to when officer and suspect were male (OMSM). Furthermore, when it was officer female suspect male (0FSM) the severity of force was decreased by 1.624 unit compared to when officer and suspect were male (OMSM). Lastly, when it was officer male suspect female (OMSF) the severity of force decreased by 1.156 units

compared to when the officer and suspect were male, holding all other variables constant. The R square for Model 2 was 30%.

5.3.3. Model 3

Model 3 was enhanced by adding three new interaction variables. It is important to note that model 3 was composed of all the variables in Model 2 with the addition of three new bystander interaction variables. The three new interaction variables added to Model 3 were interactions between bystander presence and the three officer-suspect sex grouping introduced in Model 2. Nearly all the variables that composed Model 2 were the same significance levels and similar B coefficient with Model 3. Furthermore, Officer female suspect female (OFSF) was significant at the .001 level in Model 2 while in Model 3 it was significant at the .01 level. Meaning that in Model 3, officer female and suspect female (OFSF) results in a 1.649 unit decrease in severity of force used by the police, compared to when officer and suspect are both males (OMSM), holding all other variables constant. The three interaction variables added in Model 3 with respect to presence of bystander and the three officer-suspect sex categories were not statistically significant. The R square for Model 3 is 30%.

In models 2 and 3, OMSM was used as the reference group, to which OMSF, OFSF and OFSM were compared. Since they were dummy variables their coefficient could only be compared to the reference group. One cannot compare any other group with each other. Hence, the second hypothesis – that male and female officers are more likely to use more severe force on male suspects – is only partially addressed by the result in model 3. In other words, the result shows the comparison of OMSF with OMSM but not that of OFSF with OFSM. To make a similar comparison for female officers in this hypothesis, OFSM must be compared to OFSF. This can be achieved via a pairwise comparison from the prediction model, such that any of the

groups can be compared to each other controlling for all the other variables in the model. By this, the hypothesis on female officers would be captured. To further assess the difference in average severity of force by the suspect- police officer sex combination categories, pairwise comparison tests, with Bonferroni correction was conducted to compare the average severity of force between each pair of sex combination groups. The means for each category were computed at fixed values of all other predictors in model 3 presented in Table 11 above. Results for these comparisons were computed for each of the imputed data sets and averaged across the five imputations to obtain the final estimates, which are presented in Table 12 below.

Table 12. Imputed data pairwise comparisons of estimated marginal means based on the linear predictor of dependent variable severity of force

		Mean Difference (I-J)	Std. Error
OFSF	OFSM	-.352	.507
	OMSF	-.797	.491
	OMSM	-1.949***	.456
OFSM	OFSF	.352	.507
	OMSF	-.444	.324
	OMSM	-1.597***	.266
OMSF	OFSF	.797	.491
	OFSM	.444	.324
	OMSM	-1.153***	.233
OMSM	OFSF	1.949***	.456
	OFSM	1.597***	.266
	OMSF	1.153***	.233

OMSM = Officer Male Suspect Male; OFSF=Officer Female Suspect Female, OFSM=Officer Female Suspect Male, OMSF=Off. Male Suspect Female. ***p< .001.

As can be seen from the multiple comparison results above, there is no difference in the average severity of force when officer and suspect is female (OFSF) compared to when officer is female and suspect is male (OFSM). Meaning female officers use the same severity of force irrespective of suspect sex. Furthermore, there is no difference in the average severity of force when officer and suspect is female (OFSF) compared to when officer is male and suspect is

female (OMSF). Meaning, with respect to severity of force, there is no difference in the way female officers treat female suspects when compared to how male officers treat female suspects. The average severity of force is significantly lower when officer and suspect is female (OFSF) compared to when officer and suspect is male (OMSM) That is, there is a difference in the average severity of force when both officer and suspect is female (OFSF) compared to when both officer and suspect is male (OMSM). Also, there is no difference in the average severity of force when officer is female and suspect is male (OFSM) compared to when officer is male and suspect is female (OMSF). However, the average severity of force is significantly lower when the officer is female and suspect is male (OFSM) compared to when the officer is male and suspect is male (OMSM). Furthermore, the average severity of force is significantly lower when officer is male and suspect is female (OMSF) compared to when both officer and suspect is male (OMSM). Lastly, from the result above, the average severity of force is significantly higher when the officer and suspect are both males (OMSM) compared to other officer and suspect sex combination groups (OFSF, OFSM, OMSF).

