Carrying weapons for protection in the workplace: findings from the National Crime Victimization Survey, Workplace Risk Supplement

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Carrying Weapons for Protection in the Workplace:
Findings from the National Crime Victimization Survey, Workplace Risk Supplement

By

Matthew D. Fetzer

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ABSTRACT

Decisions to carry weapons for protection in the workplace were examined in regard to relationships with collective security, routine work activities, fear and victimization. Using data from the National Crime Victimization Survey, logistic regression models were estimated on predictors of carrying firearms, knives, and pepper spray by workers in the US labor force. Results indicated that collective security, routine work activities, and prior victimization, and perceptions of risk had significant effects on decisions to carry weapons for protection. Gender-specific models were also estimated in order to determine how these factors differed for men and women. Men and women differed on type of weapon carried as well as on some of the covariates of carrying weapons for protection in the workplace.

Keywords: weapons, workplace security, fear of crime, prior victimization, routine activities
Carrying Weapons for Protection in the Workplace:

Findings from the National Crime Victimization Survey, Workplace Risk Supplement

A great deal of research has focused on explaining why individuals choose to protect their person and property by arming themselves with weapons. Explanations for protective firearms possession have included economic resources, socialization, fear and victimization, racial prejudice, collective security, and conservative ideology (Cao, Cullen, & Link, 1997). Much of this literature has focused on the home, leisure, or school domains of one's lifestyle. I seek to study one domain that has been overlooked by previous research on weapons ownership – the work domain. Despite the wealth of research on weapons ownership for protection, there is a gap in the literature in regard to the workplace.

This lack of research is unusual given the fact that almost one in five violent crimes occur in the workplace (BJS, 2001, p. 1). Government agencies such as the Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) have recognized that many workplaces are potentially dangerous and that workers are at risk for violent victimization from criminals, coworkers, customers, clients, and even family members.

For most people, a significant part of their lifestyle is dedicated to the work domain. “Those who work have a large portion of their daily activities structured in and around the workplace” (Hindelang, Gottfredson & Garofalo, 1978, p. 254). Many workers are exposed to the risks of violent victimization while they routinely perform their jobs. As Rosenbaum (1988) pointed out, “persons who can avoid high-risk behaviors and situations are considerably less likely to experience criminal victimization
than persons whose daily activities bring them into close proximity with offenders, however, many people have little choice but to live and work in high-risk environments” (p. 334). The Bureau of Justice Statistics (BJS, 2001) calculated that in the last decade there were approximately 1.7 million violent victimizations in the workplace per year, and the Bureau of Labor Statistics (2006) estimated that nearly five percent of the 7.1 million private industry business establishments in the United States had an incident of workplace violence in 2005. Given that people in the labor force spend such a great amount of time in the workplace, where they may be exposed to victimization, it seems logical that personal safety at work is just as important of a concern as personal safety at home.

Despite the risks for violence in the workplace, little is known about self-protective behaviors in this realm. I plan to address this void by studying decisions to carry weapons for protection in the workplace. I will incorporate aspects of collective security, routine activities, and fear, and victimization in explaining why workers carry weapons for protection. Using data from the Workplace Risk Supplement (WRS) to National Crime Victimization Survey (NCVS), the effects that situational factors in the workplace (security measures and routine occupational tasks) and the individual assessment of the threat of workplace violence (prior victimization, perceptions of risk, fear of crime) have on self-protective behavior (carrying weapons) will be analyzed.

I propose that individuals will carry weapons for protection while at work or on duty out of a situational need created by factors in the workplace environment. Such factors include the absence of workplace security and the routine performance of certain occupational tasks. The threat of victimization in the workplace is influenced by
routinely performed occupational tasks that affect workers’ exposure and target suitability as well as the absence of guardianship provided at an organizational level through workplace security measures. Thus, it is hypothesized that these situational and environmental factors in the workplace will influence workers’ perceptions of risk for victimization, because “individuals can anticipate danger in certain environments and estimate risk” (Ferraro & LaGrange, 1987, p. 73). When workers feel that they are at risk for becoming a victim of a violent crime, the likelihood that they will resort to carrying weapons for protection will be greater.

CHAPTER 1
SOCIAL CONTROL & SELF-HELP
Social control theory can be applied to both employers’ provision of workplace security and employees’ decisions to carry weapons for protection. Originally developed as an explanation of deviant behavior in society, social control is a response to a perceived social threat (Liska, 1997). Social control can be separated into two forms: informal social control and formal social control. Whereas “informal social control refers to society’s attempts to induce conformity through the socialization of young people into the norms of society, and through people’s supervision of each other’s behavior, reinforced by rule making, admonition and censure; formal social control refers to society’s formally constituted legal institutions of the law and criminal justice system designed to sanction offenders, to confine and rehabilitate them, and to deter crime among the population at large” (Clarke, 1997, p. 2-3). It is the latter form of social control that is relevant to the discussion of workplace security. In the present study, the
social threat is workplace violence and social control can be applied by employers in the form of security measures to counteract this threat.

In industrialized societies, formal social control has rested mainly in the hands of state and local governments. The criminal justice system is the conventional provider of formal control in our society. Since the 19th century, agents of formal social control such as the police have held a monopoly on law, justice, and order maintenance (Shearing & Stenning, 1983, p. 494). The prototypical social control approach of the criminal justice system has involved apprehending and punishing offenders, not preventing their behavior from occurring (Horwitz, 1990). However, prevention is another form of social control. “Prevention focuses on limiting the opportunity of potential deviants or altering the habits of potential victims” (Black, 1998). Horwitz (1990) pointed out that “the most effective possible social control system would be one that prevents deviance from arising in the first place” (p. 219). From a rational choice perspective, prevention strategies are designed to increase the costs of criminal offending by both decreasing the odds of a successful crime and by increasing the likelihood of apprehension. Rather than controlling the behavior of offenders by increasing punishment, it is more effective to make the offender afraid of being caught (Clarke, 1997). Fundamentally, the provision of workplace security by businesses can be viewed as social control designed to prevent crime in the workplace.

In regard to the workplace, it is not necessary to place the lone responsibility of formal social control in the hands of the police. Over the past several decades, businesses have begun to step in as agents of social control for the prevention of workplace violence. Many organizations and businesses routinely provide precautions to protect themselves,
their employees, and their clients from crime (Clarke, 1997). Early evidence of this phenomenon can be found in research on community crime prevention that was conducted in the 1970s by the National Institute of Law Enforcement and Criminal Justice (NILECJ) – now known as the National Institute of Justice (NIJ). Evaluations were conducted on applications of defensible space (Newman, 1972) and Crime Prevention Through Environmental Design (CPTED) (Jeffery, 1971), which included coordinated efforts between police and organizations representing community business owners to prevent commercial crime (Lavrakas, 1985). Newman’s (1972) work on defensible space advocated for increasing surveillance, and reducing anonymity and escape routes for offenders. Jeffrey’s (1971) research promoted CPTED, which focused on providing protection by modifying the physical characteristics of the environment.

Social control can also be used to explain decisions by employees to carry weapons for protection. Black (1998) explains that “although many citizens are entirely dependent on officials such as police to handle criminal offenders; others are prepared to protect themselves by any means necessary, including violence” (p. 38). Known as “self-help” or “unilateral” social control, this is an aggressive and violent response to crime when formal “third-party” agents of social control are inadequate or viewed as such by citizens (Black, 1983; Horwitz, 1990). In the case of the workplace, if a third-party, such as an employer, fails to provide workers with adequate protection from violent victimization, employees may seek self-help in the form of weapons.
CHAPTER 2

COLLECTIVE SECURITY

The relationship between social control and self-help is best illustrated by the collective security thesis (McDowall & Loftin, 1983) explaining the ownership of protective weapons in general society. Collective security can be defined as formal protection provided by the governing body of a state or municipality for its members or constituency. The relationship between collective security and weapons ownership is an inverse one, with the pursuit of self-help occurring when collective security is perceived to be lacking or ineffective.

McDowall and Loftin (1983) explained the demand for legal handguns through collective security. In an aggregate analysis of handgun ownership (the annual handgun licenses issued per 100,000 population) in the Detroit, Michigan area, the authors utilized three measures of collective security – the annual violent crime rate, the 1967 riot, and the number of uniformed police officers per capita. Results indicated that when collective security was in doubt (violent crime, riot) handgun ownership increased, but when collective security increased (police strength) handgun ownership decreased.

McDowall and Loftin (1983) were not the first to study how the provision of protection by the state is related to weapons ownership. More than a decade earlier, one paper addressed the relationship between attitudes of self-help and gun ownership using data from a national survey conducted by the Opinion Research Corporation in May and June of 1968 (Feagin, 1970). The study addressed whether a home defense orientation explained gun ownership. Home defense orientation was measured by a survey item that inquired as to the respondents’ preparedness to defend their homes against crime and
violence, or if they believed the police could handle instances of crime and violence. This measure was reflective of the dimension of the collective security hypothesis dealing with confidence in the police. Gun ownership was a composite measure that combined both individual and household gun ownership. Contingency table analysis was conducted using chi-square comparisons of the percent differences in homes defense orientation and gun ownership for White and Black respondents separately. The results indicate that White respondents with less confidence in police were more likely to have a gun in the household.

Another study that used data from a sample of individuals from Detroit, Michigan found similar results to those reported by Feagin (1970). McClain (1983) analyzed household gun ownership for census tract areas grouped into four risk categories based upon risk for homicide and racial composition – Black/high risk, Black/low risk, White/high risk, and White/low risk. Among the indicators in her analysis was perceived level of police protection, which was found to have an inverse relationship with gun ownership, but only for White respondents in the low risk area.

Research by Lizotte and Bordua (1980) and Lizotte, Bordua, and White (1981) also addressed the relationship between collective security and weapons ownership. The authors used path analysis to specify two models of firearms ownership – for sport and for protection – using a sample of residents from Illinois. Included in their models was a measure for collective security, which was an additive index reflecting respondent’s perceptions of the ineffectiveness of both the police and courts in dealing with crime. In their model explaining firearms ownership for protection, the perceived ineffectiveness of the police and courts had an indirect effect on owning a gun that operated through fear of
crime (Lizotte, Bordua, & White, 1981). Individuals who perceived the police and courts to be inadequate in dealing with crime had higher levels of fear and were, therefore, more likely to own a firearm for protection.

Two studies used survey data from a sample of adult White males obtained from the 1979 Detroit Area Study to investigate protective firearms ownership. The first study incorporated indicators for Wright and Martson’s (1975) “fear and paranoia” hypothesis, McDowall and Loftin’s (1983) collective security thesis, aggressive attitudes toward crime, and racial prejudice in explaining the ownership of weapons for protection (Young, 1985). Among the results, Young found that confidence in the police to provide protection was negatively related to protective firearms ownership by White males.

The second study specifically examined the hypothesis that individuals purchase firearms for protection when confidence in collective security declines (Young, McDowall, & Loftin, 1987). The dependent variable, gun ownership for protection, assessed whether or not anyone in the household owned a gun, and if so, whether the purpose was for protection. Two indices of respondents’ opinions of institutional means of security (collective security) – one for confidence in police and one for confidence in courts – were created. The results provided support for the collective security model, in that increases in confidence in the police or courts corresponded to a decrease in the probability of owning a gun for protection.

Data from the Police Services Study were used in two research studies to predict defensive weapons ownership (DeJong, 1997; Smith & Uchida, 1988). In the earlier study, the authors analyzed the effects of “conditions of vulnerability” on defensive weapons ownership (Smith & Uchida, 1988). One aspect of conditions of vulnerability...
included collective security which was measured by a rating of police – the respondent’s attitudes toward the ability of police to provide protection for the public. Defensive weapon ownership was operationalized as whether a household member purchased a gun or other weapon (e.g., knives, pepper spray) for protective purposes. A negative association was found between ratings for the police and defensive weapons ownership, meaning that respondents who felt that the police could not provide adequate protection were more likely to own a weapon for self-defense.

In the other research paper on defensive weapons ownership, DeJong (1997) analyzed how the indicators of this phenomenon differed by gender. In this study, the sample was restricted to single adult households in order to eliminate concerns as to who actually owned the weapon(s) in the household. The gender-specific models found that the effects of collective security on defensive weapons ownership operate differently for men and women. For women, collective security had no significant impact on decisions to own weapons for defense. Defensive weapon ownership by men, on the other hand, was influenced by collective security in a curvilinear manner – men whose faith in the police was either very high or very low were likely to engage in self-help (DeJong, 1997). These results indicate that decisions to carry weapons for protection are influenced by different factors for men than for women.

Some research on the relationship between collective security and firearms ownership diverged from the “traditional” measures of collective security (e.g., confidence in police). Cao, Cullen, and Link (1997) measured collective security as confidence in police, confidence in neighbors, and neighborhood disorder. There was no relationship between formal collective security (confidence in police) and protective gun
ownership. However, a relationship was found between protective gun ownership and informal collective security. Individuals who had confidence in their neighbors to provide protection against victimization were less likely to own a gun. Jiobu and Curry (2001) used data from the General Social Survey (GSS) in their analysis of personal firearm ownership and collective security on a much broader scope. Collective security was measured as the lack of confidence in the federal government. Confidence in the federal government was a factor constructed from separate measures for the Executive, Legislative, and Judicial branches of the federal government. The authors found a significant positive relationship between the lack of confidence in the federal government and personal firearm ownership, thus lending support to the collective security thesis.

Another test of the collective security thesis using GSS data was conducted by Kleck and Kovandzic (2009). In their study, the dependent variable was personal ownership of a handgun. Collective security was police strength measured as the number of full-time police officers in a jurisdiction. The relationship between these two variables was inverse, in that respondents living in cities with more police per capita were significantly less likely to own handguns. These findings suggest that effective collective security can reduce the pursuit of self-help.

Several studies found either no support for the hypothesis that collective security inversely affects weapons ownership or an opposite relationship that collective security actually increases the likelihood of weapons ownership. Ziegenhagen and Brosnan (1990) analyzed the decisions to carry weapons for protection among New York City subway riders. Included in their analysis was a rating for how well the police were able to protect subway riders. Their analysis found no significant relationship between ratings
for the police and carrying self-protective measures, which suggests that the collective security thesis does not operate among subway riders in New York City. Another study also failed to find a significant relationship between collective security and protective firearms ownership (Luxenburg, Cullen, Langworthy, & Kopache, 1994). The researchers included several measures for the collective security hypothesis – overall ratings of the police, reliance on police, and informal security provided by neighbors – but none of these measures had a significant association with protective firearms ownership. It should be noted that the data used in this study was collected through face-to-face interviews by police officers. This survey methodology may have bearing on the responses given by respondents in the study, such as failing to report owning a weapon or inflating the overall ratings of the police, and therefore, biased their results.

In a study of college students’ decisions to carry weapons for protection, Tewksbury and Mustaine (2003) analyzed the potential effects of demographics, neighborhood structures, neighborhood conditions, routine activities, fear of crime, perceptions of safety, and substance use. The authors found that the actual physical presence of collective security measures had a positive effect on carrying self-protective measures. Respondents who lived near police stations had 66% greater odds of carrying a gun, knife, club, pepper spray, or personal alarm than respondents who did not live near police stations (Tewksbury & Mustaine, 2003). This positive relationship between the presence of police and weapons carrying is contradictory to the collective security thesis. The authors speculated that the presence of police served as a constant reminder of the risk of crime, and thus, individuals who lived near police departments were more likely to arm themselves.
Giblin (2008) also found a positive relationship between measures of collective security and carrying a self-defensive weapon. Giblin (2008) conducted a secondary analysis of a special 12 city edition of the National Crime Victimization Survey that addressed criminal victimization, perceptions of community safety, and satisfaction with police. The dependent variable was carrying a self-defensive weapon, which was not limited to just firearms. Collective security measures included satisfaction with police, awareness of community policing efforts, and perceptions of change in police patrol. Findings were mixed. Some support for collective security hypothesis was found, such that respondents who indicated satisfaction with police were less likely to carry a weapon for protection. However, individuals who were aware of community policing efforts or who saw increased police patrols were more likely to carry a self-defensive weapon.

