

Actual Versus Perceived Risk of Victimization and Handgun Ownership

Clara Maria Elpi

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Neal M. King, Chair

K. Jill Kiecolt

James E. Hawdon

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ABSTRACT

This study tested the hypotheses that perceived risk of victimization had a stronger effect than actual exposure to victimization risk on handgun ownership and that this relationship was stronger for women than men. Perceived and actual risks of victimization have been discussed with respect to handgun ownership, but a general consensus in the literature was lacking and recent empirical research was scarce. Crime rates and respondents' social characteristics were used as proxy measures for victimization risk, while fear of crime measured perceived risk of victimization. Three sets of models were estimated, the first with a pooled sample of men and women, the second and third on samples separated by gender. Binary logistic regression was utilized to compare the predictive power of these two major correlates of handgun ownership and observe how their effects varied by gender. Data were drawn from the National Opinion for Research Center's (NORC) Cumulative General Social Surveys (GSS) for the years 1986 through 2008. Predictors of victimization risk, especially gender and regional crime rate, had strong effects on handgun possession, while perceived risk had no effect on handgun possession. Results also demonstrated that while women were more likely to fear crime, they were not necessarily more or less likely than men to obtain handguns in response to that fear.

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I. INTRODUCTION

This study drew from multiple strands of empirical investigation to hypothesize that perceived risk of victimization has a stronger effect than actual exposure to victimization risk on handgun ownership. Perceived and actual risks of victimization have been discussed with respect to gun ownership, but a general consensus in the literature was lacking and recent empirical research was scarce. Using regional crime rate and respondents' social characteristics as proxy measures for victimization risk and fear of crime as a measure for perceived risk of victimization, this study compared the predictive power of these two major correlates of handgun ownership and observed how their effects varied by gender. Data were drawn from the National Opinion for Research Center's (NORC) Cumulative General Social Surveys (GSS) for the years 1986 through 2008, and binomial logistic regression was used to examine whether handgun possession was more motivated by perceived risk of victimization or by actual victimization risk.

Private firearm ownership is prevalent in the United States (U.S.), which has the highest rate of civilian gun ownership in the world with about eighty-nine firearms per 100 persons (Graduate 2007). Another survey of private firearm ownership in the U.S. claimed that there were roughly ninety-three guns per 100 persons, and estimated that about twenty-five percent of Americans own firearms (Hepburn et al. 2007). Kleck (1991) estimated the firearm stock to be slightly below 200 million in 1987. Extrapolating those figures to the current year, there may be over 300 million privately owned firearms in the United States today (Kleck 1991:49-50). Another study estimated roughly 218 million privately owned firearms in the United States in 2004 (Hepburn et al. 2007). With the international civilian gun arsenal estimated at about 645 million and the US civilian arsenal estimated at about 270 million (Graduate 2007), the scarcity of theory and empirical research of gun ownership is surprising.

Many American gun owners claim to keep their firearms for protection. A 2004 survey of American adults found that about forty-percent of guns reported were handguns (Hepburn et al. 2007). About forty-six percent of handgun owners reported self-defense as their primary motivation for ownership (Hepburn et al. 2007). Seventy-eight percent of American gun owners have reported that they would be willing to use a gun for defensive purposes and even fire on an intruder (Kleck and Gertz 1995). In 1995, Kleck and Gertz estimated that there were roughly 2.2 to 2.5 million instances of defensive gun use each year in the US (1995:164-167).

II. LITERATURE REVIEW

Handgun ownership is motivated by fear of victimization (Hill et al. 1985; Marciniak and Loftin 1991), views of crime as a serious problem (Kleck 1991; McDowall 1995), and higher crime rates (Bordua and Lizotte 1979; Lizotte; Bordua and White 1981). Research also demonstrates that the factors that affect defensive handgun ownership may differ by gender (Bordua and Lizotte 1979; Hill et al. 1985; Sheley et al. 1994; DeJong 1997; Felson and Pare 2010).