Chapter 6

Discussion, Recommendations, and Conclusion

The preliminary findings suggest police use of physical force tends to be higher for males than females, which implies a significant association between suspect sex and police use of physical force. However, the preliminary findings further suggest that presence of a bystander increases police use of physical force. These two findings are consistent with previous studies examining similar concepts (Garner et al., 1995; 1996; 2002; Terrill & Mastrofski, 2002; Lawton, 2007). Upon the examination of the association between sex of officer by sex of suspect, female officers were found to use the same amount of force against male and female suspects, while male officers used less force against female suspects than male suspects. This preliminary finding supports the second hypothesis and previous positions that police are more likely to use physical force on male suspects (Lutze, & Symons, 2003; Frantzen, & San Miguel, 2009). Thus, one possible important explanation here is to the effect that male officers act chivalrously towards female suspects. With respect to female officers, it was expected that they would use the same amount of force against male and female suspects because the notion of chivalry with respect to relevant social norm and police use of physical force is more applicable between male police officers and female suspects. On severity of force, there is a significant difference in average severity of force by sex of suspect, with male suspects receiving more severe force than female suspects. However, upon multiple comparison of suspect and officer sex with respect to severity of force, it was found that average severity of force is significantly higher when officers and suspects were male, compared to other sex combination categories. Connecting this result to the previous analysis, male suspects have a higher likelihood of receiving physical force, as well as receiving more severe force compared to female suspects.

The result of the severity of force when the officer and suspect were male was expected, because the notion of chivalry does not operate between males. Chivalry, as will be discussed below, is a better explanation for why female suspects are less likely to receive physical force or more severe force from male police officers.

Based on the findings in this study, it is logical to argue that criminal threat theory may not best explain why female suspects would be less likely receive physical force or less severe force from the police than male suspects. This is because criminal threat theory suggests that police would use more force on male suspects than female suspects because male suspects are more aggressive and far more dangerous or threatening than female suspects (Hays, 2008). Thus, following this logic, it would be expected that female officers should also use more force on male suspects than female suspects. That is, use of physical force and the severity of force used by the police should be the same irrespective of officer sex, with a higher likelihood of physical force and greater severity of force against male suspects than female suspects. However, as the findings in this study suggest, female officers have the same likelihood of the use of physical force and also use the same amount of physical force against both male and female suspects. Studies that have substantiated criminal threat theory have presumably looked at the overall effect of police use of physical force on suspect's sex in general, while overlooking what was driving the effect, that is, which sex of officer was driving the effect.

It is interesting to note from the findings of this study that when sex of officer and suspect matched, there was no significant difference in the likelihood of use of physical force. That is, female officers had the same likelihood of use of physical force on female suspects when compared that of male officers on male suspects, holding all variables in the model constant. This finding may be attributed to over-representation of the OMSM group in the data (5,137) in

comparison to the OFSF group (267). However, with respect to severity of force, there was a significant difference in the average severity of force when sex of officer and suspect matched. That is, female officers use less severe force on female suspect when compared to the severity of force used by male officers against male suspects. Though the likelihood of use of physical force is the same only in the instance when sex of officer and suspect match, the severity of force is not. From this, one could infer that female officers use less severe force in general, which is consistent with previous studies (Sherman,1980; Horvath,1987; Gernnan, 1987). A possible explanation from criminal threat theory is that the likelihood of use of force should be equal when the sex of the officer and suspect match, because the level of threat perceived by same sex officer-suspect should be equal. That is, the way a female suspect serves as a threat to a female officer should be comparable to how male officers perceive the threat from male suspects, while chivalry does not operate between same sex interactions. However, with the significant difference in severity of force when sex of officer and suspect match, it could be due to the male notion of being in control (in this instance attributed to male officers), the male ego of maintaining respect (attributed to male suspects in this instance), and also, males tend to be more aggressive compared to females. Thus the higher severity of force could result as a response to the level of resistance or aggressiveness often displayed during male to male encounters, which may not exist between females.