A neighborhood-level analysis of concealed pistol license holding in Spokane, Washington also found a positive relationship between collective security and weapons carrying (Gau, 2008). The author estimated a path model explaining permits for carrying a concealed handgun using level of police service, violence crime rates, neighborhood cohesion, and fear of crime. Significant direct effects were found between respondent’s opinions of police level of service in their neighborhood and concealed pistol licenses, in that, neighborhoods where citizens believed police service levels to be adequate actually had more pistol permits.

What is known from the existing research on collective security and weapons ownership is that there is typically an inverse relationship between these concepts. Viewed as a condition of vulnerability, the absence or ineffectiveness of collective security can lead to self-help in the form of owning or carrying weapons for protection.
Although collective security has typically been measured as confidence in government institutions such as the police or courts, it has also been operationalized for smaller informal entities such as neighborhoods and communities (Cao et al., 1997; Luxenburg et al., 1994).

It is misleading to imply that carrying weapons is the only course of self-help that individuals have for personal protection. Lavrakas and Lewis (1980) described personal protection as “a series of specific behaviors by which citizens attempt to avoid experiencing some noxious condition or event” (p. 254-255). Such behaviors are quite diverse in both definition and application, as many academics have tried to organize these behaviors into logical taxonomies (Conklin, 1975; Furstenberg, 1972; Rosenbaum, 1988). Some protective behaviors include target hardening techniques such as installing locks, bars, or alarms. Alternatively, risk avoidance behaviors involve strategies such as self-isolation by staying home, avoiding certain places, or avoiding going out at certain times. The basic premise behind these strategies is to limit exposure to crime. If citizens cannot limit their exposure to crime, they will often take protective actions to manage risk by either making crime less costly to them and more costly to offenders (Rosenbaum, 1988). These actions include, but are not limited to, carrying a weapon for protection.

The workplace is not an environment that is conducive to many types of self-help options. Employees are not permitted to modify their work environment by installing security measures such as locks or alarms, which they are free to do in their home environment. Staying away from the workplace is often not an option due to the necessity of employment. Avoidance techniques, such as not going to high-risk places at high-risk times, are limited particularly when one’s job requires working at such places
during such times. Individuals may not be able to isolate themselves from potential offenders because the nature of their job does not permit them the freedom of doing so (Hindelang, Gottfredson & Garofalo, 1978). Thus, the workplace may actually limit an employee’s options for social control and, as a result, may force them into more aggressive forms of self-help, like carrying a weapon for protection.

CHAPTER 3

ROUTINE ACTIVITIES AND THE WORKPLACE

The previous section discussed how workplace violence prevention is relevant to the theory of social control. Businesses and organizations can be agents of formal social control through the provision of workplace security in response to the social threat of workplace violence. Provided employees believe that their employers can legitimately prevent workplace violence from occurring, the existence of workplace security measures should supersede self-protective behaviors by employees. Alternatively, the absence or ineffectiveness of workplace security measures can result in the pursuit of self-help – carrying weapons for protection. In order to fully understand the link between workplace security and decisions by employees to carry weapons, it is necessary to discuss the risk of victimization relative to the work environment. Decisions to carry a weapon for protection are not only related to perceptions of social control, but also to perceptions of risk of victimization.

Explanations for the risk of victimization in the workplace can be traced to the classical school of criminology in which the criminal is described as a rational, calculating being. Under this paradigm, theoretical rationale has been offered to explain the criminal event and not the behavior. Offenders weigh the consequences of their
actions through a “hedonistic calculus,” and criminal acts result when the rewards are perceived to be greater than the risks. Criminals are not impetuous in their selection of potential victims, but instead they are more opportunistic and selective in their approach. This selectivity lends itself to the idea that victims can somehow supply opportunities for potential offenders. Robinson (1999) supported this claim by proposing that “in the course of routine, normal, or patterned recreational or work activities, suitable targets become more discernable to offenders, thus increasing the likelihood of committing offenses.”

Risk for victimization can be explained through the rational choice perspective relevant to lifestyle/routine activities. “Offenders often operate in a rational fashion; they prefer to commit crimes that require the least effort, provide the highest benefits, and pose the lowest risks” (Taylor & Harrell, 1996, p. 2). People’s actions and activities in various aspects of their lifestyles can increase their attractiveness to criminals. Likewise, certain actions and activities that occur in the work dimension of one’s lifestyle can solicit criminal victimization.

Early research on personal victimization postulated that “routine daily activities,” including those carried out at work, can directly influence risk (Hindelang, Gottfredson, & Garofalo, 1978). Furthermore, Cohen and Felson (1979) developed a routine activity theory that explains criminal victimization through exposure to potential offenders, target suitability, and the absence of guardianship. When routine activities expose an individual to a pool of likely offenders, make a person an attractive target for offenders, and lower capable guardianship, the risk for victimization increases.
In the past, researchers have found that routine activities explain victimization in occupational settings (Budd, Arvey, & Lawless, 1996; Collins, Cox & Langan, 1987; Lynch, 1987; Wooldredge, Cullen & Latessa, 1992). Job functions that create an atmosphere of vulnerability through the exposure to potential offenders, target attractiveness, and lack of capable guardianship have been found to increase the risk of victimization in the workplace.

Lynch (1987) used the Victim Risk Supplement to the National Crime Survey to empirically test routine activity theory in explaining victimization in the work domain. Workers who handled money, worked at multiple locations or traveled for their job, worked in unsafe areas, and had increased face-to-face contact with large numbers of persons experienced significantly greater odds of victimization at work. Likewise, Budd and colleagues (1996) found that certain routine work activities were associated with attacks at work. Controlling for gender and race, the authors analyzed how the work activities of dealing with the public, handling cash, and working at night influenced the odds of being attacked or threatened at work. Results indicated that workers who routinely handled cash had an increased risk of being threatened, and persons who worked night-time hours had a higher risk of both threats and attacks.

Collins, Cox and Langan (1987) used data from a random telephone survey of workers from the Washington, D.C. metropolitan area to study nonfatal violence in the workplace. Comparing victimizations at work to those not at work, the authors concluded that workers who dealt with the public and delivered passengers or goods experienced an increased risk for violent victimization at work.
Additional studies focusing on specific occupations have tested the relationships that face-to-face contacts with persons and working at night have with the risk of nonfatal violence at work. One study of nurses in Minnesota found that increased contact with patients and large caseloads (> 5 patients/nurse) significantly increased the odds of assaultive violence to staff (Lee, Gerberich, Waller, Anderson & McGovern, 1999). Gates, Fitzwater, and Succop (2003) found that larger workloads or increased interactions with clients resulted in greater risk of attack for healthcare workers in nursing homes in Ohio.

Similarly, a study of workplace victimization at a University of Cincinnati campus, routine activities were found to influence both personal and property victimization of faculty members (Wooldredge, Cullen & Latessa, 1992). Variables representing degree of exposure, level of guardianship, and perceived dangerousness were significant predictors of property victimization, while only exposure variables and attractiveness variables explained personal victimization. Specifically, the study found that employees working on campus after hours, walking alone on campus, and socializing with students outside of class had greater odds of victimization.

Although the previously mentioned research studies explained how routine activities in the workplace influence the risk of victimization, it is not unreasonable to assume that such explanations can be applied to carrying weapons for protection. In fact, two research studies examined the relationship between routine activities and decisions to carry weapons. Giblin (2008) examined decisions to carry self-defensive weapons among a sample of respondents from a special application of the National Crime Victimization Survey that was administered in 12 metropolitan cities across the country.
Included in his examination of decisions to carry weapons for protection were lifestyle or routine activities including taking public transportation, shopping, and spending evenings away from the home. Giblin found that routine activities influenced decisions to carry a weapon for protection, such that respondents who spent evenings away from home or shopping were more apt to carry a self-defensive weapon.

Tewksbury and Mustaine’s (2003) analysis found that routine activities are more influential on carrying self-protective measures than perceptions of fear of crime and safety. In studying college students lifestyles and self-protective behaviors, the authors found that respondents who associated with strangers on the weekends, studied away from home frequently, and went out in the evenings for entertainment were more likely to carry a weapon for protection. “College students’ use of self-protection was based on actual proximity to potential offenders, individuals’ vulnerability as a target, as well as individuals’ perceptions of how safe certain circumstances or structures are (Tewksbury & Mustaine, 2003, p. 322).

Based upon this extant research, certain mundane activities performed as part of one’s occupation provide opportunities for motivated offenders. The management of cash and valuable property make workers attractive targets for offenders motivated by monetary gain. Additionally, frequent interactions with persons other than co-workers can increase exposure to potential offenders. Individuals who work evening and late-night shifts, times when a disproportionate number of predatory crimes occur, may also be exposed to potential offenders. Workers who perform these activities are likely to be at greater risk for victimization at work. Although not specific to the workplace, routine activities have also been found to influence decisions to carry weapons for protection. It
is logical that routine activities specific to the work domain would be associated with decisions to carry weapons for protection in that domain.

CHAPTER 4

PRIOR VICTIMIZATION, RISK PERCEPTION, AND FEAR

The lack of security in the workplace and the performance of “risky” occupational tasks may not be the only factors that can compel workers to pursue self-protection. Conditions of vulnerability also include a process of personal threat assessment, in which individuals react to the actual, perceived, and emotional threat of workplace violence, which can lead to self-protection. The actual threat of workplace violence involves individuals’ experiences with criminal victimization. Perception of threat is the cognitive assessment of the likelihood that victimization may occur to oneself or beliefs about how safe one is from victimization. The emotional threat is the affective reaction an individual has to workplace violence, typically expressed as fear. Each of these factors is capable of shaping individual responses in terms of their behaviors.

Prior Victimization

Much of the existing literature on weapons ownership has included prior victimization as a predictor variable. Based upon the fear and victimization explanation for weapons ownership, it has been assumed that purchasing a weapon for protection is a reaction to individual experiences with personal or property crime. To date, empirical support for a relationship between prior victimization and weapons ownership is divided. Several studies found a significant positive relationship between prior victimization and weapon ownership (Arthur, 1992; DeJong, 1997; Giblin, 2008; Hill, Howell, & Driver, 1985; Lizotte et al., 1981; Sheley, Brody, & Wright, 1994; Smith & Uchida, 1988;
Williams & McGrath, 1976; Ziegenhagen & Brosnan, 1990). However, there is also research where victimization was found to be unrelated to weapons ownership (Bankston & Thompson, 1989; Celinska, 2007; DeFronzo, 1979; Delmas & Bankston, 1993; Jiobu & Curry, 2003; Kleck & Kovandzic, 2009; Marciniak & Loftin, 1991; Wright, Rossi & Daly, 1983).

Williams and McGrath (1976) conducted a study in order to determine why people own guns. Gun ownership was measured as household ownership and could not be specifically attributed to the respondent. A composite measure for prior victimization, victim status, was constructed from three items in the GSS (a) threatened with a gun, (b) home burglary, and (c) had something taken by force. The authors reported a weak association between prior victimization and gun ownership, suggesting some support for the conclusion that victims are more likely to own a gun than non-victims.

Another study utilized data from the GSS to examine whether prior victimization increased the probability of handgun ownership among Blacks (Arthur, 1992). Prior victimization was a single measure that reflected a respondent’s experience with robbery, assault, threat with a gun, or household burglary. The dependent variable of handgun ownership reflected the presence of a handgun in the household. Results from the multiple regression analysis indicated that Blacks who had prior victimization were more likely to own a handgun than Black respondents who had no prior victimization.

Acknowledging the work of DeFronzo (1979) and building upon it, Hill, Howell, and Driver (1985) sought to understand the phenomenon of protective gun ownership. The authors used a nationally representative sample from the 1980 GSS to examine the relationships between fear of crime, prior victimization, and protective handgun
ownership. A caveat to the 1980 GSS is the presence of a “refined” measure for protective handgun ownership, which permits for the identification of personal ownership instead of household ownership. Protective handgun ownership in this study was defined as individuals who personally own a handgun, but do not hunt. Prior victimization was an indicator of whether the respondent had been robbed or burglarized in the past year. The authors estimated regression models for a pooled sample as well as for separate samples of males and females. They reported a significant positive relationship between prior victimization and protective handgun ownership for both their pooled sample and their male sample.

Although Hill et al. reported a significant relationship between previous victimization and protective handgun ownership, their analysis and the methodology employed were flawed. The authors noted that their measure of protective handgun ownership was biased and ignored reasons other than protection for handgun ownership. This issue, as well as several analytical issues, is addressed in detail in Marciniak and Loftin’s research (1991). Marciniak and Loftin replicated the analyses by Hill and colleagues after correcting for these issues and, in fact, could not reproduce the significant relationship between prior victimization and protective handgun ownership for either the full sample or male sample. This fact cast doubts on the accuracy of the results originally reported by Hill, Howell, and Driver (1985).

In a study by Sheley and colleagues (1994), data from multiple years of the GSS were used to identify differences in the correlates of gun ownership between males and females. Included in their analysis were measures for prior victimization. The GSS includes items that address whether or not the respondent had been a victim of both
armed robbery and household burglary in the previous year. In the past, responses from these two items have typically been combined into a composite measure for prior victimization. However, both prior robbery and household burglary victimization were analyzed separately in this study allowing for differentiation between personal and property victimization. Logistic regression analyses were estimated for separate models of gun ownership – one for personal gun ownership and one for personal pistol ownership. While there was no significant relationship between prior victimization and personal gun ownership, there was a significant relationship with personal pistol ownership. Respondents who had experienced a home burglary had significantly greater odds of personally owning a handgun than persons whose homes had not been burglarized. By separating prior victimization into separate measures, it was found that past property victimization (burglary), not violent victimization, was related to pistol ownership.

The results from these four national studies lend support to the proposition that prior victimization is correlated with firearm ownership. Several studies of more localized populations also found support for the proposition that prior victimization is positively related to gun ownership. These studies are discussed next.

In a study of survey data from residents in the state of Louisiana, researchers found that prior victimization was related to the possession of a handgun in single female-headed households (Thompson, Bankston, & St. Pierre, 1991). Prior victimization was measured by household members’ victim experience with rape, assault, battery, burglary, theft, robbery, or vandalism over the past year. The authors conducted a path analysis and found that only one variable, victim experience, had a statistically
significant and direct effect on the possession of a handgun. Females from the state of Louisiana who have prior victimization experiences were more likely to have a handgun in their household than females with no prior victimization.

Two separate studies that used the household survey data from the 1977 Police Services Study found a relationship between prior victimization and weapons ownership (DeJong, 1997; Smith & Uchida, 1988). Data were collected from interviews of respondents from 59 residential neighborhoods from Rochester, New York, St. Petersburg, Florida, and St. Louis, Missouri. In the earlier study by Smith and Uchida (1988), the effects of “conditions of vulnerability” on defensive weapon ownership were analyzed. Among these conditions of vulnerability was victim status – whether a household member was a victim of personal or property crime. The dependent variable, defensive weapon ownership, was operationalized as whether a household member purchased a gun or other weapon for protective purposes. Results from the logistic regression models showed that prior victimization was positively associated with protective weapons ownership. The later study (DeJong, 1997) tested for gender differences in the relationship between prior victimization and purchasing a weapon for self defense. Using probit analyses to estimate this relationship for males and female separately, the author found that prior victimization was only statistically significant among male respondents. Males, not females, were more likely to purchase a weapon for protection if they had been the victim of a personal or property crime.