Previous studies have linked handgun ownership to fear of victimization and perceptions of crime (Kleck 1991; McDowall 1995; Kleck and Kovandzic 2009). Handgun ownership has also been linked to residence in areas with higher crime rates (Bordua and Lizotte 1979; Lizotte; Bordua and White 1981). Some studies have found significant positive relationships between fear of crime and gun ownership (Hill, Howell, and Driver 1985; Marciniak and Loftin 1991; Cao, Cullen, and Link 1997), though studies that have addressed whether fear of crime prompts protective gun ownership show inconsistent findings (DeFronzo 1979; Young 1985; Bryant and Shoemaker 1988; Smith and Uchida 1995; Kleck 1991; Sheley et al. 1994; Cao et al. 1997; DeJong 1997). For example, Cao et al. (1997) found an inverse relationship between personal gun ownership and exposure to victimization. Research on gun ownership thus lacks a consensus on how perceptions of crime or victimization risk impact handgun possession.

Research does suggest, however, that fear of crime may be affected by gender (Bordua and Lizotte 1979; Hill et al. 1985; Sheley et al. 1994). Previous research on gun ownership has reported that women are more motivated than men by fear of crime or perception of risk to purchase firearms (Bordua and Lizotte 1979; Lizotte and Bordua 1980; Lizotte et al. 1981; Sheley et al. 1994; DeJong 1997; Felson and Pare 2010), and studies have found that fear of

crime is more common among women than men (Garofalo 1981; McGarrell, Giacomazzi and Thurman 1997).

Recent empirical research on victimization risk as a motivator of handgun possession is lacking. The most recent study (Felson and Pare 2010) uses data from the mid-1990s to observe the effects of cultural and regional differences in weapon carrying by race. The researchers examined the effect of “current threat” on carrying weapons for protection, measured as respondents’ “concern for personal safety, history of personal victimization, and characteristics of the county in which they reside, including the violent crime rate, percent black, percent in poverty, and whether the county is in an urban area” (Felson and Pare 2010:1364). They used these measures related to perceptions of social disorder in order to “capture as completely as possible the threat experienced by the respondent” (Felson and Pare 2010:1364). They ultimately found a positive association between current threat and firearm carrying. In contrast, Cao et al. (1997) found that personal gun ownership was inversely linked to exposure to victimization as measured by how many hours each day the respondents’ typically spent away from home. These studies both accounted for victimization risk, but Felson and Pare (2010) used firearm carrying as their outcome variable and Cao et al. used personal gun ownership as their dependent variable, so whether this was for protective reasons was unclear. This measure was insufficient for measuring protective gun ownership because carrying a concealed weapon is restricted or illegal in some areas, and persons are more likely to keep firearms in their home for self-defense.

Perceived Risk

Fear of crime affects handgun ownership, though research has produced inconsistent evidence on whether fear of crime prompts protective handgun ownership. Fear of crime has a positive effect on gun ownership (Hill et al. 1985; Smith and Uchida 1988; Marciak and Loftin

1991; Smith and Smith 1995; Cao et al. 1997; DeJong 1997; Felson and Pare 2010), but related research has also found that fear of crime has an inverse effect on gun ownership (Bryant and Shoemaker 1988; Sheley et al. 1994).

Among the studies that have found a positive relationship between fear of crime and gun ownership is Smith and Uchida's (1988) study of defensive weapon ownership as measured by asking whether or not persons have purchased a gun or other weapon for their protection. They found perceptions of vulnerability and a lack of faith in local law enforcement to have a positive effect on defensive gun ownership. They used Donald Black's theory of self-help, where individuals take "measures to protect themselves from the threat of crime" (1988:94), to ground their analysis.

DeJong (1997) also found a positive effect of perceptions of crime and risk of victimization on owning weapons for protection. People who perceived a crime increase in their neighborhood were more likely to own a weapon for protection. In examining various motivations of defensive gun ownership, Cao et al. (1997) found that persons who felt that their neighborhood was less safe than others were more likely to own a gun for protection. They concluded that when people "doubt the ability of institutionalized, collective means of security—in particular the criminal justice system—to protect them, they turn to protective ownership as a means of self-help against crime" (Cao et al. 1997:631). Felson and Pare (2010) also found that carrying a firearm for protection was positively linked to respondents' concern for safety.