Suspect resistance has been considered the major predictor of police use of physical force, and findings from the current study supports this reality (Garner et al., 1995; 1996; Terrill & Mastrofski, 2002). The findings here suggest that the likelihood of force is increased based on the level of resistance on the part of the suspect. When the influence of bystanders was examined in combination with suspect resistance and physical force it was found that presence of

bystanders increased the likelihood of physical force across the level of suspect resistance. This finding agrees with previous findings to the effect that presence of bystanders increases police use of force. The presence of bystanders was also found to increase the likelihood of physical force across suspect sex. However, this increased percentage of physical force is lower for females than male suspects. Furthermore, preliminary finding further suggested that presence of bystanders does not have any effect on the severity of force with respect to officer and suspect grouping categories. Presence of bystanders does not affect the severity of force by suspect sex. However, findings suggest that there is a significant difference in average severity of force across the presence of bystanders. Thus, average severity of force used by the police shifts with respect to the presence or absence of bystanders, but the severity of force used by the police does not shift with respect to suspect sex and presence of bystanders.

Another important preliminary finding is to the effect that there is a significant association between suspect resistance and suspect sex. Female suspects are compliant more frequently, are not as likely to be antagonistic, and physically resist in a lower percentage of cases than male suspects. This could explain, to an extent, why male suspects receive more physical force from the police than female suspects. This is consistent with the notion of criminal threat theory. The presupposition that males are more aggressive and dangerous, and thus attract physical force from the police, is consistent with these findings (Chesney-Lind & Shelden, 2004; Steffensmeier & Allan, 2000) to the extent that suspect resistance increased the percentage of force. The preliminary findings further points out that presence of bystanders reduced the percentage of suspect compliance, while it increased the likelihood of suspect antagonism and suspect physical resistance. This implies that presence of bystanders has a negative effect on the arrest event with respect to suspect behavior.

There are various factors that might influence suspect resistance in the presence of a bystander. Part of the supposed reasons might be "showing masculinity" (Messerschmidt, 1993). That is, individuals, most especially men, may try to demonstrate their toughness by engaging in resistance behaviors with the police when they know others are watching them. In addition, some engage in the act of antagonism or physical resistance as an attempt to preserve their ego or respect in the presence of others. Thus, preserving respect (Anderson, 1999) could be one of the possible explanations of why suspects may resist in the presence of bystanders. However, this assumption should be substantiated by future empirical evidence.

The results of the main analysis across the models has shown other situational elements of the officer-suspect encounter are significant. Another finding of the study is that arrests associated with a violent offense is associated with an increased severity of force used by police. That is, type of offense is associated with the amount of force used by the police. These findings are in line with criminal threat theory, which argues that the recipients of police use of physical force are individuals or criminals who serve as a threat to police or citizens (Hays, 2008). That is, police are more likely to respond with physical force, and more severe force, with suspects who are more aggressive or have committed a violent offense. This finding is also consistent with the findings of Terrill and Reisig (2003) who found that police are more likely to use higher levels of force in a neighborhood with higher homicide rate. Garner et al. (2002) also found type of offense to be a statistically significant predictor of police use of physical force.

Another situational element is jurisdiction. In conducting this kind of study where data from six jurisdictions are examined, it is prudent to control for jurisdiction in order to be more certain with the outcome of study. All five jurisdiction included in the models (Charlotte-Mecklenburg (North Carolina), Colorado Springs (Colorado), Dallas (Texas), San Diego

(California) and the San Diego County Sheriff's Department (California) were found to be associated with a decreased likelihood of physical force compared to St. Petersburg (Florida). The same effect was recorded for severity of force. Various factors may be associated with why particular jurisdictions have more or less use of physical force. Such explanations may include departmental polices, police culture, and the political climate of the area (i.e., whether it is more conservative or liberal), and, importantly, the characteristics of the neighborhoods or jurisdiction the police serve.