Two studies estimated path models explaining protective weapons ownership among heads of households from downstate Illinois (Lizotte and Bordua, 1980; Lizotte,
A measure for prior victimization was constructed from the summation of five variables addressing past experiences with theft, breaking and entering, robbery, assault and battery with fists, and assault and battery with a firearm. Protective gun ownership was a dichotomous measure that specifically addressed the ownership of a gun for the purpose of protection. Results from the path analysis showed that prior victimization did not have a direct effect on owning a gun for protection. Prior victimization did have indirect effects on protective gun ownership, which operated through fear of crime and perceptions about crime rates.

Giblin’s (2008) analysis of personal security using data from the *Criminal Victimization and Perceptions of Community Safety in 12 U.S. Cities* also identified protection as the motivation for weapons ownership, but his measure was explicit for *carrying* the weapon. Among the findings from his logistic regression analysis was that prior victimization during the past 12 months was positively associated with the carrying of weapons for protection.

Similar to Giblin’s (2008) study, Ziegenhagen and Brosnan (1990) also analyzed carrying weapons for protection. Their study focused on a specific environment and studied these behaviors among respondents who rode subways in New York City. Protective weapons were not limited to firearms and included knives, razors or stabbing instruments, mace or pepper spray, and other weapons. When the relationship between prior victimization and protective weapons carrying was analyzed, New York City subway riders who had been victimized in the past were more likely to arm themselves for protection.

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1 The Lizotte, Bordua, and White (1981) article is a correction to the analysis for the Lizotte and Bordua (1980) article.
Perceived Risk

Attempts to disentangle the process of personal threat assessment have been made by many scholars studying fear of crime and related concepts. Taylor and Shumaker (1990) identified fear of crime, feelings of personal vulnerability, perceptions of risk, and assessments of the intensity of crime-related problems as individual, cognitive or perceptual responses to crime. The most commonly studied response to crime has been fear of crime. Ferraro and LaGrange (1987) discussed how the phrase “fear of crime” has been defined many different ways throughout the existing body of literature that its current usefulness in negligible. They proposed the existence of a continuum with cognitive judgments about risk and safety at one end and affective or emotive reactions involving fear at the other end. Additional support has been offered by researchers who have differentiated between perceptions of risk and fear of crime and found empirical evidence that perceptions of risk and fear of crime are two distinct concepts which are inter-related (Ferraro, 1996; Forde, 1993; LaGrange, Ferraro & Supancic, 1992; Rountree & Land, 1996; Warr, 1987; Warr & Stafford, 1983).

Empirical research has shown that perceptions of risk influence owning and carrying weapons for protection. Analysis of individual protective behaviors in 12 large U.S. cities showed that persons who believed serious crime in their neighborhood had recently occurred were more likely to carry a weapon for self-defense (Giblin, 2008). When perceptions of risk for criminal victimization are high, individuals are more likely to own or carry weapons for protection.

Data from the 1977 Police Services Study were used to estimate the effects that perceptions of risk have on the purchase of weapons for protection (DeJong, 1997; Smith
& Uchida, 1988). Although both studies measured perceptions of risk in the same manner, opposite results were found. Smith and Uchida (1988) observed that individuals were more likely to arm themselves with weapons for protection when they believed that crime surrounding their homes was increasing and that the likelihood of being a victim of burglary or robbery was high. Alternatively, DeJong (1997) found that neither variable was statistically significant in predicting defensive weapons ownership in her gender-specific models.

The difference between these two studies is noteworthy. Smith and Uchida used the full sample in which the unit of analysis was households and, therefore, weapon ownership was attributed to the household and not the individual. DeJong used a subsample of the same data, selecting only single adult households. This manipulated the unit of analysis and restricted the ownership of weapons to the individual and not the household. The difference in the results of these two studies may be attributed to the difference in the measurement of dependent variable – household weapons ownership versus personal weapons ownership.

To further test this supposition, Cao, Cullen, and Link (1997) analyzed both personal gun ownership and household gun ownership separately. Parallels exist between their study and what was found between DeJong’s (1997) and Smith and Uchida’s (1988) research in regard to the relationship between perceived risk and weapons ownership. Cao and colleagues found that perceptions of risk, as measured by beliefs about the relative crime level in the community, were insignificant in relation of personal ownership of guns, but significant with household gun ownership.
Additional studies have found that perceptions of risk do not have direct effects on protective weapons ownership or carrying, but instead have indirect effects through a mediating variable. Lizotte, Bordua, and White (1981) found that respondents who perceived their county’s crime rate to be higher relative to other counties in the state of Illinois had higher levels of fear of crime, which in turn had a direct effect on protective gun ownership.

In developing a causal model for carrying firearms for protection among white males in Louisiana, Bankston and Thompson (1989) found similar results. Perception of risk was an index that measured the likelihood that a home invasion, threat with a weapon, assault, or murder would happen in the next 12 months. Carrying a weapon for protection was measured by the frequency that such behavior occurs when the respondent leaves the house. Their path analysis model showed that perceived risk indirectly effected decisions to carry a firearm for protection through fear of crime, as well as through attitudes about the effectiveness of weapons.

*Fear of Crime*

The link between fear of crime and weapons ownership has been studied at length, yet there is little agreement as to the true nature of this relationship. Some research found that this relationship was insignificant, and fear of crime did not increase the likelihood of weapons ownership (Arthur, 1992; Celinska, 2007; DeFronzo, 1979; Delmas & Bankston, 1993; Marciniak & Loftin, 1991; Young et al., 1987). Other studies reported significant positive effects between fear of crime and protective weapons ownership (Hill, Howell & Driver, 1985; Lizotte & Bordua, 1980; Lizotte et al., 1981; McClain, 1983; Ziegenhagen & Brosnan, 1990). Furthermore, some studies have found a
significant negative relationship between fear and weapon ownership (Kleck & Kovandzic, 2009; Sheley et al., 1994; Williams & McGrath, 1976).

Several studies estimated causal models for carrying or owning guns for protection. The first set of studies estimated the causal relationship between fear and gun ownership for protection (Lizotte & Bordua, 1980; Lizotte, Bordua, & White, 1981). Fear was the summation of three items: (a) being afraid to walk alone at night within one mile of the home, (b) being afraid to be alone at home at night, and (c) how important crime is to the respondent. When regressed with the endogenous variable, Lizotte, Bordua, and White (1981) found a direct positive relationship between fear of crime and gun ownership for protection.

In the second study, Bankston and Thompson (1989) constructed a fear index that was the summation of how afraid the respondent was of home invasion, threat with a weapon, robbery, murder, and assault. This fear index was analyzed as an exogenous variable on the frequency that respondents carried a firearm for protection when they left the home. No direct effect was found between fear and carrying a firearm, however, an indirect effect was found through a mediating variable that measured respondent’s beliefs about the effectiveness of weapons. Individuals who exhibited high levels of fear were more likely to believe that a gun or weapon is an effective tool in reducing crime and, therefore, were more likely to carry a firearm for protection.

Two studies using data from the GSS studied the relationship between fear of crime and protective gun ownership (Hill, Howell, & Driver 1985; Young, 1986). Protective gun ownership was assumed, and defined as personal ownership for non-hunters. Young’s (1986) dependent variable was any type of gun, while Hill, Howell,
and Driver narrowed their focus to only handgun ownership. Both studies found significant positive relationships between fear of crime and handgun ownership among a specific demographic group – males in Hill, Howell, and Driver’s study and White females from the non-South in Young’s study. Again, the measurement of the dependent variable in both of these studies has inherent validity issues (see Marciniak & Loftin, 1991), which can call into question the reliability of these results.

A more localized study that employed measures similar to those in the GSS concluded that there was a relationship between fear and gun ownership. McClain (1983) found in her analysis of Detroit census tracts that Whites who were afraid to walk alone at night were more likely to have a firearm in the household. In a study of New York City subway riders, Ziegenhagen and Brosnan (1990) found that carrying self-protective measures was a function of fear of victimization. Respondents who were afraid of specific crimes such as robbery or assault were more likely to carry a weapon on their person for protection.

A review of the existing literature on fear of crime and gun ownership has also uncovered support for an inverse relationship between these two concepts. In three studies, analysis determined that persons who were less fearful were significantly more likely to own guns than persons who expressed more fear (Kleck & Kovandzic, 2009; Sheley et al., 1994; Williams & McGrath, 1976). All three studies used data from the GSS and fear of crime was measured as concern about walking in the neighborhood at night. The earlier study estimated zero-order and conditional correlations between the independent variables and gun ownership. Gun ownership was household ownership with no further specifications for type of gun or motivation for ownership. Although
Williams and McGrath (1976) hypothesized a positive relationship between fear and gun ownership, they found a significant negative relationship indicating that persons expressing fear were less likely to own a weapon.

In a study of gender differences in gun ownership, Sheley and colleagues (1994) found a significant negative relationship between fear and personal gun ownership. When the authors introduced interaction effects with gender, they found that males experienced a negative relationship between fear and personal gun ownership.

The more recent study by Kleck and Kovandzic (2009) utilized the same measure for fear of crime but gun ownership was measured as personal ownership of a handgun. Their analysis found that persons afraid to walk alone at night were significantly less likely to own a handgun, or in other words, persons who were not afraid to walk alone at night had greater odds of being a handgun owner.

While little consensus exists on the actual relationship between fear of crime and weapons ownership, there does, however, appear to be agreement in the literature regarding the limitations of many of these studies. The validity of measures for the underlying concepts of both fear of crime and protective weapons ownership for studies that used data from the General Social Survey makes conclusions from these studies difficult. These limitations are discussed more in the following section.

CHAPTER 5
LIMITATIONS OF PRIOR RESEARCH

A common criticism of prior research is that the concepts of protective weapons ownership and fear of crime have been poorly operationalized. These measurement issues are largely due to the fact that many studies used secondary data from surveys not
specifically designed to measure protective weapons ownership. Inconsistent findings for the relationship between fear of crime and weapons ownership may be attributed to measurement error. Because both fear of crime and protective weapons ownership are key concepts in the current study, it is important to further discuss this issue.

Evidence of such limitations has been found in the measurement of self protective behaviors such as weapons ownership. Several studies that utilized data from the General Social Survey could not specify who actually owned firearms because prior to 1980, the survey inquired as to whether or not the respondent had any guns in their home (Arthur, 1992; Celinska, 2007; DeFronzo, 1979; Delmas & Bankston, 1993; Sheley, et al., 1994; Williams & McGrath, 1976). This item – “Do you happen to have in your home or garage any guns or revolvers? Is it a pistol, shotgun, or what?” – was a better measure of household not personal weapons ownership. There has also been a failure to specify the motivation for the ownership of weapons in prior research. Motivations for the purchase or ownership of a firearm can include sport, protection, work, and criminal behavior. The assumption that the ownership of weapons is for protection without specifically inquiring as to the motive may have confounded research findings (see Hill, Howell, & Driver, 1985; Young, 1986). However, several studies have specified the motivation of protection in the operationalization of weapon ownership (Bankston & Thompson, 1989; Cao, Cullen & Link, 1997; DeJong, 1997; Giblin, 2008; Lizotte & Bordua, 1980; Lizotte, et al., 1981; Smith & Uchida, 1988; Ziegenhagen & Brosnan, 1990). While most of these articles focused only on firearm ownership, others included additional weapons such as knives or pepper spray (DeJong, 1997; Giblin, 2008; Smith & Uchida, 1988; Ziegenhagen & Brosnan, 1990).
Early studies on fear of crime and its effects on precautionary behaviors operationalized fear of crime as “omnibus” or “global” fear (Ferraro & LaGrange, 1987). These measures for fear of crime were derived from questions present in the General Social Survey and the National Crime Survey that inquired about how safe a respondent felt walking alone at night in his or her neighborhood. Contradictory findings regarding the effects of global fear on various outcome measures led to closer scrutiny in how fear of crime should be conceptualized and measured.

Garofalo (1979) provided the following critique of this global measure for fear of crime: (a) crime is not even mentioned leaving the thrust of the question more implicit than explicit; (b) the geographical frame of reference is the neighborhood, which means different things to different people; (c) respondents are asked to think about their perceived risk when alone at night in their neighborhood—there are few instances when this actually occurs; (d) the part of the question that asks “do you feel or would you feel” mixes actual with hypothetical assessments of safety which are not necessarily equivalent (p. 82). Ferraro and LaGrange added to this critique stating that “the item fails to differentiate relatively objective risk judgments from emotional fears of crime, thus rendering the question conceptually vague and largely invalid” (1987, p. 77).

An additional issue with prior literature is the limited amount of research that has been conducted on carrying weapons in the workplace. Wright, Rossi & Daly (1983) briefly discussed findings from the Decision Making Information (DMI) poll indicating that 5% of respondents listed protection at work as a reason for handgun ownership. Their analysis was mainly descriptive and went no further than to acknowledge that individuals carry firearms for protection while at work. Another study addressed the
effects of employers’ policies towards guns on workplace homicides (Loomis, Marshall, & Ta, 2005). Factors associated with decisions to carry guns in the workplace were not addressed beyond workplace policies that prohibited such behavior. With the exception of these two studies, knowledge about employees’ carrying of weapons for self protection is limited. Because of these limitations and the gap in the research, the current study will examine decisions to carry weapons for protection in the workplace.

CHAPTER 6

HYPOTHESES

Hypothesis 1: Collective Security is Inversely Related to Carrying Weapons for Protection

The more security measures that a business establishment provides in the workplace, the less likely employees will be to carry a weapon for personal protection. It is within reason to consider businesses as agents of collective security particularly when employers provide protective measures in the workplace. Prior research has found evidence that when collective security is in doubt or ineffective, people will turn to individualistic means of protection (DeJong, 1997; Feagin, 1970; Giblin, 2008; Jiobu & Curry, 2001; Kleck & Kovandzic, 2009; McClain, 1983; McDowall & Loftin, 1983; Lizotte & Bordua, 1980; Lizotte, et al., 1981; Smith & Uchida, 1988; Young, 1985; Young, et al., 1987; Zeigenhagen & Brosnan, 1990). Logically, it would follow that minimal or non-existent workplace security measures could be viewed as an inherent threat to individual safety by employees, who in turn seek means of self-help such as carrying weapons for personal protection.
Hypothesis 2: Routine Activities Influence Decisions to Carry a Weapon

It is hypothesized that routine work activities that create conditions of vulnerability will be positively related to carrying weapons for protection. Employees who perform these routine occupational tasks will have a greater likelihood of carrying a weapon for protection. Job functions that increase exposure to potential offenders, increase target attractiveness, and reduce capable guardianship will have influence on workers’ decisions to carry weapons for protection.

Within this hypothesis, five specific relationships were examined: (a) the number of persons that are present in the workplace will be inversely related to carrying weapons for protection; (b) the handling of money or valuables will be positively related to weapons carrying; (c) working at a business that is open to the public will positively affect the carrying of weapons for protection, (d) having face-to-face contact with the public will positively affect decisions to carry a weapon in the workplace; and (e) working evening or night shifts will be positively associated with carrying a weapon for protection.