Other research has found that fear of crime has an insignificant or inverse effect on defensive and general gun ownership rates. DeFronzo (1979) used GSS data to examine the relationship between handgun ownership and fear of crime among about 1,800 men. Women were excluded from the analysis because it was assumed that the "presence of handguns in the

household was likely to depend mainly on the initiative of the husband in married households” (1979:334). DeFronzo (1979) found that fear of crime did not affect men’s handgun ownership. Bryant and Shoemaker (1988) found that residents of Virginia who feared crime were less likely to own handguns, but only by a very small margin. The study also found that respondents who felt there was a serious problem with crime in their community were more likely to own handguns.

Much research on fear of crime has also suggested that a gender gap in fear exists. Women tend to be more fearful of crime than men (Garofalo 1981; Ferraro 1996; McGarrell, Giacomazzi and Thurman 1997; Schafer, Huebner and Bynum 2006), despite higher rates of victimization for men (Hindelang, Gottfredson and Garofalo 1978; Cohen and Felson 1979).

Research also suggests that women are more motivated than men by fear of crime or perception of risk to purchase firearms (Bordua and Lizotte 1979; Lizotte and Bordua 1980; Lizotte et al. 1981; Sheley et al. 1994; DeJong 1997; Felson and Pare 2010). Because women are more fearful of crime, they respond to perceptions of threats from their proximal environment by acquiring firearms. In addition, women were more sensitive and more responsive than men to perceptions of risk in their decisions to acquire defensive weapons (DeJong 1997).

One explanation for this gender gap in perceived risk is that women’s fear of crime is overshadowed by a fear of sexual harassment and assault (Ferraro 1996; Schafer et al. 2006). For instance, in the case of robbery, men are more likely to fear losing property, whereas women are more likely to fear being sexually victimized. Women’s social and physical vulnerabilities induce fear when they visit high crime areas or engage in leisure activities that increase their victimization risk (Schafer et al. 2006:287). Therefore fear of crime and fear of victimization are likely to affect women’s gun ownership more than that of men. Lizotte, Bordua, and White

(1980) found that women are more likely than men to own a firearm for protective purposes, while men are more likely to own a firearm for sport. Felson and Pare (2010) found that women show more concern for their safety and are more likely than men to carry some form of weapon for protection. A 2009 National Shooting Sports Foundation survey found that eighty percent of female gun owners surveyed had purchased their gun for self-defense (Volk and Weber 2010). DeJong (1997) examined gender differences in indicators of defensive weapon ownership, finding that women who perceive they are at a high risk for criminal victimization are more likely to own a weapon for protection than “women who do not share the same perception” (1997:522-523). This suggests that men’s and women’s defensive handgun ownership are motivated by different factors and that they respond differently to perceptions of risk.

Predictors of Risk of Victimization

Defensive gun ownership has been linked to actual victimization exposure, but little research suggests a lasting correlation (McDowall 1995; Cao et al. 1997; Felson and Pare 2010). Since the National Crime and the National Crime Victimization Surveys begun in the early 1970s, numerous studies and subsequent theories have emerged, mostly arguing for predictable trends in victimization rates for certain populations.

Hindelang et al. (1978) observed patterns of crime victimization, specifically those involving bodily injury, and found consistently high rates of victimization for persons with certain demographic and social characteristics among eight major United States cities. African Americans, persons under thirty, men, and persons with low incomes were more likely to be victimized than persons with high incomes, whites, women and persons from age thirty through sixty five. Hindelang et al. (1978) ultimately proposed a lifestyle theory of victimization: as personal victimization tends to occur disproportionately away from home, those people who

engage in more activities away from home, especially leisure activities, have higher risks of victimization than persons who do not engage in leisure activities as frequently.

Cohen and Felson (1979) likewise contend that risk of victimization depends on the social characteristics of the victims. According to the routine activities theory, people's everyday activities determine victimization risk by controlling the presence and interaction of three conditions: motivated offenders, suitable targets and lack of capable guardianship. Motivated offenders are persons "with both criminal inclinations and the ability to carry out those inclinations" (Cohen and Felson 1979:590). Suitable targets include those persons and objects that are high in value, visible, and accessible. Capable Guardianship is protection provided by regular citizens as they go about their daily activities, or routine activities. Capable guardianship is often overlooked in sociological research because it implies the absence of crime and is difficult to measure. According to the routine activities theory, these three conditions are necessary for a direct-contact predatory violation, any act in which "someone definitely and intentionally takes or damages the person or property of another" (Cohen and Felson 1979:589), to occur. Persons are believed to decrease capable guardianship and increase target suitability (or risk) when they spend time away from their home or family.