Other important predictors found to be statistically significant with respect to police use of physical force and severity of force included the location where the police/suspect encounter occurred. If the location was known for criminal activity, it increased the likelihood of physical force and the severity of force. This is consistent with previous findings (Garner et al., 2002; Terrill, & Reisig, 2003). Suspect intoxication, officer called for backup, priority call, officer used lights and sirens in response to the event, and officer dispatched were all found to be statistically significant with respect to police use of physical force. This finding is consistent with the findings of Garner and colleagues (2002), upon which the current study data is based. However, with respect to severity of force, suspect intoxication, officer called for backup, officer used lights and sirens were found to increase severity of force. This is also consistent with previous research (Garner et al., 2002). Another major finding as earlier discussed is with respect to presence of bystanders. In this study, presence of bystanders increased the likelihood of physical force and severity of force. This finding is consistent with previous studies (Friedrich, 1980; Garner et al., 1995).

Officer and suspect characteristics were also important predictors of police use of force. Such characteristics include age of officer, which was found to be associated with a decreased

likelihood of physical force and severity of force, with older officers being less likely to use force and using less severe physical force, on average. This significant finding on effect of officer's age is not surprising, as scholars have opined that the age of officers is a pertinent characteristic that influences police use of physical force (Fogelson, 1977). Furthermore, this finding is consistent with previous studies that have examined age of officer to the extent that older officers, when compared to younger officers, tend to use less physical force and less severe force (Fogelson, 1977; Garner et al., 1995; Mastrofski, & Terrill, 2002). An interesting finding concerns suspects that are categorized as an "other" race. The finding implies that when race of suspect is other than black or Hispanic, compared to white, the likelihood of physical force increased. This finding is consistent with other studies who have found race to be a significant predictor of police use of physical force (Garner et al., 2002). It is important to note that suspect race is not significant with respect to severity of force. When officers reported being Hispanic, compared to White, there was an increase in the likelihood of physical force, meaning Hispanic officers are more likely to use physical force compared to white officers. Thus, this also made race of officer a predictor of use of physical force. The race of officer was not statistically significant with respect to severity of force. It is important to also note that this finding is not consistent with other studies that found statistically significant effects when suspect or officer race was black. Research in this area is not conclusive. Another important finding in this study is that sex of suspect was found to be significant. It is important to note that suspect sex is a predictor of physical force and severity of force as this study found suspect sex to be statistically significant – the odds of using physical force is 1.47 times higher, and average severity of force is about 1 unit higher, when suspect is male compared to female. In a similar vein, sex of officer is a significant predictor of use of physical force and severity of force – the odds of using

physical force is 1.57 times higher, and average severity of force is about 1.44 unit higher, when officer is male compared to female, which is supported by various studies on officer sex (Alpert et al., 1997; Cohen & Chaiken 1972; Garner et al., 1996).

A major finding crucial to this study is with respect to the interaction between officer and suspect sex. Current results found that the officer-suspect sex combination is associated with police use of physical force and the severity of force used in arrest events. That is, male officers are more likely to use physical force and more severe force on male suspects compared to female suspects. That is, it may be that male officers display chivalry towards female suspects with respect to the likelihood of use of physical force and the severity of force. However, the presence of bystanders was not found to be a moderator of this relationship. That is, presence of bystanders does not influence the gender gap in the likelihood of police use of physical force. Nevertheless, the study found that when bystander are present, and the sex of officer and suspect is female, the likelihood of physical force is reduced compared to when the officer and suspect was male. In this instance, bystander presence influenced whether physical force was used, but not how much physical force was used. A possible explanation to this is that female officers usually use less force, consistent with Sherman (1980), Horvath (1987) and Gernnan (1987), who found that female police officers use less force and are less likely to be involved in use of force situations. In addition, Schuck and Rabe-Hemp (2007; 2005) found that female police officer pairs use less force when compared to male officers in male to male police officer pairs. Thus, a female officer uses physical force in limited instances, or hardly use physical force. From result of this study, the interaction means that the gender gap widened relative to the effect when the suspect and officer were male and in the presence of bystanders. It could be that female officers do not change their behavior at all in the presence of bystanders when the suspect is female,

while male officers use more force against male suspects in the presence of bystanders. The interaction is a relative measure, not an absolute measure. It is important to note the rate of female suspect's physical resistance in the presence of bystanders is relatively low compared to male suspects. Thus, this may explain why the bystander interaction effect was found for female officer and female suspects.