Hypothesis 3: Prior Victimization Increases Self-help

Although findings from prior research are mixed, it is hypothesized that individuals who have been victims of violence in the workplace will be more likely to carry a weapon for protection. Support for this hypothesis has been found in the body of literature dealing with weapons ownership outside of the workplace (Arthur, 1992; DeJong, 1997; Giblin, 2008; Hill et al., 1985; Lizotte et al., 1981; Sheley et al., 1994; Smith & Uchida, 1988; Williams & McGrath, 1976; Ziegenhagen & Brosnan, 1990). Prior victimization will make workers cognizant of the actual threat of workplace
violence. Workers who have been victims of workplace violence will have a desire to avoid future victimizations and, therefore, will make active decisions to prevent victimization from reoccurring. Therefore, prior experience with violence in the workplace will be positively associated with decisions to carry a weapon for protection.

*Hypothesis 4: Perceptions of Risk Increase Self-help*

Individuals who perceive their workplaces and the areas surrounding their workplaces to be dangerous will have greater odds of carrying a weapon for protection. Perception of threat is the cognitive assessment of the likelihood that victimization may occur to oneself or beliefs about how safe one is from victimization. Previous studies have found that perceptions of risk influence decisions to own or carry a weapon for protection (Cao, et al., 1997; Giblin, 2008; Lizotte, Bordua, & White, 1981; Smith & Uchida, 1988). Prior research studies analyzed perceptions of risk for environments outside the workplace, therefore, it is sensible to expect that when the workplace environment is perceived to be unsafe, employees will take steps to shield themselves from such risks.

*Hypothesis 5: Fear of Crime Increases Self-help*

Employees who are afraid of workplace violence will be more apt to carry a weapon for protection than employees who are not afraid. Despite the fact that prior literature has produced mixed findings in regard to the relationship between fear of crime and weapons ownership, I anticipate that fear of workplace violence will lead to weapons being carried in the workplace by employees. Because this study addressed many of the measurement issues found with both fear of crime and weapons ownership, it was expected that the results would agree with those studies that found a significant positive
association between these concepts (Bankston & Thompson, 1989; Hill, Howell & Driver, 1985; Lizotte et al., 1981; McClain, 1983; Sheley et al., 1994; Ziegenhagen & Brosnan, 1990).

**Hypothesis 6: These Relationships will Operate Differently for Males and Females**

It was hypothesized that gender differences would be found among the relationships hypothesized in this study of decisions to carry weapons for protection in the workplace. Several studies made similar conclusions by analyzing models for owning or carrying weapons for protection separately by gender or by including interaction terms for gender (Arthur, 1992; DeJong, 1997; Hill, et al., 1985; Marciniak & Loftin, 1991; Sheley et al., 1994; Young, 1986). This hypothesis is more exploratory in nature than explanatory because there is limited prior research on carrying weapons in the workplace for pooled samples, or gender-specific samples.

**Control Measures**

In addition to the independent variables in the above mentioned hypotheses, additional variables that may influence decisions to carry weapons for protection were included as controls in this study. These control variables included both demographic characteristics of the respondents and characteristics of the workplace. Individual demographics such as the respondent’s gender, age, race, Hispanic origin, and level of education were controlled for. Characteristic of the workplace including type of business (private vs. government), regional location, and location relative to the population were also controlled for in this study.

Prior research has found that gender has a strong relationship with weapons ownership. Nationally representative studies of firearms ownership are in agreement that
males are more likely to own a gun than females (Arthur, 1992; Celinska, 2007; Delmas & Bankston, 1993; Hill, et al., 1985; Jiobu & Curry, 2001; Kleck & Kovandzic, 2009; Marcianak & Loftin, 1991; Sheley, et al., 1994; Williams & McGrath, 1976). Support for this relationship between gender and firearms ownership has also been found among studies of localized populations (Bankston & Thompson, 1989; Bankston, Thompson, Jenkins, & Forsyth, 1990; Cao, et al., 2007; Lizotte & Bordua, 1980; Lizotte, et al., 1981; Luxenburg, et al., 1994; McClain, 1983). The aforementioned research has shown that males are significantly more likely than females to own or carry firearms.

Despite the robust findings, three studies have found that males are either significantly less likely (Giblin, 2008) or no more likely than females to carry weapons for protection (Tewksbury & Mustaine, 2003; Ziegenhagen & Brosnan, 1990). It is important to point out that each of these studies had a broader definition of the dependent variable. Instead of studying only firearms, multiple protective weapons were studied. Protective weapons could have included firearms, but they also included knives, mace or pepper spray, clubs, or other weapons. The different relationships found when studying either firearms specifically or multiple types of weapons makes it important to control for gender in the present study.

Age of the respondent’s was also included as a control variable in the current study. The literature is less conclusive regarding the relationship between age and weapons ownership. Using data from the GSS, the majority of studies found that older persons were more likely than younger persons to possess a firearm (Celinska, 2007; Hill, et al., 1985; Jiobu & Curry, 2001; Kleck & Kovandzic, 2009; Marciniak & Loftin, 1991; Sheley, et al., 1994). Arthur (1992) also used GSS data and found that younger persons
were more likely to own a firearm, but this relationship was for Black respondents only. More localized studies typically found that younger persons were more likely to own weapons (Bankston & Thompson, 1989; DeJong, 1997; Giblin, 2008; Luxenburg et al., 1994), with an exception being Lizotte, Bordua, and White’s (1981) re-analysis of a sample from Illinois. While respecting that the nature of the relationship between age and weapons is inconclusive, age was controlled for in the present analysis of decisions to carry a weapon for protection in the workplace.

In accordance with the analyses from previous research of weapons ownership, race was included as a control variable for carrying weapons in the workplace for protection. Research is inconclusive regarding race and weapons ownership. Many studies did not find a significant relationship between race and weapons ownership (Cao, et al., 1997; Giblin, 2008; Hill, et al., 1985; Jiobu & Curry, 2001; Marciniak & Loftin, 1991; Tewksbury & Mustaine, 2003; DeFronzo, 1979; DeJong, 1997; Smith & Uchida, 1988; Thompson, Bankston, & St. Pierre, 1991). Among those studies where a relationship was found, typically Whites were more likely than minorities to own a firearm for protection (Celinksa, 2007; Lizotte, et al., 1981; Sheley, et al., 1994; Williams & McGrath, 1976). It was anticipated that white respondents would be more likely to carry a weapon for protection that non-White respondents. Along with race, Hispanic origin was included in this study. Evidence on the nature of the relationship between Hispanic-origin and carrying weapons is limited, but a similar relationship was expected in that non-Hispanics would be more likely to carry firearms for protection.

Education level was also analyzed as a control variable in this study. Support has been found for an inverse relationship between education and weapons ownership, with
the likelihood of ownership decreasing as education increases (Celinska, 2007; Lizotte, et al., 1981; Sheley, et al., 1994; Jiobu & Curry, 2001; McClain, 1983; Delmas & Bankston, 1993). Exceptions have been with gender-specific analyses that found a positive relationship between education and weapons. DeJong (1997) found that higher educated males were more likely to purchase a weapon for protection, and Young (1986) found a positive relationship between education and weapons ownership among White females from the non-South.

Another control variable was geographic region of the workplace. Studies on gun ownership have included region as an independent variable as an indicator for the “subculture of violence” thesis. The original subculture of violence thesis posits that subcultures have emerged through the transgenerational transference of norms and values associated with an acceptance for violence (Wolfgang & Ferracuti, 1967). Researchers have modified this thesis into a southern subculture of violence through the prevalence of firearms ownership and homicide in this region of the United States (Gastil, 1971; Hackney, 1969; Reed, 1972). In the study of weapons ownership, many researchers have found a significant relationship with either currently residing in the South or having grown up in the South (Celinska, 2007; DeFronzo, 1979; Dixon & Lizotte, 1987; Hill, et al., 1985; Jiobu & Curry, 2001; Kleck & Kovandzic, 2009; Marciniak & Loftin, 1991; Smith & Uchida, 1988; Wright & Marston, 1975; Young, 1986). While the current study did not empirically test for a southern subculture of violence due to the lack of the necessary social and cultural variables in the data, region was controlled for given that there may be regional effects on decisions to carry weapons in the workplace.
Research has established a link between urbanization, or size of place, and firearm ownership. Studies have shown that weapons ownership is significantly more likely in less populated or rural areas than it is in heavily populated areas such as cities. This has been shown using both national-level (Arthur, 1992; Celinska, 2007; Delmas & Bankston, 1993; Jiobu & Curry, 2001; Sheley et al., 1994; Williams & McGrath, 1976; Wright & Marston, 1975) and state-level data (Bankston, et al., 1990; Lizotte & Bordua, 1980; Lizotte, et al., 1981; Tewksbury & Mustaine, 2003). In accordance with this literature, it was hypothesized that urbanization should have an effect on weapons in the workplace, in that persons who work in rural areas would be more likely to carry weapons for protection than those who work in suburban or urban areas.

Finally, the type of business that the respondent works at was included in the models as a control variable. Type of business refers to whether the business is privately owned or if the respondent works for an agency that is operated by local, county, state, or federal government. The decision to include type of business as a control variable was made based on the rationale that security measures may be affected by whether the respondent works for a private or government run business. It is assumed that government agencies will have more security measures present than private companies because of financial considerations. Security measures are an added expense to the daily operations of any business. These expenses are more easily assumed by government agencies that are not profit driven and have the financial backing of tax dollars. Privately owned businesses, on the other hand, may be less likely to have security measures present for two reasons. The first reason is the costliness of such measures for a business that is profit-driven. Nigro and Waugh (1996) point out that employers who have not
experienced a “highly visible and costly case of violence in the workplace have little incentive to consider meaningful prevention programs. The second reason is that private industries that depend on the financial support from customers and clients may be less likely to install security measures that could possible turn business away.

The goal of the current study was to examine the correlates of protective weapons carrying in the workplace. Given that there is a lack of literature on weapons carrying in the work domain, findings from research on weapons ownership and carrying in other domains (e.g., home, leisure) were applied to the workplace. The present study addressed many of the measurement issues of prior research in this analysis. These issues are addressed in the methods section of this paper.

CHAPTER 7
METHOD

Based on what previous research has found regarding the ownership of weapons for protection, I analyzed decisions to carry weapons for protection in the workplace. Factors that contribute workers’ vulnerability should lead to decisions to pursue self-protective behaviors. In the workplace environment, factors such as workplace security and the performance of routine occupational tasks can lead to a situational need for self-help. Workers who have been victimized at work will perceive their workplace to be unsafe and have a greater fear of workplace crime, compared to workers who have not been victimized. Individuals who feel their workplace is unsafe and have a fear of victimization will be more likely to carry a weapon in the workplace for protection than individuals who feel they work in a safe environment and do not fear crime.
Survey

I addressed how collective security, routine work activities, and fear and victimization are related to decisions to carry weapons for protection by using data from the National Crime Victimization Survey (NCVS). Although the NCVS collects detailed information on nonfatal victimizations, specific data on events that occur in the workplace are limited. However, in 2002 a supplement to the standard NCVS was administered that specifically focused on work-related victimizations. This addendum, known as the National Crime Victimization Survey - Workplace Risk Supplement (NCVS-WRS), was a six-month supplement to the standard survey. The NCVS-WRS contains a wealth of data on workers, their workplaces, and circumstances surrounding victimization.

Sample

The NCVS-WRS was administered over a six month period (quarters 1 and 2 of 2002) to 37,150 households, interviewing 55,158 individuals (Demographic Surveys Division, Census Bureau, 2003). The supplement was administered and linked to the entire NCVS, providing a data file with a hierarchical structure that can be analyzed by address, household, person, or incident. I will use secondary analysis of cross-sectional data from the 2002 supplement. The unit of analysis will be individuals because the supplement was administered at the individual level to all respondents 16 years of age and older.

Data from the WRS provide a chance to study decisions to carry weapons for protection in the workplace. The data are well suited for the proposed study because the survey collected information on various aspects of respondents’ workplaces, judgments
and affective responses to workplace violence, experiences with workplace violence, and self-protective behaviors.

**Missing Data**

Due to skip patterns in the questionnaire and certain intricacies associated with the NCVS-WRS, the issue of missing data arises. Data were not collected for persons who were not employed or for individuals with a ‘residue’ response for the question addressing which best describes the respondent’s job – Item 48a of the NCVS basic screen questionnaire.\(^2\) Cases were excluded where the respondent had either not held a job in the previous six months, or did have a job in the last six months without that job lasting two consecutive weeks or more. This scenario led to the exclusion of 758 cases from the sample. There were 508 ‘residue’ responses for the classification that best describes one’s job which were also eliminated from the sample. Additionally, a workplace risk supplement was not completed for respondents classified as ‘non-interview.’\(^3\) A total of 7,012 non-interviews were removed from this study because of missing data. Reasons for the non-interviews for the supplement included refusal (n = 2,732), not available (n = 628), language problems (n = 109), NCVS proxy (n = 1,213), and unknown (n = 2,330)

**Work location.** The NCVS-WRS surveys a national representative sample of workers, some of whom do not work in a fixed location. Workplace security measures are only applicable to persons who work in a fixed location and not to persons who are

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\(^2\) Responses were coded as *don’t know* when a respondent does not know the answer to the question; *residue* referred to non-response due to a respondent’s refusal to answer a question or field interviewer error; *out of universe* referred to no response due to a survey question not being applicable and resulted from skip patterns in the survey (Rennison, 2004, p.46).

\(^3\) A WRS non-interview occurs when either the respondent refuses to answer the questionnaire or is unavailable to do so.
more mobile or transient in their daily work activities. The survey instrument also does not inquire about fear of crime in the workplace for respondents who do not work in a single, fixed location. As such, this study restricted the sample to only those respondents whose work location is fixed, and 10,913 respondents who worked at more than one location were excluded from the sample.

Potential Confounding Factors

There were also two factors that could potentially confound results from the proposed study. These confounding factors included job type and self-employment.

Job type. Another possible confounding factor was job type. Some professions are inherently dangerous to the extent that workers are both required to expose oneself to violence and to carry weapons for protection. Lynch (1987) pointed out that “policemen are routinely obliged to intervene in situations where the probability of assault is high” (p. 286). As such, workers in the law enforcement and security field have a high probability of carrying weapons for both personal protection and the protection of others, despite any collective security measures that might be present in the workplace. These individuals (n = 1,020) who had classified their jobs as a law enforcement officer, prison or jail guard, security guard, or some other law enforcement or security profession were removed from analyses.

Self employment. Self-employed persons created a unique problem for the main research question to be addressed by this study. One cannot determine the effect that collective security has on the decision to carry personal security devices for persons who work for themselves. In this study collective security is conceptualized at the organizational level, which was provided by the business or employer, and personal
security is conceptualized at the individual level, which was provided by the worker or employee. When the worker is the employer or business owner there is no longer a distinction between collective and personal security. Thus, the theoretical argument falls apart. Self employed persons were also removed from the analyses (n = 5,834).

A total of 22,100 cases were excluded from this study, because of one or more of these issues concerning missing data or the potential for confounding the results in the study. These criteria for excluding respondents resulted in a final sample size of 33,058 cases.

*Carrying Weapons for Protection*

The outcome measure is this study was whether or not respondents choose to carry weapons for protection while at work or on duty. The carrying of weapons for protection was identified by a series of items in the WRS. Specifically, the question “Did you use or carry any of the following objects to protect yourself at work or while working?” was asked of respondents. These objects included mace or pepper spray, personal alarm devices, firearms, knives, or some other type of weapon.