According to the lifestyle and routine activities theories of victimization, certain social characteristics cause some groups to be at a higher risk of victimization than others. Related empirical studies found that age, gender, race, income, and proximal crime rates are all correlated with victimization, thus these factors may be able to predict an individual's risk of victimization (Hindelang et al. 1978; Cohen and Felson 1979; Cook 1986; Miethe and McDowell 1993; Dugan and Apel 2003).

Men experience higher rates of victimization than women (Hindelang et al. 1978; Cohen and Felson 1979; Dugan and Apel 2003; Lauritsen and Helmer 2008), but interestingly, women tend to be more fearful of crime than men (Garofalo 1981; Ferraro 1996; McGarrell, Giacomazzi and Thurman 1997; Schafer, Huebner and Bynum 2006).

Persons from the age of eighteen to thirty are the most likely age group to experience victimization, typically because they engage in leisure activities the most often. People over the age of sixty-five are the second most likely group to experience victimization because they are seen as accessible and weak by offenders (McCabe and Gregory 1998). Finally people from the ages of thirty to sixty-five experience the least amount of victimization (Miethe, Stafford and Long 1987; Miethe and McDowell 1993; Hindelang et al. 1978).

African Americans have higher rates of victimization than whites; this relationship holds for both men and women (Miethe and McDowell 1993; Dugan and Apel 2003). Persons with lower incomes have a higher rate of victimization than persons with higher incomes (Hindelang et al. 1978; Smith and Jarjoura 1988; Miethe and McDowell 1993). This is because persons with lower incomes lack resources to protect themselves from crime and tend to reside in areas where crime rates are high.

Persons who frequently engage in leisure activities or frequently spend time away from home are considered to increase their likelihood of being victimized by spending time away from relatives and spending more time around strangers. Therefore, persons who more frequently participate in leisure activities are at a higher risk of being victimized than those who less frequently participate in leisure activities (Hindelang et al. 1978; Cohen and Felson 1979).

Few empirical studies of defensive gun ownership have accounted for actual victimization risk. Gun ownership research that has accounted for victimization risk is

inconclusive about how risk affects defensive handgun ownership (Bordua and Lizotte 1979; Sheley et al. 1994; Kleck and Gertz 1995; Cao et al. 1997; Hepburn et al. 2007; Kleck and Kovandzic 2009; Felson and Pare 2010). Kleck and Gertz (1995) found that most persons who have used a gun in self-defense are those persons with higher rates of victimization. Cao et al. (1997) also accounted for victimization risk as measured by how many hours per day the respondents typically spent away from home. They found defensive gun ownership to be inversely linked to exposure to victimization. While not predicted by lifestyle and routine activities theories, this relationship may be explained by higher risk preferences that reduce one's chances of taking defensive measures (Cao et al. 1997).

Studies of gun ownership have used national or proximal crime rates as a measure of victimization risk, typically finding that the higher crime rates are, the more likely persons are to arm themselves (Bordua and Lizotte 1979; Sheley et al. 1994; Cao et al. 1997; Hepburn et al. 2007; Kleck and Kovandzic 2009). Kleck and Kovandzic (2009) examined the relationship between homicide rates and city-level handgun ownership trends over time, finding a positive correlation. Sheley et al. (1994) compared general handgun ownership rates to national crime rates and also found a positive correlation. However Lizotte and Bordua (1979) found an inverse correlation for county-level violent crime rates and legal firearm ownership for men, but found a curvilinear pattern of ownership for women. At higher levels of violent crime, women's gun ownership was higher. Sheley et al. (1994) also found that women's handgun ownership was positively correlated with high national crime rates, whereas men's handgun ownership was negatively correlated, suggesting that the effect of proximal crime rates on defensive handgun ownership must vary by gender.