It is important to note at this point that, although it was expected that social norms would result in the use of less physical force in the presence of bystanders, current analyses show that the presence of bystanders is associated with higher antagonisms from the suspect to the police. But antagonistic suspects are also associated with a higher likelihood of physical force and more severe force by the police. Put together, the prior expectation of less force in the presence of bystander is weakened by the fact that suspects are more likely to be antagonistic when bystanders are present. In other words, the effect of bystanders on police use of physical force and the severity of force used may be moderated by the effect of bystanders on suspect's resistance. Further studies may need to investigate why and how bystander presence influences suspect's resistance.

There are some limitations associated with the current study. First, the data used in this study is a secondary data set collected for the purpose of another study. This imposes some constraints on the present study. This is not necessarily a serious constraint, as researchers often use secondary data. There are a few limitations to this present study, however, which include the fact that researchers did not draw a random sample of arrests throughout the years. This study did not include use of force of either the suspect or officers that did not lead to arrest. Thus, it is limited to police-suspect encounters that led to an arrest during the specified time range in each jurisdiction. The combined data from all jurisdictions may not be a representative sample of

agencies or arrests, however, it is a large diverse sample that could effectively test the strength of predictors of physical force and severity of force. Another possible limitation is the fact that the data used in this study were drawn from surveys administered to police officers, which may not adequately reflect the suspect's account on any of the variables. The suspect interview data had numerous issues, including missing data due to the fact that responses could not be obtained from some suspects who were drunk, refused to respond, or were simply not presented for interview by the jail officials. Another limitation is with respect to the researchers' maximum force scale of 1 (least forceful) to 100 (most forceful). The item was ranked based on the ranking officer's personal experience and not based on departmental policy. That is, the ranking is subjective and relative to each officer. The data did not contain departmental or neighborhood characteristics of the six sites so as to account for jurisdictional differences. Another limitation is that the study relied on secondary quantitative data thereby losing the qualitative nuance of the officer- suspect encounter. It is possible that first female officers at the scene often deferred to male officers when male suspects were involved, most especially more masculine featured male suspects. Lastly, gender was measured by biological sex. There is no other gender measure in the data, which might explain why other predicted effects with respect to the presence of bystanders were not found. However, despite the limitations identified above, the strengths of this study outweigh the limitations, and can lead to better studies in the future.

In conclusion, a very significant contribution of this study is that it lends support to existing knowledge on the relationship between suspect's gender and police use of physical force. Though it was found in this study that male officers are less likely to use physical force and less severe force on female suspects compared to male suspects, this study also attempted to explain this disparity in treatment from a theoretical point of view, introducing social norms with

respect to chivalry and criminal threat theory. The study, in an attempt to theoretically explain the effects of suspect's sex on police use of physical force and severity of force examines the way male and female officers treat both male and female suspects with the interaction effect of presence of bystanders. The study found support for chivalry as an explanation of police officer use of physical force and severity of force with respect to suspect's gender. However, to further understand suspect's gender and police use of physical force and the severity of force, biological, psychological, and social measures or definitions of gender/gender characteristics should be examined. This examination should go beyond suspect's sex (i.e., male/female categorization) in order to capture potential and relevant effects of gender. Though the lexicon definition of gender often indicates sex, and most studies have regularly used the male/female dichotomy to measure gender, this measure may be inadequate. Future studies should consider this recommendation when examining police use of force and suspect characteristics, most especially suspect gender in a broader perspective than the traditional male/female categorization.

APPENDICES

APPENDIX A. Original data. Logistic regression summary for physical force (n = 7,512)

Table 13. Original data. Logistic regression summary for physical force (n = 7,512).