This series of items in the WRS allowed for the independent measurement of each of these five weapons. Thus, it is possible to identify employees who carry any single type of weapon as well as employees who carry multiple weapons for protection in the workplace. I chose to restrict my analysis to the weapons of firearms, knives, and pepper spray in this study. Personal alarm devices were not identified as a dependent variable because they are technically not a weapon. Other weapons were excluded because of ambiguity surrounding such a classification, and the potential for a great deal of heterogeneity in this variable. Three binary dependent variables were constructed that
measured whether an employee carried a weapon or not – one for firearms, one for knives, and one for pepper spray. In the sample, the number of respondents who carried firearms, knives, or pepper spray for protection at work were 126, 305, and 569, respectively. Table 1 shows the coding of these variables as well as all other variables that were used in this study.

[Insert Table 1 Here]

These indicators do not suffer from some of the limitations common to previous measures of protective weapon ownership. The motivation for carrying weapons was specified in the survey as protection, and moreover, the variable is not confounded by the problem of who owns or carries the weapon. This survey question also included multiple types of weapons not just firearms, allowing for the identification of respondents who may choose to protect themselves with a less lethal option, such as pepper spray. By differentiating between different types of weapons, it may be possible to identify relationships that might be masked if these weapons were grouped together.

Workplace Security

One of the major research questions of this study is concerned with how collective security in the workplace is related to decisions by workers to carry weapons. The NCVS-WRS inquired about security in the workplace through a series of questions that addressed the presence of the following: a receptionist or guard to admit persons to the workplace (n = 18,065), burglar alarm system (n = 15,735), guard dogs (n = 569), surveillance cameras (n = 13,406), police or guards for protection (n = 9,650), a metal detector (n = 1,383), x-ray inspection (n = 754), a locked entry or gate during working
hours (n = 7,722), and the requirement of an ID or pass to gain entry into the workplace (n = 11,622).

The Workplace Risk Supplement allows for the identification of multiple security measures in an employee’s workplace. Accordingly, it could be determined if no security measures are provided in the workplace (n = 4,481). These measures were combined into a single independent variable, the number of workplace security measures present, which ranged from zero to nine security measures. The presence of workplace security in fixed locations should influence self-protective behaviors. The more security provided in the workplace should result in a lesser likelihood of carrying weapons for protection.

*Routine Occupational Tasks*

Routine occupational tasks can increase target attractiveness and exposure to motivated offenders. The routine occupational tasks of working with other employees, handling cash, working at a business that is open to the public, having face-to-face contact with others, and working evenings or nights were included as factors that contribute to personal security in the workplace.

The number of employees that work with the respondent was included as a routine activity for the workplace. The number of co-workers present may act as a form of guardianship from victimization. The number of employees was measured as 0, 1, 2 to 4, 5 to 9, 10 to 49, and 50 or more. If this “strength in numbers” assumption holds, than the more co-workers that a respondent has, the less likely a decision to carry a weapon for protection will be made.

The handling of cash was measured by the supplement as the frequency in which a respondent performed this job activity. The original variable was ordinal with the
response categories of *never, less often, monthly, weekly or daily*. The uneven
distribution of data across these five response categories led to the coding of this variable
into a single dichotomous variable measuring whether or not the respondent handled
cash. In the sample, 23,114 respondents never handled cash or valuables, and 9,944
respondents did perform this work activity. Assuming that individuals who handle cash
as part of their job functions will be more at risk for robbery-related violence, it is
hypothesized that these same individuals will be more likely to carry personal security
devices for protection.

Being open to the general public was included as a measure for routine activities
in the workplace because it is an indicator for exposure to motivated offenders. This was
measured by the dichotomous categories of *no* or *yes*. In the study sample, 61% of
respondents worked at a business that was open to the public. Individuals whose
workplaces are open to the public are more at risk for workplace victimization from
potential outside motivated offenders, and should be more likely to carry a weapon for
protection than persons whose workplace is not open to the public.

Another work activity variable included in this study was face-to-face contact
with persons at work. Face-to-face contact was measured as the number of people
(excluding co-workers) that the respondent talked to or saw in person on a weekly basis.
Responses were categorized into an ordinal scale of *zero, 1 to 5, 6 to 25, 26 to 100, 101
to 200* and *more than 200* persons. Face-to-face contact with persons other than co-
workers is an ordinal measure of the level of exposure to potential offenders. This
variable will be recoded into a single dichotomous variable on the median split that
identifies if respondents have face-to-face contact with 25 or fewer persons (n = 18,346)
versus more than 25 people (n = 14,003). Workers who have increased exposure through face-to-face contact with persons will be more likely to carry a weapon than workers who have little or no contact with others.

A final routine work activity studied was whether or not respondents worked evening or night shifts. Respondents were given a series of shifts that best describe their work schedule, which included working a regular evening shift (between 2 p.m. and midnight) or a regular night shift (around 9 p.m. to 8 a.m.). In the sample, 3,392 respondents worked the evening or night shift. These two responses were combined into a variable which identifies persons who work evenings or nights to correspond with the time of day that most violent crimes occur. In accordance with research showing that violent victimizations occur disproportionately in the late-night/early-morning hours, workers who regularly work evening and night shifts are expected to carry weapons for protection.

Each of these routine occupational tasks is hypothesized to have influence on workers’ decisions to carry a weapon. With the exception of number of employees, all of the routine activity variables should positively influence respondents’ likelihood to have a gun, knife, or pepper spray with them at work. The number of employees is expected to have an inverse relationship with carrying a weapon for protection.

*Prior Victimization*

In keeping with previous research, prior victimization was included in this study. Since this paper focuses on the work domain, prior victimization specific to the workplace was measured. Respondents were asked if they experienced any of the following incidents while working or on duty for their employer: being grabbed, held,
tripped, jumped, or pushed; hit, slapped, or knocked down; hit with an object (thrown or held in their hand); threatened with a gun, knife, or other weapon; had a gun, knife, or other weapon used on them; attempted rape; raped; or something else. Responses could include experience with any one of these victimizations, multiple victimizations, or no victimization. These responses were recoded to identify respondents who have no prior victimization or those who have experienced prior victimization in the workplace. A total of 1,070 individuals in the sample had been victimized in the workplace previously. Prior victimization in the workplace is expected to have an effect on carrying weapons, such that victims are more likely to choose means of self-protection.

Perceptions of Risk

Self-protection should be utilized by workers who perceive their workplace as unsafe or dangerous. The NCVS-WRS inquires as to how safe a respondent thinks that his or her workplace and neighborhood surrounding the workplace is from crime as a measure perceived risk. Responses to these questions included: very safe, somewhat safe, don’t know, somewhat unsafe, or very unsafe from crime. These measures for the workplace and neighborhood surrounding the workplace were combined into a composite measure for perceived risk. Each original variable was scored from 1 (very safe) to 5 (very unsafe) – a simple additive scale was then constructed with values ranging from 2 to 10, with higher scores representing greater perceived risk. Perceived risk should have effects on carrying weapons in the workplace for protection.

Fear of Crime

Also in agreement with the extant research on carrying weapons for protection, fear of crime was analyzed. Again, fear of crime is specific to the immediate realm of the
workplace. Respondents were asked if they “worry that someone at their workplace might attack or threaten them with harm.” This variable is a dichotomous measure (no, yes) of fear of workplace violence, with 2,147 of the 33,058 respondents in the sample indicated that they did worry about being threatened or attacked while at work. Fear of crime is expected to be related to decisions to carry weapons, and persons afraid of being attacked or threatened with harm in the workplace will be more likely to carry a weapon.

Despite conflicting or null findings regarding the effects of fear of crime on self-protection, this study will include this measure in the analyses. The measure for fear of crime in this study does not suffer from many of the validity issues found in previous studies. Unlike earlier surveys, this question about fear explicitly mentions fear of “crime” and does not measure “global” or “omnibus” fear. Also, the term “worry” elicits an emotional response not a judgment. Individuals are asked to report their fear of physical violence by the use of the phrases “attack” or “threaten with harm,” unlike questions that simply inquire about fear of crime in general. The question asks about fear of crime in a specific locale, the workplace, whereas past research has been ambiguous about the geographic location that could inspire fear.

*Outside Victimization*

As to not overlook the importance that prior victimization can have on individuals’ choices for self-protective measures, previous victimizations that occurred outside of the workplace were included in this study. This information was collected from the incident reports from the full NCVS. In agreement with prior violent victimizations occurring in the workplace, previous victimizations outside of the workplace included only contact offenses. Contact offenses were defined as the threat,
attempt, or completion of rape, sexual assault, robbery, aggravated assault, simple assault, purse snatching and pocket picking. Series victimizations were also included if they were categorized as contact crimes. A total of 346 respondents were identified as having experienced a prior violent victimization outside of the workplace, 14 of whom had been victims of series crimes.

Control Variables

Demographic variables. Respondents’ demographic characteristics were incorporated into the study as control measures. These personal traits included gender, age, race, Hispanic origin, and educational attainment. Gender was coded as either male (n = 14,320) or female (n = 18,738). Age was measured in years and ranged from 16 to 90. Age is truncated by the WRS because 16 years of age is the earliest year of possible employment across the US. Respondent race was collapsed into the categories of white or non-white, with the majority of the sample (n = 28,056) identifying themselves as white. The majority of the sample was also non-Hispanic, with 3,812 persons classified as Hispanic. Finally, educational attainment was added as a control variable. A respondent’s education was measured as the highest year completed and ranged from no education or kindergarten to six years of college.

Workplace characteristics. Several characteristics associated with one’s workplace were also included as control variables in this study. These included whether or not the respondent worked in the South, whether or not the respondent worked in a rural area, and whether the business was a private or government establishment. Region and size of place were included in accordance with prior literature, where weapons

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4 Series crimes were defined as “six or more incidents in a six month period that are similar and for which the respondent cannot provide details on individual events” (Lynch, Berbaum, & Planty, 2002, p. 9).
carrying would be more expected in the South and rural areas. A variable identifying the workplace as privately owned or run by local, state, or federal government was included as a potential influential variable on carrying a weapon to work. In comparison to private businesses, government agencies are more likely to provide security for employees and have policies on carrying weapons to work.

**Analytic Strategy**

Multivariate analyses were conducted to empirically assess the effects of the predictors on personal security in the workplace. Due to the complex sampling design of the NCS-VRS, the data were weighted using a person-level weight variable specific to the workplace risk supplement. The computation of complex standard errors was performed by a Taylor series method that will for the stratification and clustering of the survey design. This was done using Stata’s *svyset* command.

A total of nine models were estimated in this study. First, a separate model was estimated for each of the three dependent variables – firearms, knives, and pepper spray – using the pooled sample (see Table 2). Next, gender-specific models were estimated for each of the three dependent variables. Differences in the coefficients between the male and female models were calculated to determine if the covariates of weapons carrying are statistically different by gender.\(^5\) Because the dependent variables are dichotomous, nominal-level variables, binary logistic regression models were estimated.

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\(^5\) The comparison of coefficients test was calculated using the appropriate formula as explained by Paternoster, Brame, Mazerolle, & Piquero (1998, p. 862).
CHAPTER 8

RESULTS

Pre-Estimation Analyses

Ordinal-level variables. One of the workplace characteristic variables, number of employees, was measured in an ordinal scale, which poses a problem for the logistic regression analysis. Previous research has discussed the method of coding ordinal independent variables as dichotomous indicator variables and comparing them to a single referent category in regression analyses (Lemeshow & Hosmer, 1984; Walter, Feinstein & Wells, 1987). Another method has been to treat ordinal-level variables as though they were interval. This approach implies that the categories in each of these variables is equally spaced and assumes that an increase from one category to the next is the same for all categories in that variable (Long & Freese, 2001). Treating an ordinal variable as though it were interval makes interpretation simpler, but information may be lost regarding the effects of the independent variables on the dependent variable.

In order to test whether treating the number of employees variable as interval variables resulted in a loss of information, I compared a logistic model that included only the ordinal variable to a model that include both the ordinal variable and all but two of the corresponding indicator variables (see Long & Freese, 2001 p. 269). The likelihood ratio test was not found to be statistically significant, with a $LX^2 = 8.46$, $df = 4$, and $p = .08$. Thus, the indicator variables did not add additional information to the model and the ordinal-level variable, number of employees, was used in the binary logistic model. This of course, could only be done if the additional degrees of freedom do not lead to “over-fitting” the data.
Over-fitting and data separation. Due to the fact that there are a limited number of respondents who carry weapons for protection in this sample, it is necessary to address how this may affect multivariate analyses. This study employs binary logistic regression models to estimate effects on self-protective behavior. Logistic regression utilizes maximum likelihood estimation, which is dependent upon the configurations of the sample points in the observation space (Albert & Anderson, 1984; and Santner & Duffy, 1985). Long (1997, pp. 54) points out that maximum likelihood estimation is often inadequate when sample sizes are small and when there is little variation in the dependent variable.

The first problem occurs when data are “overfit” by using regression models with too many independent variables when the sample size is insufficient (Harrell, Lee, Matchar and Reichert, 1985). To say the sample size is insufficient is not only reflective of the overall sample size, but it is also reflective of the number of events, workers who carry weapons, in the sample. Regression models frequently fail when the number of predictors is large in comparison to the number of events (Harrell, et al., 1985). Often referred to as events per variable (EPV), when this ratio is small regression coefficients can be biased and misleading (Peduzzi, Concato, Kemper, Holford & Feinstein, 1996). It is recommended that regression models contain no more than one independent variable for every 10 events in the sample in order to produced unbiased results (Long, 1997; Peduzzi, et al., 1996; Concato, Peduzzi, Holford, & Feinstein, 1995; and Harrell, et al., 1985).

The second issue concerns “infinite parameters,” which is the situation when maximum likelihood estimate does not exist because the likelihood equation does not
have a finite solution (So, 1999). This can occur when there is complete or quasi-complete separation in the data (SAS Institute Inc., 2004). Complete separation is when the independent variables completely predict the dependent variable, and quasi-complete separation occurs when the dependent variable is almost completely predicted by the independent variables. If the data are completely separated or quasi-completely separated there will be no maximum likelihood estimate because convergence may not occur (Webb, Wilson & Chong, 2004). Results will be insignificant because the regression coefficients and standard errors will be unusually large, making it difficult to reject the null hypothesis.

Determination of data separation can be completed through several methods. Prior to the estimation of the logistic regression models, the relationship between the independent variables and the dependent variable can be studied in contingency tables. When there are no cases in any category in the contingency table, “zero-cells,” the data are separated. Once logistic regression models are estimated, there are two ways to determine if the data are separated. Separation will be indicated when convergence does not occur, or dependent upon which statistical package is used, an error message will appear. Also, if any of the regression coefficients and standard errors is exceedingly large, this will indicate separation in the data.

Because of the limited number of case events (respondents who carry weapons for protection) in this study, the number of independent variables in the logistic regression models and the separation of data are concerns for the breakdown of maximum likelihood estimates. Preliminary analyses including contingency tables and a logistic regression model containing all independent variables of interest were performed. Contingency
tables of the dichotomous nominal-level independent variables with the dependent variable(s) were analyzed for any evidence of data separation. Over-fitting and data separation were not problems with the data, as no models failed to converge.

**Collinearity diagnostics.** Prior to the estimation of the logistic regression models, standard diagnostics were employed to determine if collinearity was present among the independent variables. Collinearity diagnostic procedures can be performed by estimating a series of OLS regression models in which each independent variable is set as the dependent variable and by obtaining variance inflation factors (VIFs) for OLS models that include the dependent and independent variables (Menard, 2001). I found that none of the variance inflation factors exceeded a value of 4, and the greatest VIF was 1.37. Among the different series of OLS regression equations, no auxiliary $R^2$ was greater than 0.23. These findings eliminated concerns about collinearity in the logistic regression analysis.