Perceived risk and actual risk have been linked to handgun ownership, but a consensus in the literature is lacking and empirical investigations are scarce. The current study will contribute to this research by dividing risk into two categories—actual and perceived—and assessing their effects on men and women’s handgun possession. This study hypothesized that perceived risk of victimization had a stronger effect on handgun possession than actual victimization risk, and that this association was stronger for women than men. This hypothesis was tested using data from the General Social Survey, a national sample, from 1986 to 2008. Crime rates and respondents’ social characteristics were used as proxy measures of actual victimization risk, while fear of crime measured perceived risk of victimization. Binary logistic regression was utilized to regress handgun possession on predictors of victimization risk, regional crime rate, fear of crime, and survey year.

III. METHODS

The Sample

This study used data from the NORC's cumulative General Social Surveys for the years 1986, 1987, 1988, 1989, 1990, 1991, 1993, 1994, 1996, 1998, 2000, 2002, 2004, 2006 and 2008. The GSS is a cross-sectional repeated survey and has been administered by computer-assisted face-to-face interviewing since 2002. Prior to that year, the survey was conducted in a paper-and-pencil format (Davis and Smith 2008). The total number of cases available for the study was 42,391 prior to listwise exclusions for missing values. Once people who live alone were isolated, the sample size was reduced to 10,501. I isolated persons who live alone because the wording and order of the firearm possession questions in the GSS make it impossible to identify what type of firearm the respondent personally owns. Therefore, by isolating these persons who lived alone for my analysis I was able to attribute handgun possession to individual respondents. To isolate people who lived alone, I used the GSS measure of household composition, which asked how many persons, including the respondent, usually reside in the household but are temporarily away, but excluding any students away at college, away for armed forces, or away in institutions (Davis and Smith 2008:2277). Only respondents who lived alone were included in the analysis. Additionally, only African Americans and whites were compared in this study because the third "other race" category was insufficient for differentiating between Hispanics, Native Americans, Asians, etc. It was important to exclude this race category from the analysis because victimization rates for these groups vary considerably (Dugan and Apel 2003). Use of this data set also allowed me to analyze a general sample of the United States population and to examine change over time.

Dependent Variable

Handgun possession. I chose handgun possession as the outcome variable in my analysis because most handgun owners report self-defense as the primary reason for ownership (Kleck 1991; Kleck and Gertz 1995; McDowall 1995; Hepburn et al. 2007; Kleck and Kovandzic 2009). This measure was based on a question where the GSS asks respondents if they keep a pistol or revolver in their home. First the GSS asks if the respondent “happens to have in [their] home or garage any guns or revolvers?” If the respondent answered yes, they were then asked if the gun was a “pistol, shotgun, rifle, or what” (Davis and Smith 2008:354). Those who responded that they had a pistol or revolver in the household were coded as one for handgun possession. Those who answered no to possession of a pistol or revolver in the household were coded as zero. Thus the reference category was respondents who lived alone, but did not keep handguns in their home.

Independent Variables

Year. Survey year was included in the models to observe change in defensive handgun ownership rates over time. The years for which data are available were 1986, 1987, 1988, 1989, 1990, 1991, 1993, 1994, 1996, 1998, 2000, 2002, 2004, 2006 and 2008.

Perceived risk. Perceived risk was measured by the respondents’ response to a fear of crime measure provided by the GSS. Respondents are asked, “Is there any area right around here—that is, within a mile—where you would be afraid to walk alone at night?” Responses were coded one for fear and zero for no fear.

Predictors of victimization risk. To account for actual victimization risk, I used proxy measures of actual victimization risk consisting of a sociability measure, demographic measures, and regional arrest rates. The demographic measures of particular interest in this study were age,

income, gender, and race (Hindelang et al. 1978; Cohen and Felson 1979; Cohen et al. 1981; Cook 1986; Miethe and McDowell 1993; Dugan and Apel 2003).

Age. The GSS recoded respondents' date of birth into actual age (Davis and Smith 2008:2257). These age values in years were divided by ten and recoded into decade units. Age squared was added to account for a possible curvilinear association between age and victimization risk.