	Model 1 Original		Model 2 w/o Inter.		Model 3 with Inter.	
	Exp(B)	*SE*	*Exp(B)*	*SE*	*Exp(B)*	*SE*
Antagonistic suspect	2.893***	.103	2.896***	.103	2.895***	.103
Suspect physically resist	21.437***	.098	21.452***	.098	21.540***	.098
Violent offense	1.213*	.095	1.214*	.095	1.214*	.095
Age of suspect (30-34)[1]	1.004	.021	1.004	.021	1.004	.021
Age of officer (30-34)[1]	.921**	.032	.921**	.032	.921**	.032
Suspect Race (White ref.)						
Other	1.459	.268	1.465	.268	1.461	.268
Black	1.171	.094	1.173	.094	1.174	.094
Hispanic	1.284*	.125	1.285*	.125	1.290*	.125
Officer Race (White ref.)						
Black	1.020	.123	1.020	.123	1.016	.123
Hispanic	1.440**	.142	1.435*	.142	1.436*	.142
Other	.984	.250	.981	.250	.975	.251
Jurisdiction (St. Pete ref.)						
Charlotte PD	.611***	.121	.609***	.121	.610***	.121
Colorado Springs PD	.592***	.142	.593***	.142	.594***	.142
Dallas PD	.566***	.129	.565***	.129	.565***	.129
San Diego PD	.719*	.143	.719*	.143	.717*	.143
San Diego Sheriff's Dept.	.672**	.148	.671**	.148	.673**	.148
Location known for criminal activity	1.384***	.082	1.384***	.082	1.384***	.082
Suspect intoxicated	1.201**	.084	1.202*	.084	1.201*	.084
Officer called for backup	1.821***	.084	1.820***	.084	1.822***	.084
Priority call	1.619***	.110	1.615***	.110	1.614***	.110
Used lights and sirens	1.354*	.120	1.352*	.120	1.349*	.120
Officer dispatched	.723***	.089	.723***	.089	.723***	.089
Officer is male	1.643***	.132				
Suspect is male	1.458***	.108				

Table 13 (cont'd)

	Model 1 Original		Model 2 w/o Inter		Model 3 with Inter.	
	Exp(B)	*SE*	*Exp(B)*	*SE*	*Exp(B)*	*SE*
Bystander present	1.635***	.080	1.631***	.080	1.705***	.091
Officer-Suspect sex (OMSM ref.)[2]						
OFSF[3]			.518*	.262	.759	.385
OFSM[4]			.568***	.149	.627*	.211
OMSF[5]			.658***	.116	.702*	.175
Bystander by OFSF[3]					.520	.519
Bystander by OFSM[4]					.825	.296
Bystander by OMSF[5]					.893	.232
Nagel. R^2	**.360**		**.360**		**.361**	

*p < .05. **p < .01. ***p< .001.

1 Centered at median age group 2 OMSM = Officer Male Suspect Male; 3 OFSF=Officer Female Suspect Female, 4OFSM=Officer Female Suspect Male, 5OMSF=Off. Male Suspect Female.

APPENDIX B. Original data. Multivariate regression summary for severity of force (*n* = 7,512)

Table 14. Original data. Multivariate regression summary for severity of force (*n* = 7,512).

	Model 1 Original Data		Model 2 w/o Inter.		Model 3 with Inter.	
	B	SE	B	SE	B	SE
Suspect Resist. (Compliant ref.)						
Antagonistic suspect	1.349***	.276	1.353***	.276	1.356***	.277
Suspect physically resist	7.707***	.280	7.709***	.280	7.711***	.280
Violent offense	.944***	.227	.941***	.227	.945***	.227
Age of suspect (30-34)[1]	-.061	.047	-.062	.047	-.061	.047
Age of officer (30-34)[1]	-.369***	.067	-.370***	.067	-.369***	.067
Suspect Race (White ref.)						
Other	.124	.602	.129	.602	.124	.602
Black	.134	.207	.136	.207	.134	.207
Hispanic	.455	.279	.455	.279	.452	.279
Officer Race (White ref.)						
Black	-.317	.279	-.313	.279	-.315	.279
Hispanic	-.485	.330	-.496	.330	-.498	.330
Other	.402	.526	.399	.526	.405	.526
Jurisdiction (St. Pete ref.)						
Charlotte PD	-9.804***	.279	-9.808***	.279	-9.805***	.280
Colorado Springs PD	-8.890***	.306	-8.881***	.306	-8.879***	.306