**Pooled Sample Models**

The first part of the logistic regression analysis in this study was to use the full sample of 33,058 cases and calculate the weighted parameters for variables predicting decisions to carry weapons for protection in the workplace. Three separate models were estimated – one for each dependent variable.

**Carrying firearms for protection.** The first of the three full sample logistic regression models looks at the effects on decisions to carry a firearm for protection in the workplace. The results are presented in Table 2. Table 2, as well as all other tables displaying results from the weighted logistic regression models, includes the log odds
coefficient, the odds ratio, and the percent change in odds for each independent variable.\textsuperscript{6} For the sake of parsimony, the interpretation of results will vary between the odds ratio and the percent change in odds. The percent change in odds is the simplest interpretation method, with the exception of when the odds ratio is greater than 2.0. Then the odds ratio is used because the percent change in odds will be greater than 100 percent.

\textbf{[INSERT TABLE 2 HERE]}

The first equation estimated the effects of the independent variables on the odds of carrying a firearm for protection in the workplace. The value for F was 18.51 and statistically significant, which indicated that at least one of the estimates in this model was significantly different from zero.

In this equation, the relationship between gender and carrying a weapon is statistically significant and inverse. Being a female reduces the odds of carrying a firearm by 84.6\% (p < .001). Two other demographic variables had significant negative relationships with the odds of carrying a gun. Controlling for all other variables, race had a significant inverse relationship with weapons, such that the odds of non-whites carrying a firearm to work were 58.6\% less than the odds for whites (p < .05). Hispanics also had lower odds (-61.7\%, p < .05) of carrying a firearm compared to non-Hispanics.

Workplace characteristics were also significantly related to the dependent variable. Controlling for all other variables in the equation, the odds of carrying a firearm were more than twice as large for persons working in the South compared to the rest of the US (O.R. = 2.362, p < .001). Holding all other variables constant, working in

\textsuperscript{6} The log odds were transformed to the percentage change in the odds of the dependent variable with the formula: $100[\exp(\text{log odds})-1]$ (Long & Freese, 2001, p. 135-136).
a government business increased the odds of carrying a firearm by a factor of 2.5 \((p < .001)\).

In relation to carrying firearms for protection in the workplace, no support for the collective security hypothesis was found. An inverse relationship between workplace security measures and carrying a firearm had been anticipated here. Instead, each additional security measure present in the workplace increased the odds of carrying a weapon by 18.0\% \((p < .01)\).

Next, the results for the routine activity variables in relation to weapon carrying are discussed. Each unit increase in the number of employees in the workplace reduced the odds of carrying a gun for protection by 36.6\% \((p < .001)\). The handling of cash or valuables had a significant relationship with the dependent variable. Persons who handled cash at their job were 2.3 times more likely to carry a firearm for protection compared to those who did perform this job function \((O.R. = 2.267, p < .001)\). Working at an establishment that is open to the general public had a negative relationship with gun carrying, such that the odds were 44.0\% lower compared to establishments closed to the public \((p < .05)\).

The results show that aspects of fear and victimization influence decisions to carry a firearm for protection. Individual perceptions about the dangerousness of the workplace and surrounding area were found to increase the odds of carrying a gun by 24.6\% with each scalar increment \((p < .001)\). The relationship of the greatest magnitude was that between carrying a weapon and having been a victim of a violent crime outside of the workplace. The odds of carrying a firearm increased to a factor of 5.4 for persons who had been victimized outside of the working environment \((p < .001)\).
Carrying knives for protection. The second model in Table 2 presents the results of the logistic regression equations on carrying a knife for protection. The carrying of knives for protection in the workplace is significantly related to gender, age, Hispanic origin, and education. The odds of carrying a knife are 72% lower for females than males (p < .001). Each increase in one year of age corresponds to a 2.8% decrease in the odds of protecting oneself with a knife (p < .001). Hispanics were 47.5% less likely to carry a knife than non-Hispanics (p < .05). With every increase in one year of education the odds of carrying a knife to work are reduced by 7.6% (p < .001).

In regard to the working environment, size of place and geographic location correspond to significant differences in the odds of carrying this type of weapon for protection. Those who work in rural areas have odds that are 59.9% greater for carrying a knife than persons working in urban or suburban areas. The odds of carrying a knife for protection are 88.2% higher for those working in the South compared to other regions of the country (p < .001).

As for the relationship between routine activities and self-protection, only the number of employees present in the workplace had a significant effect. Each one unit increase in the number of employees reduces the odds of carrying a knife by 18.2% (p < .01).

The relationship between perceived risk and knife carrying was statistically significant, such that each increase in risk perception corresponded to a 24.3% increase in the odds of carrying a weapon. For knives, prior victimization in the workplace, instead of outside victimization, was significant. Having been a victim of workplace violence increased the odds of carrying a knife by 76% (p < .05).
Carrying pepper spray for protection. The last model in Table 2 shows the results for the model explaining self-protection with pepper spray. Demographic characteristics, workplace characteristics, routine work activities, and individual risk assessment are all significantly related to carrying pepper spray for protection ($F = 26.64, p > F = 0.000$). Females have much greater odds of carrying pepper spray for protection in the workplace compared to men (O.R. = 5.503, $p < .001$). Both age and Hispanic origin were negatively associated with carrying pepper spray. The odds are reduced by 1.3% for each year increase in age ($p < .001$). Persons of Hispanic origin have lower odds of carrying pepper spray or mace for protection (O.R. = 0.563, $p < .01$). In regard to carrying a non-lethal weapon for protection, education level has a positive effect. Each increase in educational attainment reduces the odds of carrying pepper spray by 5% ($p < .01$).

Each additional security measure present in the workplace corresponds to a 16.6% increase in the odds of carrying mace ($p < .001$). So again, no support for the collective security hypothesis was found. Instead the relationship between security in the workplace and carrying weapons is positive in direction.

A unit increase in the number of employees present in the workplace results in a 20% decrease in the odds of carrying this type of protective device ($p < .001$). Workers who handle cash have 34.6% greater odds of choosing pepper spray as a self-protective measure ($p < .01$). The odds of carrying pepper spray for protection are 29% greater for persons who workplace are open to the public ($p < .05$).

Again both prior workplace violence and perceived risk predicted decisions to carry a weapon for protection in the workplace. Having been victimized at work in the
past increases the odds of choosing pepper spray by 80% (p < .001). The odds of carrying mace or pepper spray significantly increase for every increase in perceived risk of the workplace and surrounding neighborhood (O.R. = 1.209, p < .001).

**Gender-Specific Models**

Based on the findings from the analysis of the full sample of workers in the NCVS-WRS, gender-specific models were created to determine how males and females differed, if at all, in decisions to carry weapons for protection in the workplace. The sample was split by worker gender and the effects of individual and workplace characteristics, collective security, routine occupational tasks, and fear and victimization on carrying weapons were studied. Again, analyses were performed for each type of weapon – firearms, knives, and pepper spray. Thus, a total of six separate analyses were performed, one for each different weapon type by gender. Analyses were conducted for 1) males carrying firearms, 2) males carrying knives, 3) males carrying pepper spray, 4) females carrying firearms, 5) females carrying knives, and 6) females carrying pepper spray.

**[INSERT TABLE 3 HERE]**

*Males carrying firearms.* The first analysis in this series observes the effects that male workers’ demographic characteristics have on the odds of carrying a firearm for protection. In this instance, only race had a significant influence on decisions by males to carry a firearm while at work or on duty. Non-white males have odds of carrying a gun for protection that are 57% lower than white males in the workforce. In Table 3, it is shown that all slopes for demographic characteristics are not equal to zero (F = 18.07, p > F = 0.000).
The logistic regression model for firearm carrying among males, working in the South has a significant positive effect on firearm carrying. Male workers in the southern US have odds of carrying a gun to work that are almost three times greater than male workers in the rest of the United States (p < .001). Working for a business operated by the government as opposed to a private business increases the odds of carrying a firearm for protection by a factor of 2.8 (p < .001).

The presence of security measures in the workplace significantly increases the odds of choosing to carry a firearm, in that, each additional security measure present increases the odds of carrying a gun by 18% (p < .01).

The performance of certain routine activities predicts carrying a gun for protection by males as indicated in Table 3 of the analysis. Controlling for all other variables, the number of employees present at the workplace significantly decreases the odds of carrying a gun. The odds of a male worker carrying a firearm for protection decrease by 35.7% for each scaled increase in the number of employees at the workplace (p < .001). The odds of carrying a firearm to protect oneself are greater for male workers who handle cash or valuables and have contact with others in the workplace. The handling of cash or valuables increases the odds of carrying a firearm for protection by a factor of 2.4 in comparison to male workers who do not perform this duty as part of their job. Having face-to-face contact with many people throughout the workday leads to odds of carrying a gun that are 81% greater than for male workers who have little or no interaction with others. Working in an establishment that is open to the public is now significantly related to the odds of carrying a gun for protection. Individuals who work in
at a business that is open to the general public have an odds of carrying a firearm that is
51% lower than those whose workplace is closed to the public.

In this model explaining the tendencies of male workers to carry firearms for
protection, both the perceptions of risk and prior victimization outside of the workplace
are significantly related to carrying weapons. First, each scalar increase in risk
perceptions increases the odds of carrying a gun by 24%. Second, individuals who have
been the victim of violent crimes outside of their workplace are much more likely to
carry a gun for protection while at work. The odds increase by a factor of 6.1 for males
who have been victims outside of the workplace compared to those who have not
experienced outside victimization (p < .001).

*Females carrying firearms.* Table 3 also shows the regression model estimated
for carrying firearms for the female sample. None of the individual demographic
variables were found to be significantly related to decisions of female worker to carry
guns at work. Females who work in rural areas have much greater odds of carrying a
weapon for protection compared to those who work in urban or suburban areas (O.R. =
2.549, p < .01). Among women, the odds of carrying a firearm for protection decrease by
38.6% for each increase in the number of employees present in the workplace (p < .001).
Women who perceive the area where they work to be unsafe from crime have
significantly greater odds of carrying a gun for safety while at work or on duty. The odds
of carrying a firearm increase by 28.7% for each scalar increase in perceived risk (p <
.05).

In comparison to males, only a few factors were found to significantly increase
the odds of a female carrying a gun for protection in the workplace. These variables were
rural location, the number of employees in the workplace, and perceptions of risk. Although, several difference were found between males and females in regard to carrying a firearm for protection. Only one of these differences was statistically significant. The last column in Table 3 shows the comparison of coefficients using the appropriate z-test for differences (see Paternoster, Brame, Mazerolle, & Piquero, 1998). The only significant difference in coefficients between males and females was found for face-to-face contact with others.

*Males carrying knives.* Table 4 shows how individual demographics, workplace characteristics, routine occupational tasks, and individual risk assessment impact on decisions to carry a knife for protection among males in the labor force.

**[INSERT TABLE 4 HERE]**

The first section shows the effects of demographic characteristics on knife carrying. Age, Hispanic origin, and educational attainment are statistically significant factors that hold influence on the decisions to carry a knife for protective purposes. Age has a negative relationship on the decision to carry a weapon, such that each one-year increase in the age of a male worker decreases his odds on carrying a knife by 2.4% \((p < .001)\). Hispanic male workers are 45.2% less likely to carry a knife when compared to non-Hispanic male workers \((p < .05)\).

Education also has an inverse relationship with knife carrying. Each one-year increase in education level results in a decrease in the odds of carrying a knife by 9.2% for male workers in the study \((p < .001)\).

A statistically significant relationship was found between geographic location and carrying a knife. Compared to male workers from other regions in the United States,
those in the South are more apt to carry a knife while at work or on duty (log odds = 0.942, p < .001). As the number of additional employees in the workplace increases, the odds of carrying a knife for protection decreases by 21.2% (p < .001).

The decision to carry a knife for protection among males appears to be driven by perceptions of risk and prior victimization. Specifically, males who have experienced prior victimization in the workplace have odds of carrying knives for protection 96.5% greater than their counterparts who have not been victimized in the workplace (p < .05). Respondents, who viewed their workplace and surrounding areas as unsafe, had significantly higher odds of carrying a knife. Each scaled increase in perceived risk resulted in a 22.5% increase in the odds of carrying this type of weapon for personal protection.

**Females carrying knives.** Hardly any significant relationships were found among the logistic regression equations addressing decisions of female workers to carry knives for protection. Only age and perceived risk were found to have significant effects on knife carrying. Age was found to have a significant inverse relationship with weapon carrying, as each one-year increase in age results in a 3.7% decrease in the odds of carrying a knife for protection (p < .001). Females with higher perceptions of risk had higher odds of carrying a knife for protection in the workplace. Every one-unit increase in perceived risk increased the odds of carrying this specific type of weapon by 29.1% (p < .001).

Only one comparison of coefficients test was statistically significant. This was the coefficient for region or South, which was statistically significant in predicting knife carrying among males but not for females.
Males carrying pepper spray. In addition to the potentially deadly weapons already studied, the non-lethal weapon of pepper spray or mace was analyzed as the dependent variable. The results are somewhat different than what has been found among males in the previous logistic regression models for firearms and knives.

[INSERT TABLE 5 HERE]

In reference to individual demographics, only educational attainment had a significant association with decisions to carry pepper spray for personal protection among males. This relationship, however, is positive in nature. Each one-year increase in level of education results in a 11.9% increase in the odds of arming oneself with pepper spray (p < .01).

Security measures had a positive relationship to weapon carrying, as each additional countermeasure present in the workplace increased the odds of having pepper spray for protection by 23.2% (p < .001).

Activities associated with male workers’ jobs were related to non-lethal weapons. The number of employees or coworkers present had a negative impact on decisions to carry pepper spray as a weapon for protection. Each one unit increase in the number of employees led to a 25.3% decrease in the odds of carrying pepper spray (p < .01). The odds for carrying pepper spray were higher for those who handle cash of valuables as opposed to those who do not (O.R. = 2.453, p < .001). Males who worked evening or night shifts were more prone to carry pepper spray for personal safety (O.R. = 2.352, p < .05).

Decisions to carry non-lethal weapons for personal safety were also driven by victimization and risk. If one had previously been a victim of workplace violence, the
odds of carrying pepper spray were 2.5 times greater (p < .05). Again, perceptions of risk significantly influenced the carrying of weapons among male workers. Each one-unit increase in risk perceptions increased the odds of having pepper spray by 19.2% (p < .05).

_Females carrying pepper spray._ Among individual demographics for female workers, all two characteristics had a significant relationship with decisions to carry pepper spray for protection. Table 5 shows the results for this logistic regression model. Younger females in the labor force have greater odds of carrying non-lethal weapons for protection. Each one-year increase in age is associated with a 1.8% decrease in the odds of carrying pepper spray (p < .001). Non-Hispanic females have greater odds of carrying pepper spray for protection in the workplace, as Hispanic females had odds 42.9% less (p < .05).

Workplace security has a significant positive relationship with non-lethal weapon carrying. Each additional security measure increases the odd of carrying pepper spray by 14.5% (p < .001).

The more coworkers that females had, the lower their odds of carrying pepper spray for protection. Each unit increase in the number of employees in the workplace lowered the odds of carrying pepper spray by 18.5% (p < .001).

For female workers with prior victimization in the workplace, the odds of carrying pepper spray for protection were 63.9% higher than those who had not experienced workplace violence (p < .05). Finally, perceptions of risk had a significant positive relationship with non-lethal weapon carrying. Every increase in perceived risk
corresponded to a 21.4% increase in the odds of arming oneself with pepper spray (p < .001).