Income. The GSS measured income in categories, where respondents were asked to specify within which group their "total family income, from all sources, fell last year before taxes" (Davis and Smith 2008:155). While respondents were not asked to report the exact their exact total income, the GSS does provide an interval measure of income where categories are recoded into real dollar units using categorical midpoints and imputations, then converted to 1986 dollars. However, as this measure was only available for respondents up to the year 2006, income as it was categorically measured in 2006 dollars was used to account for income levels of 2008 respondents. I converted the midpoint values for the reported categories into 1986 dollars and then imputed these values as real income units for 2,023 respondents. Further, there were also missing values on income for 1,765 respondents. Therefore, respondents' incomes were imputed using a linear regression equation containing the respondents' year, gender, age, education, race, marital status, and employment status (Schnittker 2008:263). Income values were then recoded into thousands of dollars and ultimately, as income varies inversely with risk, the income measure was converted into an inverse term and the range of this variable became - 62.50 to 6.62. An inverse squared term was also included to more closely examine a possible non-linear relation between risk and handgun possession.

Gender. Sex was recoded into a dummy variable with women coded as zero and men coded as one.

Race. Race was measured by a single dummy variable; African Americans are coded as one and whites are coded as zero.

Sociability index. To account for how often the respondent exposed him or herself to victimization, a sociability index was estimated using two GSS measures related to leisure activities. The GSS asked how often respondents engage in certain activities, those involving interaction with non-relatives were of interest in this study. Responses to two GSS questions were recoded and values were combined to create a sociability index with a maximum value of 4. The first question asked how often the respondent “spends a social evening with friends who live outside the neighborhood” (Davis and Smith 2008:306). Those who replied that they spent a social evening with friends who live outside the neighborhood almost every day, once or twice a week, or several times a month were coded as two, those that do about once a month, several times a year, or about once a year were coded as one, and those who replied that they never do so were coded as zero. The second question asks how often the respondent “goes to a bar or tavern” (Davis and Smith 2008:307). Those who went to a bar almost every day, once or twice a week, or several times a month were coded as two, those who went to a bar or tavern about once a month, several times a year, or about once a year were coded as one, and those who replied that they never go to a bar or tavern were coded as zero.

Regional crime rate. Regional arrest rates per 100,000 persons were obtained from the Federal Bureau of Investigation (FBI) Uniform Crime Reports (UCR) for the years 1986 through 2008 and imputed according to the survey year and region. The UCR regions correspond with GSS regions: the West (Washington, Oregon, California, Alaska, Hawaii, Montana, Idaho,

Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico), the South (Arkansas, Oklahoma, Louisiana, Texas, Kentucky, Tennessee, Alabama, Mississippi, Delaware, Maryland, West Virginia, Virginia, North Carolina, South Carolina, Georgia, Florida, District of Columbia), the Midwest (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Wisconsin, Illinois, Indiana, Michigan, Ohio), and the Northeast (New York, New Jersey, Pennsylvania, Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island). These arrest rates per 100,000 were converted into arrest rates per 10,000,000, making the range of this variable about 3.74 to 6.40.

Analytic Strategy

Due to the dichotomous nature of the dependent variable, I used binary logistic regression to examine the effects of perceived risk of victimization and indicators of exposure to victimization risk on handgun possession. Two separate models were estimated for 2,019 available cases after listwise deletion. The first model tested the effect of the proxy measures of victimization risk on handgun possession. In the second model, perceived risk was added to see if the effect of actual risk on handgun possession changes. The introduction of fear should weaken the model. If fear has no effect on handgun possession, the unstandardized regression coefficients and significance levels of the risk proxy measures will not change at all or only slightly.

These models were re-estimated after the sample was separated by gender to compare how risk and fear affect men's and women's handgun possession. In order to do this, the unstandardized coefficients for all risk and fear measures were compared with a z test for statistically significant differences across genders (Paternoster et al. 1998). Pseudo R² values for each model were also examined to see how much variation in defensive handgun ownership was

accounted for by the independent variables, and changes in protective handgun ownership over time were also observed.