Table 14 (cont'd)

	Model 1 Original Data		Model 2 w/o Inter.		Model 3 with Inter.	
	B	SE	B	SE	B	SE
Dallas PD	-5.570***	.294	-5.569***	.294	-5.564***	.294
San Diego PD	-5.263***	.324	-5.261***	.324	-5.262***	.324
San Diego Sheriff's Dept.	-3.906***	.336	-3.904***	.336	-3.902***	.336
Location known for criminal activity	.503**	.185	.501**	.185	.502**	.185
Suspect intoxicated	.393*	.191	.394*	.191	.395*	.191
Officer called for backup	1.790***	.205	1.787***	.205	1.788***	.205
Priority call	1.804***	.262	1.804***	.262	1.803***	.262
Used lights and sirens	2.076***	.292	2.069***	.292	2.068***	.292
Officer dispatched	-.550**	.194	-.552**	.194	-.555**	.194
Bystander present	.667***	.180	.663***	.180	.654**	.210
Officer is male	.954***	.265				
Suspect is male	1.137***	.220				
Officer-Suspect sex (OMSM ref.)[2]						
OFSF[3]			-1.622***	.509	-1.219	.719
OFSM[4]			-1.134***	.303	-1.139**	.399
OMSF[5]			-1.247***	.238	-1.343***	.329
Bystander by OFSF[3]					-.806	1.017
Bystander by OFSM[4]					.010	.611
Bystander by OMSF[5]					.200	.472
R^2	**.315**		**.316**		**.316**	

*p < .05. **p < .01. ***p< .001.

1 Centered at median age group 2 OMSM = Officer Male Suspect Male; 3 OFSF=Officer Female Suspect Female, 4OFSM=Officer Female Suspect Male, 5OMSF=Off. Male Suspect Female

APPENDIX C. Original data. Pairwise comparisons of estimated marginal means based on the linear predictor of dependent variable police use of physical force

Table 15. Original data. Pairwise comparisons of estimated marginal means based on the linear predictor of dependent variable police use of physical force

		Mean Difference (I-J)	Std. Error
OFSF	OFSM	-.025	.294
	OMSF	-.174	.280
	OMSM	-.581	.262
OFSM	OFSF	.025	.294
	OMSF	-.149	.179
	OMSM	-.556**	.149
OMSF	OFSF	.174	.280
	OFSM	.149	.179
	OMSM	-.407**	.118
OMSM	OFSF	.581	.262
	OFSM	.556**	.149
	OMSF	.407**	.118

OMSM = Officer Male Suspect Male; OFSF=Officer Female Suspect Female, OFSM=Officer Female Suspect Male, OMSF=Off. Male Suspect Female. **p < .01

APPENDIX D. Original data. Pairwise comparisons of estimated marginal means based on the linear predictor of dependent variable severity of force

Table 16. Original data. Pairwise comparisons of estimated marginal means based on the linear predictor of dependent variable severity of force.

		Mean Difference (I-J)	Std. Error
OFSF	OFSM	-.461	.574
	OMSF	-.345	.541
	OMSM	-1.595*	.509
OFSM	OFSF	.461	.574
	OMSF	.116	.357
	OMSM	-1.134**	.304
OMSF	OFSF	.345	.541
	OFSM	-.116	.357
	OMSM	-1.250***	.237
OMSM	OFSF	1.595*	.509
	OFSM	1.134**	.304
	OMSF	1.250***	.237

OMSM = Officer Male Suspect Male; OFSF=Officer Female Suspect Female, OFSM=Officer Female Suspect Male, OMSF=Off. Male Suspect Female. *p < .05. **p < .01. ***p< .001.

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