The comparisons of coefficients indicated that there were more statistically significant difference between male and female workers who carried pepper spray for protection. Although, only two tests, the comparisons for age and working evenings, have any utility. Significant difference were also found for government business and being open to the public, but neither of these variables was statistically significant for either males or females.

CHAPTER 9

DISCUSSION

The current study extended the body of research on protective weapons ownership by applying it to the work domain. Decisions to carry weapons for protection in the workplace were examined in regard to collective security, routine work activities, prior victimization, perceived risk, and fear. An unanticipated relationship in the reverse direction was found between security and decisions to carry weapons. Support was found for hypotheses dealing with routine activities, prior victimization, and perceived risk. No significant relationship was found between fear of workplace violence and decisions to carry a weapon for protection.

Hypotheses

Collective security. My first hypothesis was that collective security, measured by the actual number of security measures present in the workplace, would have a significant inverse relationship of carrying protective weapons in the workplace. This relationship was not found for any weapon in the pooled sample, nor was it found among the gender-
specific samples. Instead, a positive relationship was found between collective security and personal security in the workplace. More workplace security led to greater odds of carrying firearms and pepper spray for protection. This relationship was found in both the gender-specific analyses as well as the analysis of the combined sample. It is possible that my workplace security variable is not a valid measure for collective security. The bulk of the prior research on this topic has measured collective security through opinions about the police or courts, and these studies did find a significant relationship between collective security and weapons ownership. In using the data from the NCVS, I am limited by available information. There were no items that measured opinions about collective security in the workplace. It is quite possible that even though multiple security measures are present in a workplace, workers feel that such security measures are ineffective in protecting them from criminal victimization.

Perhaps, this finding can be explained by the unintended consequences of security measures in the workplace. More security measures might make workers anxious about the safety of their environment or even feel that it is dangerous where they work, thus causing them to arm themselves. Support for this alternative explanation has been found in the prior literature (Gua, 2008; Giblin, 2008; Tewksbury & Mustaine, 2003). Gau’s (2008) analysis of aggregate data found that police service level had a direct positive relationship on the number concealed pistol licenses in neighborhoods in Spokane, Washington. Giblin (2008) found that survey respondents were more likely to carry a weapon for protection when they believed that police patrols had increased in their neighborhoods and concluded that “the visible presence of security may be a reminder of undesirable neighborhood conditions that might encourage protective behavior” (p. 375).
Tewksbury and Mustaine (2003) found a similar “escalation” effect when respondents who lived in close proximity to police stations reported that they were more likely to carry a weapon for protection. Each of these studies found that formal agents of social control induced citizen self-help instead of deterring it.

The unexpected positive relationship between security measures and protective weapons carrying may be explained by the perceptions of risk that respondents who carried weapons for protection exhibited. Prior research has pointed out that the visibility and activity of police can have unintended consequences on citizen’s actions and beliefs. These unintended consequences include individuals becoming more cognizant or aware of the risks of crime (perceived or actual) and more fearful of crime (Gau, 2008; Scheider, Rowell, & Bezdikian; 2003). In the present study, similar results were found where employees who carried weapons at work for protection also perceived their workplace and surrounding neighborhood to be unsafe. These same individuals may be mindful of the risks of victimization in their workplace because of the presence of security measures, and thus choose to protect themselves. The number of security measures present in the workplace may actually be a measure of objective risk of the workplace and not a measure of collective security.

Routine activities. It had initially been hypothesized that routine work activities that expose an individual to a pool of likely offenders, make a person an attractive target for offenders, and lower capable guardianship, would persuade workers to carry weapons for protection. The first series of logistic models in this study that utilized the full WRS sample found support for this hypothesis. The handling of cash or valuables was found to be significantly related to increased odds of carrying a firearm or pepper spray for
protection in the workplace. Workers whose occupational task entailed handling cash (making them attractive targets for victimization) were more likely to carry weapons for protection while on the job. Support for the relationship between guardianship and carrying weapons was also found. Respondents who worked with greater numbers of coworkers were significantly less prone to carry a firearm, knife, or pepper spray to work for protection. Exposure to potential offenders, as measured by the workplace being open to the public, increased the odds of workers carrying pepper spray for protection. Working late night hours and having increased contact with others were not found to influence any of the self-protective measures for the whole sample.

The gender-specific models found mixed support for this hypothesis. First, the number of employees present in the workplace reduced the likelihood of carrying a weapon for protection in every gender-specific model except for females and knives. For males, cash handling and contact with others increased the odds of carrying a firearm. Decisions by males to carry mace or pepper spray were driven again by cash handling activities, but also by working evening/night shifts.

Prior victimization. Prior victimization was found to increase the odds of carrying a weapon in the workplace, although where the victimization occurred had an impact on the type of weapon that a person carried. Individuals who had prior victimization in the workplace were had greater odds of carrying a knife or pepper spray, than those who had no prior experience with workplace violence. Prior workplace victimization did not influence decisions to carry a firearm for protection, but prior victimization that occurred outside of the workplace did influence the carrying of firearms in the workplace. This finding may reflect the fact that persons who carry a firearm for protection do so in all
domains of their lifestyle, such that persons who were victimized outside of the workplace carry a firearm both while at work and outside of work. The data used in this study does not permit for the identification of weapons carrying in any domain outside of the workplace, so it is not possible to determine if persons who carry firearms do so in all domains of their lifestyle.

In the gender-specific models, prior workplace violence only influenced the carrying of pepper spray for female workers. Males, on the other hand, had greater odds of carrying a knife or pepper spray in the workplace if they had experience with workplace violence in the past. The relationship between outside victimization and firearms carrying in the workplace was found only among males.

*Perceived risk.* Support was also found for the fear and victimization hypothesis, in that individual risk assessment can influence workers to carry weapons for protection. Across all of the regression models (i.e., both the full sample and gender-specific analyses) the perceptions of risk were positively related to decisions to carry weapons, regardless of type. Respondents who perceived their workplace and the neighborhood surrounding their workplace to be dangerous were prone to carry a weapon for protection. This hypothesis received strong support from results in this study. Individuals who carry a firearm, knife, or pepper spray in the workplace perceived that workplace to be unsafe.

*Fear of crime.* The lack of support for fear of crime influencing the carrying of weapons was unanticipated. The WRS measure for fear of crime seemed to be less ambiguous than other measures of fear from previous research. In having a stronger measure of fear of crime in the current study, I had not anticipated the null findings. The lack of a relationship coincides with findings from prior research (Arthur, 1992; Celinska,
To delve deeper into this result, I ran descriptive statistics on respondents who carried weapons and also reported being worried about a threat or attack in the workplace. In the sample, there were 2,147 workers who carried a weapon (e.g., firearm, knife, and/or pepper spray) to work. Of these, only 20 reported having fear of workplace violence. It is plausible that carrying a weapon reduces fear and this relationship is why so few armed workers reported fear, but this relationship was not in a negative direction.

This finding – that fear of workplace violence was not significantly related to weapons carrying, but perceived risk was – supports previous research that distinguished between these two concepts as being fundamentally different (Ferraro, 1996; Forde, 1993; LaGrange, Ferraro & Supancic, 1992; Rountree & Land, 1996; Warr, 1987; Warr & Stafford, 1983). The results from the present study suggest that cognitive assessments of risk are more influential than emotional responses (e.g., fear) in predicting aggressive forms of self-help.

Additional Findings

The ability to separate out the different types of weapons led to significant findings in this analysis. While some factors had consistent effects across the three types of weapons, some differing patterns were found when lethal weapons were separated from non-lethal weapons. Future research on weapon ownership should take this finding under consideration.

Overall, there were definite gender differences among both predictors and types of weapons. Females were more likely to carry pepper spray for protection, while males
were found to favor firearms or knives. The gender-specific analyses found that more predictors were significant in the male models than in the female models. For example, females were not significantly affected by any of the routine activity variables, while males were.

Limitations

There are some limitations of this study that need to be addressed. The first limitation is the relatively small number of persons in the sample who carried a firearm, knife, or pepper spray. Having so few cases in the sample hindered the number of variables that could be included in the logistic regression models without over-fitting the data or causing separation.

Second, there was a lack of information concerning the respondents’ occupation or industry. Unfortunately, information about occupation or industry was only identified in the WRS for law enforcement, medical, education, retail, and transportation workers, while the majority of the sample was simply classified as ‘other.’ One of the major hypotheses of this study concerned workplace security measures. The WRS identified nine specific types of measures, but without some workplace context it is difficult to apply any intricate analyses. It is logical that not all workplaces would be affected the same way by each security measure. Preliminary analyses were conducted on the individual workplace security measures, and no specific measures significantly affected decisions to carry weapons. Other than finding general patterns such as businesses open to the public were less likely to have security, and government agencies were more likely to have security, little was able to be achieved using these measures separately.
Another limitation of the study is the inability to establish a clear temporal order using the available data. As with the previously mentioned lack of relationship between fear of crime and weapon, it is not possible to determine if carrying weapons alleviated fears. The WRS was only a one time supplement that did not follow participants for the standard 3 1/2 year time period. If data were available for different ‘waves’ of the NCVS, it would be possible to try and resolve the time order issue. The cross-sectional nature of this study precludes any resolution to the temporal order question. Future research should investigate this important question.

Although some of my hypotheses were not supported, it is important to note that this research has addressed many questions to which the answers were unknown. To date, there has been no other studies that have looked at carrying protective weapons in the workplace domain. This study has found that some explanations for gun ownership from other domains are applicable to the workplace. I have found that the correlates of weapon ownership differ by weapon type and for males and females, with regard to the workplace. I have also identified some key areas for future research on this topic, such as revisiting the collective security and fear of crime explanations for weapons ownership. Given that a positive relationship was found between security measures and carrying weapons for protection, it is important to address why exactly such a relationship exists.

Implications

The prevention of violence in the workplace is a concern for both employers and employees. Business owners have a federal obligation to provide a safe workplace under the Occupational Health and Safety Act of 1970’s “general duty clause.” Under this clause, employers are to keep places of employment “free from recognized hazards that
are causing or are likely to cause death or serious physical harm to his employees,” and such hazards can include violence or the threat of violence (OSHA, 1970). Whether out of legal obligation or altruistic concern for the safety of employees, many employers have implemented security measures designed to prevent workplace violence.

A major policy implication from the current study concerns positive relationship that was found between workplace security measures and personal security. It may be that numerous security measures are necessary in a workplace because that workplace is indeed dangerous. However, if employers are providing unnecessary security measures to make employees feel safer, the additional security may exacerbate the problem and make employees feel less safe. In addition, if an unintentional consequence of more security is increasing the likelihood that workers will carry weapons; the workplace could become a more dangerous environment. Loomis and colleagues (2005) found that businesses in which firearms were carried were more at risk for workplace homicide. It advised that a healthy equilibrium be achieved between adequate security to prevent workplace violence and not make employees feel more at risk and lead them to carry weapons in the workplace. This would also entail that workplace violence prevention policies be implemented in the workplace to make the workplace safer, make workers feel safer, and at the same time, prohibit lethal weapons from being carried into the workplace.
REFERENCES


APPENDIX A

SURVEY ITEMS FROM THE NCVS-WRS 2002

Outcome Variable:

Carrying Objects for Personal Security

(Do/Did) you use or carry any of the following objects to protect yourself at work or while working?

Mace or pepper spray

Personal alarm device or “screamer”

Firearm

Knife

Some other weapon

Independent Variables:

Organizational/Workplace Security Measures

Which of the following types of security (are/were) at your job?

A receptionist or guard who (checks/checked) people who (come/came) in

A burglar alarm system

Guard dogs

Surveillance cameras

Police or guards for protection

A metal detector

X-ray inspection of bags/briefcases/etc

An entry or gate which (is/was) kept locked during working hours

A pass of ID required to enter
Routine Occupational Tasks

How often does your job call for you to carry or handle money or valuables?

Every day
At least once a week
At least once a month
Less often
Never
Don’t know

In an average week, besides your co-workers, how many people do you see or talk to in person as part of doing your job?

None
1-5
6-25
26-100
100-200
>200
Don’t know
It varies or depends

Which of the following best describes the hours you usually work at your job?

A regular evening shift (between 2 p.m. to midnight)
A regular night shift (around 9 p.m. to 8 a.m.)
Prior Victimization

Have/Did you experience(d) any of the following incidents while you were working or on duty for your employer? Someone…

Grabbed, held, tripped, jumped, or pushed you

Hit, slapped, or knocked you down

Hit you with an object (thrown or held in their hand)

Threatened you with a gun, knife, or other weapon

Used a gun, knife, or other weapon on you

Attempted to rape you

Raped you

Something else

Fear of Crime

Do/Did you worry that someone at your workplace might attack you or threaten you with harm?

Yes

No

Don’t Know

Perceptions of Risk

Do you think that your workplace (is/was) very safe from crime, somewhat safe from crime, somewhat unsafe from crime, or very unsafe from crime?

Do you think the neighborhood around your workplace (is/was) very safe from crime, somewhat safe from crime, somewhat unsafe from crime, or very unsafe from crime?
Table 1

Variable Coding Table

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coding</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carrying Weapons for Protection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firearm</td>
<td>R carries a firearm for protection: 0=No, 1=Yes</td>
<td>0.01</td>
</tr>
<tr>
<td>Knife</td>
<td>R carries a knife for protection: 0=No, 1=Yes</td>
<td>0.01</td>
</tr>
<tr>
<td>Mace</td>
<td>R carries mace/pepper spray for protection: 0=No, 1=Yes</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Demographic Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Respondent's gender: 0=Male, 1=Female</td>
<td>0.57</td>
</tr>
<tr>
<td>Age</td>
<td>Respondent's age: in years</td>
<td>39.57</td>
</tr>
<tr>
<td>Race</td>
<td>Respondent's race: 0=white, 1=non-white</td>
<td>0.15</td>
</tr>
<tr>
<td>Hispanic Origin</td>
<td>Respondent's origin: 0=non-Hispanic, 1=Hispanic</td>
<td>0.12</td>
</tr>
<tr>
<td>Education Level</td>
<td>R's educational attainment: in years completed</td>
<td>14.22</td>
</tr>
<tr>
<td><strong>Workplace Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>Respondent works mainly in southern US: 0=No, 1=Yes</td>
<td>0.09</td>
</tr>
<tr>
<td>Rural</td>
<td>Respondent works mainly in a rural area: 0=No, 1=Yes</td>
<td>0.34</td>
</tr>
<tr>
<td>Government Business</td>
<td>R works for local, county, state, or federal government: 0=No, 1=Yes</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>Collective Security</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Workplace Security Measures</td>
<td>The number of security measures present in R's workplace: count</td>
<td>2.00*</td>
</tr>
<tr>
<td><strong>Routine Work Activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Employees</td>
<td>The number of other persons working with R: 0=0, 1=1, 2=2 to 4, 3=5 to 9, 4=10 to 49, 5=50 or more</td>
<td>5.00*</td>
</tr>
<tr>
<td>Handling Cash or Valuables</td>
<td>R handles cash or valuables as part of job: 0=No, 1=Yes</td>
<td>0.30</td>
</tr>
<tr>
<td>Public</td>
<td>R's workplace open to general public: 0=No, 1=Yes</td>
<td>0.61</td>
</tr>
<tr>
<td>Face-to-face Contact W/ Others</td>
<td>The number of persons R has face-to-face contact with daily: 0='0-25', 1='&gt;25'</td>
<td>0.43</td>
</tr>
<tr>
<td>Work Evenings/Nights</td>
<td>R typically works evening or night shift: 0=No, 1=Yes</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>Fear and Victimization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior Workplace Victimization</td>
<td>R has been a victim of violence in the workplace: 0=No, 1=Yes</td>
<td>0.03</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>R's workplace and surrounding neighborhood are safe from crime: 2 to 10, higher scores indicate greater perceived risk</td>
<td>3.45</td>
</tr>
<tr>
<td>Fear of Workplace Violence</td>
<td>R worries that someone might threaten or attack them in workplace: 0=No, 1=Yes</td>
<td>0.06</td>
</tr>
<tr>
<td>Prior Outside Victimization</td>
<td>R has been a victim of violence outside of the workplace: 0=No, 1=Yes</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Note. R = respondent. * is median score instead of mean score.
Table 2