Limitations

While the GSS does ask about the type of guns respondents keep in their household, the wording and order of the firearm possession questions in the GSS make it impossible to identify what type of firearm the respondent personally owns if there was more than one person residing in the household. Therefore it was necessary to isolate persons who live alone for analysis in order to identify whether or not the respondent owns handguns.

The current research was also unable to determine the specific motivations for keeping handguns, whether for recreation or protection; however, most handgun owners report self-defense as the primary reason for ownership. And while the pistol or revolver may not personally belong to the respondent, the respondent still possessed the firearm and could potentially have it in their home for defensive purposes. Finally, persons that perceive they have a high risk of being victimized may be ethically opposed to purchasing firearms, but may have no problem keeping one in their home for protection.

IV. RESULTS

Table 1: Descriptive Statistics

As expected, the sample contained more women than men, with women composing about fifty-seven percent of the sample. About sixteen percent of respondents are African American. The mean age of respondents was about fifty-four years. The mean income for respondents was roughly 21,000 per year in 1986 dollars. On average, respondents went to a bar or tavern several times per year. Respondents spent time with friends who live outside their neighborhood about once or twice per month. The average crime rate per 100,000 persons was 5,241. Roughly forty-six percent of respondents reported that they were afraid to walk alone at night in their neighborhood or within a mile of their home. Eighteen percent of respondents reported that they had pistols or revolvers in their home.

Men only. About sixteen percent of men in the sample are African American. The mean age for men in the sample was about forty-eight years. The mean income for men was roughly 24,600 per year in 1986 dollars. On average, men went to a bar or tavern once a month to a few times per year. Men in the sample spent time with friends who live outside their neighborhood about one to several times per month. Roughly twenty-seven percent of men reported that they were afraid to walk alone at night in their neighborhood or within a mile of their home. About a fourth of men in the sample reported that they have a pistol or revolver in their home.

Women only. Consistent with the overall sample, about sixteen percent of women are African American. The mean age for women in the sample was about fifty-eight years. The mean income for women was roughly 17,670 per year in 1986 dollars. On average, women went to a bar or tavern a few times per year. Women in the sample spent time with friends who live outside their neighborhood about once per month. Roughly sixty-one percent of women reported

Table 1. Descriptive Statistics

Variables	N	Mean	SD	Min.	Max.	Means by gender	
						Men	Women
Predictors of victimization risk							
Sex (male)	8,818	.43	.50	.00	1.00	.43	.57
Race (African American)	8,439	.16	.37	.00	1.00	.16	.16
Age (in decades)	8,764	5.38	1.90	1.80	8.90	4.80	5.82
Income	8,771	20.67	20.72	-24.47	141.04	24.60	17.67
1 / Income	8,771	.14	.78	-.62	.50	.62	.14
Sociability index	4,858	2.01	1.21	.00	4.00	2.35	1.77
Time spent with friends	4,858	1.34	.71	.00	2.00	1.41	1.28
Time spent at bar or tavern	4,859	.68	.78	.00	2.00	.93	.49
Regional crime rate	8,818	5.24	.64	3.74	6.40	5.24	5.24
Perceived risk							
Fear of walking alone at night	4,902	.46	.50	.00	1.00	.27	.61
Handgun possession	4,882	.18	.38	.00	1.00	.26	.12
Valid N (listwise)	2,019					850	1,169

that they were afraid to walk alone at night in their neighborhood or within a mile of their home.

Roughly twelve percent of women reported that they have a pistol or revolver in their home.

Table 2: Two Regression Models of Handgun Ownership

Model 1. In the first model handgun possession was regressed upon predictors of victimization risk, regional crime rate and survey year. The constant's unstandardized coefficient value was about negative ninety showing that overall persons are not likely to possess handguns. Once survey year, race, gender, age, income, sociability and regional crime rates are taken into account that likelihood increased or decreased depending on the direction and value of the unstandardized coefficients.

The model showed that sex, income, age and regional crime rate were the strongest predictors of handgun possession. Every decade a person aged increased their likelihood of having handguns by about 130 percent, and once persons reached their fifties, their chances of having handguns began to decrease about seven percent with each decade they aged. Men were two times more likely than women to have handguns and this association was significant ($b=1.10; p=.001$). Regional crime rate had a strong positive effect on handgun possession. Every increase in regional crime rate of 1,000 arrests per 100,000 persons raised the likelihood of keeping handguns by almost 180 percent. Income was a strong predictor of handgun possession ($b=.25$), and for every 1,000 dollar decrease in income, likelihood of having a handgun also decreased about twenty two percent. With the inclusion of a squared term in the model, at the lowest levels of income handgun possession was not as unlikely.