**Logistic Regression Analyses: Pooled Sample, Protective Weapons**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Firearms Coef.</th>
<th>O.R.</th>
<th>%</th>
<th>Knives Coef.</th>
<th>O.R.</th>
<th>%</th>
<th>Pepper Spray Coef.</th>
<th>O.R.</th>
<th>%</th>
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</thead>
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<td><strong>Individual Demographics</strong></td>
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</tr>
<tr>
<td>Female</td>
<td>-1.869***</td>
<td>0.154</td>
<td>-84.6</td>
<td>-1.274***</td>
<td>0.280</td>
<td>-72.0</td>
<td>1.705***</td>
<td>5.503</td>
<td>450.3</td>
</tr>
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<td>Age</td>
<td>0.012</td>
<td>1.012</td>
<td>1.2</td>
<td>-0.028***</td>
<td>0.972</td>
<td>-2.8</td>
<td>-0.013***</td>
<td>0.987</td>
<td>-1.3</td>
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<tr>
<td>Race</td>
<td>-0.882*</td>
<td>0.414</td>
<td>-58.6</td>
<td>-0.063</td>
<td>0.939</td>
<td>-6.1</td>
<td>-0.150</td>
<td>0.861</td>
<td>-13.9</td>
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<td>Hispanic Origin</td>
<td>-0.959*</td>
<td>0.383</td>
<td>-61.7</td>
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<td>-47.5</td>
<td>-0.574***</td>
<td>0.563</td>
<td>-43.7</td>
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<td>Education Level</td>
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<td>0.966</td>
<td>-3.4</td>
<td>-0.080***</td>
<td>0.924</td>
<td>-7.6</td>
<td>0.049**</td>
<td>1.050</td>
<td>5.0</td>
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<td><strong>Workplace Characteristics</strong></td>
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<tr>
<td>South</td>
<td>0.860***</td>
<td>2.362</td>
<td>136.2</td>
<td>0.632***</td>
<td>1.882</td>
<td>88.2</td>
<td>0.081</td>
<td>1.084</td>
<td>8.4</td>
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<td>Rural</td>
<td>0.304</td>
<td>1.355</td>
<td>35.5</td>
<td>0.470</td>
<td>1.599</td>
<td>59.9</td>
<td>-0.080</td>
<td>0.923</td>
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<td>Government Business</td>
<td>0.901***</td>
<td>2.462</td>
<td>146.2</td>
<td>0.161</td>
<td>1.174</td>
<td>17.4</td>
<td>-0.071</td>
<td>0.931</td>
<td>-6.9</td>
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<tr>
<td># Workplace Security Measures</td>
<td>0.166**</td>
<td>1.180</td>
<td>18.0</td>
<td>0.055</td>
<td>1.057</td>
<td>5.7</td>
<td>0.154***</td>
<td>1.166</td>
<td>16.6</td>
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<td><strong>Routine Work Activities</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Number of Employees</td>
<td>-0.456***</td>
<td>0.634</td>
<td>-36.6</td>
<td>-0.201***</td>
<td>0.818</td>
<td>-18.2</td>
<td>-0.225***</td>
<td>0.799</td>
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</tr>
<tr>
<td>Handling Cash or Valuables</td>
<td>0.818***</td>
<td>2.267</td>
<td>126.7</td>
<td>0.091</td>
<td>1.095</td>
<td>9.5</td>
<td>0.297***</td>
<td>1.346</td>
<td>34.6</td>
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<tr>
<td>Public</td>
<td>-0.580*</td>
<td>0.560</td>
<td>-44.0</td>
<td>0.028</td>
<td>1.029</td>
<td>2.9</td>
<td>0.258*</td>
<td>1.294</td>
<td>29.4</td>
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<tr>
<td>Face-to-face Contact w/ Others</td>
<td>0.350</td>
<td>1.419</td>
<td>41.9</td>
<td>-0.098</td>
<td>0.906</td>
<td>-9.4</td>
<td>-0.066</td>
<td>0.936</td>
<td>-6.4</td>
</tr>
<tr>
<td>Work Evenings/Nights</td>
<td>0.048</td>
<td>1.049</td>
<td>4.9</td>
<td>-0.131</td>
<td>0.878</td>
<td>-12.2</td>
<td>0.073</td>
<td>1.076</td>
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<tr>
<td><strong>Fear and Victimization</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior Workplace Victimization</td>
<td>0.439</td>
<td>1.550</td>
<td>55.0</td>
<td>0.565*</td>
<td>1.759</td>
<td>75.9</td>
<td>0.585***</td>
<td>1.796</td>
<td>79.6</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>0.220***</td>
<td>1.246</td>
<td>24.6</td>
<td>0.218***</td>
<td>1.243</td>
<td>24.3</td>
<td>0.190***</td>
<td>1.209</td>
<td>20.9</td>
</tr>
<tr>
<td>Fear of Workplace Violence</td>
<td>0.411</td>
<td>1.508</td>
<td>50.8</td>
<td>0.373</td>
<td>1.452</td>
<td>45.2</td>
<td>0.270</td>
<td>1.309</td>
<td>30.9</td>
</tr>
<tr>
<td>Prior Outside Victimization</td>
<td>1.692***</td>
<td>5.428</td>
<td>442.8</td>
<td>0.372</td>
<td>1.451</td>
<td>45.1</td>
<td>0.197</td>
<td>1.217</td>
<td>21.7</td>
</tr>
</tbody>
</table>

\[ F = 18.51, p > F = 0.0000 \quad F = 13.36, p > F = 0.0000 \quad F = 26.64, p > F = 0.0000 \]

*Note.* Coef. = log odds; O.R. = odds ratio; % = percent change in simple odds, (calculated as O.R. - 1).

*\( p < .05. \) **\( p < .01. \) ***\( p < .001. \)
Table 3

Logistic Regression Analyses: Gender Specific Samples, Firearms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>z-test Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>O.R. %</td>
<td>Coef.</td>
</tr>
<tr>
<td>Individual Demographics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.017</td>
<td>1.017</td>
<td>1.7</td>
</tr>
<tr>
<td>Race</td>
<td>-0.834 *</td>
<td>0.434</td>
<td>-56.6</td>
</tr>
<tr>
<td>Hispanic Origin</td>
<td>-0.836</td>
<td>0.433</td>
<td>-56.7</td>
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<tr>
<td>Education Level</td>
<td>-0.047</td>
<td>0.954</td>
<td>-4.6</td>
</tr>
<tr>
<td>Workplace Characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>1.035 ***</td>
<td>2.816</td>
<td>181.6</td>
</tr>
<tr>
<td>Rural</td>
<td>0.095</td>
<td>1.100</td>
<td>10.0</td>
</tr>
<tr>
<td>Government Business</td>
<td>1.018 ***</td>
<td>2.769</td>
<td>176.9</td>
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<tr>
<td>Collective Security</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Workplace Security Measures</td>
<td>0.165 **</td>
<td>1.179</td>
<td>17.9</td>
</tr>
<tr>
<td>Routine Work Activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Employees</td>
<td>-0.441 ***</td>
<td>0.643</td>
<td>-35.7</td>
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<td>Handling Cash or Valuables</td>
<td>0.867 ***</td>
<td>2.380</td>
<td>138.0</td>
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<tr>
<td>Public</td>
<td>-0.765 **</td>
<td>0.465</td>
<td>-53.5</td>
</tr>
<tr>
<td>Face-to-face Contact w/ Others</td>
<td>0.594 *</td>
<td>1.812</td>
<td>81.2</td>
</tr>
<tr>
<td>Work Evenings/Nights</td>
<td>0.123</td>
<td>1.131</td>
<td>13.1</td>
</tr>
<tr>
<td>Fear and Victimization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior Workplace Victimization</td>
<td>0.450</td>
<td>1.569</td>
<td>56.9</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>0.215 **</td>
<td>1.240</td>
<td>24.0</td>
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<tr>
<td>Fear of Workplace Violence</td>
<td>0.175</td>
<td>1.191</td>
<td>19.1</td>
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<tr>
<td>Prior Outside Victimization</td>
<td>1.813 ***</td>
<td>6.130</td>
<td>513.0</td>
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</table>

F = 18.07, p > F = 0.0000  
F = 11.56, p > F = 0.0000

Note. Coef. = log odds; O.R. = odds ratio; % = percent change in simple odds, (calculated as O.R. - 1). 
z-test difference is the comparison of coefficients.

*p < .05. **p < .01. ***p < .001.
Table 4

**Logistic Regression Analyses: Gender Specific Samples, Knives**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males Coef.</th>
<th>Males O.R.</th>
<th>Males %</th>
<th>Females Coef.</th>
<th>Females O.R.</th>
<th>Females %</th>
<th>z-test Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual Demographics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.025 ***</td>
<td>0.976</td>
<td>-2.4</td>
<td>-0.038 ***</td>
<td>0.963</td>
<td>-3.7</td>
<td>1.118</td>
</tr>
<tr>
<td>Race</td>
<td>-0.095</td>
<td>0.910</td>
<td>-9.0</td>
<td>0.036</td>
<td>1.036</td>
<td>3.6</td>
<td>-0.358</td>
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<tr>
<td>Hispanic Origin</td>
<td>-0.601 *</td>
<td>0.548</td>
<td>-45.2</td>
<td>-0.907</td>
<td>0.404</td>
<td>-59.6</td>
<td>0.524</td>
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<tr>
<td>Education Level</td>
<td>-0.096 ***</td>
<td>0.908</td>
<td>-9.2</td>
<td>-0.028</td>
<td>0.972</td>
<td>-2.8</td>
<td>-1.518</td>
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<tr>
<td><strong>Workplace Characteristics</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>0.942 ***</td>
<td>2.567</td>
<td>156.7</td>
<td>-0.230</td>
<td>0.794</td>
<td>-20.6</td>
<td>3.457 ***</td>
</tr>
<tr>
<td>Rural</td>
<td>0.401</td>
<td>1.493</td>
<td>49.4</td>
<td>0.705</td>
<td>2.024</td>
<td>102.4</td>
<td>-0.605</td>
</tr>
<tr>
<td>Government Business</td>
<td>0.355</td>
<td>1.427</td>
<td>42.7</td>
<td>-0.256</td>
<td>0.774</td>
<td>-22.6</td>
<td>1.378</td>
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<td><strong>Collective Security</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Workplace Security Measures</td>
<td>0.022</td>
<td>1.022</td>
<td>2.2</td>
<td>0.136</td>
<td>1.146</td>
<td>14.6</td>
<td>-1.220</td>
</tr>
<tr>
<td><strong>Routine Work Activities</strong></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Employees</td>
<td>-0.238 ***</td>
<td>0.788</td>
<td>-21.2</td>
<td>-0.088</td>
<td>0.916</td>
<td>-8.4</td>
<td>-1.039</td>
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<tr>
<td>Handling Cash or Valuables</td>
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<td>1.272</td>
<td>27.2</td>
<td>-0.146</td>
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<tr>
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<td>1.044</td>
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<td>0.890</td>
<td>-11.0</td>
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<td>Face-to-face Contact w/ Others</td>
<td>-0.187</td>
<td>0.829</td>
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<td>0.075</td>
<td>1.078</td>
<td>7.8</td>
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<tr>
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<td>0.023</td>
<td>1.023</td>
<td>2.3</td>
<td>-0.520</td>
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<tr>
<td><strong>Fear and Victimization</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior Workplace Victimization</td>
<td>0.676 *</td>
<td>1.965</td>
<td>96.5</td>
<td>0.260</td>
<td>1.297</td>
<td>29.7</td>
<td>0.660</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>0.203 ***</td>
<td>1.225</td>
<td>22.5</td>
<td>0.255 ***</td>
<td>1.291</td>
<td>29.1</td>
<td>-0.685</td>
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<tr>
<td>Fear of Workplace Violence</td>
<td>0.424</td>
<td>1.528</td>
<td>52.8</td>
<td>0.278</td>
<td>1.320</td>
<td>32.0</td>
<td>0.273</td>
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<tr>
<td>Prior Outside Victimization</td>
<td>0.449</td>
<td>1.567</td>
<td>56.7</td>
<td>0.237</td>
<td>1.268</td>
<td>26.8</td>
<td>0.232</td>
</tr>
</tbody>
</table>

\[ F = 10.94, p > F = 0.0000 \quad F = 5.00, p > F = 0.0000 \]

*Note.* Coef. = log odds; O.R. = odds ratio; % = percent change in simple odds, (calculated as O.R. - 1). z-test difference is the comparison of coefficients.

* p < .05. ** p < .01. *** p < .001.
Table 5

Logistic Regression Analyses: Gender Specific Samples, Pepper Spray

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>z-test Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>O.R.</td>
<td>%</td>
</tr>
<tr>
<td><strong>Individual Demographics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.014</td>
<td>1.014</td>
<td>1.4</td>
</tr>
<tr>
<td>Race</td>
<td>0.283</td>
<td>1.327</td>
<td>32.7</td>
</tr>
<tr>
<td>Hispanic Origin</td>
<td>-0.777</td>
<td>0.460</td>
<td>-54.0</td>
</tr>
<tr>
<td>Education Level</td>
<td>0.112*</td>
<td>1.119</td>
<td>11.9</td>
</tr>
<tr>
<td><strong>Workplace Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>0.059</td>
<td>1.061</td>
<td>6.1</td>
</tr>
<tr>
<td>Rural</td>
<td>0.494</td>
<td>1.639</td>
<td>63.9</td>
</tr>
<tr>
<td>Government Business</td>
<td>0.605</td>
<td>1.832</td>
<td>83.2</td>
</tr>
<tr>
<td><strong>Collective Security</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Workplace Security Measures</td>
<td>0.209***</td>
<td>1.232</td>
<td>23.2</td>
</tr>
<tr>
<td><strong>Routine Work Activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Employees</td>
<td>-0.291*</td>
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<td>-25.3</td>
</tr>
<tr>
<td>Handling Cash or Valuables</td>
<td>0.897**</td>
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</tr>
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<td>Public</td>
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</tr>
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<td>Face-to-face Contact w/ Others</td>
<td>0.436</td>
<td>1.547</td>
<td>54.7</td>
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<td>Work Evenings/Nights</td>
<td>0.855*</td>
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<td>135.2</td>
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<tr>
<td><strong>Fear and Victimization</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Prior Workplace Victimization</td>
<td>0.906*</td>
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<td>147.4</td>
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<tr>
<td>Perceived Risk</td>
<td>0.176*</td>
<td>1.192</td>
<td>19.2</td>
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<td>Fear of Workplace Violence</td>
<td>0.610</td>
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<td>-0.340</td>
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<td>-28.8</td>
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</table>

* F = 9.17, p > F = 0.0000  F = 10.25, p > F = 0.0000

Note. Coef. = log odds; O.R. = odds ratio; % = percent change in simple odds, (calculated as O.R. - 1).

z-test difference is the comparison of coefficients.

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