African Americans were about thirteen percent less likely than whites to keep handguns. Sociability had a weak effect on handgun possession, and overall likelihood of handgun

Table 2. Logistic Regression Coefficients, Standard Errors, and Related Statistics from Two Models of Handgun Ownership

Variable	Model 1		Model 2	
	Exp (B)	b	Exp (B)	b
Survey year	1.04	.04 *** (.01)	1.04	.04 *** (.01)
Predictors of victimization risk				
Sex (male)	3.02	1.10 *** (.13)	2.74	1.01 *** (.14)
Race (African American)	.88	-.13 (.18)	.89	-.12 (.18)
Age (in decades)	2.32	.84 *** (.22)	2.34	.85 *** (.22)
Age (in decades) squared	.93	-.07 *** (.02)	.93	-.07 *** (.02)
1 / Income	.78	-.25 (.15)	.78	-.24 (.15)
1 / Income squared	.99	-.01 (.01)	.99	-.01 (.01)
Sociability index	1.07	.06 (.06)	1.06	.06 (.06)
Regional crime rates	1.80	.59 *** (.12)	1.81	.59 *** (.12)
Perceived risk				
Fear of walking alone at night			.74	-.30 * (.13)
Constant	.00	-89.86 *** (24.68)	.00	-85.47 *** (24.69)
Cox and Snell pseudo-R ²		.06		.07
Nagelkerke pseudo-R ²		.11		.11
N		2,019		2,019

Note. Standard errors are in parentheses.

* $p < .05$. ** $p < .01$. *** $p < .001$. (two-tailed tests)

ownership increased by about 4% every one to two years from 1986 to 2008.

The Cox and Snell pseudo- R^2 shows that roughly six percent of the variation handgun possession was explained by year, gender, race, age, income, sociability, and regional crime rates. The Nagelkerke pseudo- R^2 tells us that roughly eleven percent of the variation in handgun possession was explained by the previously mentioned independent variables.

Model 2. When fear was added to the second model, relationships between handgun possession and age, income, sociability and regional crime rate did not change. The nonlinear relationship between age and handgun possession persisted, as well as the nonlinear relationship between income and handgun possession. Regional crime rate still had a strong effect on handgun possession. Sociability still had a weak effect on handgun possession. Men were still more likely than women to possess handguns, but they were only 2.7 times as likely to have handguns in the second model, and the difference across models was not statistically significant.

After fear was added to this model, the constant decreased from negative ninety to negative eighty-six, showing that fear had a considerable influence on handgun possession. The relationship between fear and handgun possession was strong ($p=.023$; $b=.30$); persons who feared walking alone in their neighborhood at night were about thirty percent less likely than persons without fear to have handguns. Also the addition of fear into the second model did not have a strong effect on changes in handgun possession over time.

The pseudo- R^2 values show that roughly seven to eleven percent of the variation in handgun possession was explained by year, gender, race, age, income, sociability, and regional crime rate.

Table 3: Four Regression Models of Handgun Ownership

Men's Model 1. In this set of models handgun possession was regressed upon predictors of victimization risk for men in the sample. The constant value was about negative seventy-nine showing that overall men were not likely to have handguns. On average, men's likelihood of having handguns increased about 3.7% every one to two years from 1986 to 2008. Black and white men shared a relatively equal likelihood of having handguns, where African Americans were only six tenths of a percent more likely to have handguns than white men. However, this association was not strong. Sociability was also not a strong predictor of men's handgun possession, however the relationship indicated that handgun possession was positively related to men's sociability.

Every decade increase in age increased men's likelihood of having handguns, however, the age-squared term showed that once men reached their sixties, their chances of having a handgun stopped increasing and began to decrease about five percent with each decade they aged.

Interestingly, income was a statistically significant ($p=.003$) predictor of handgun possession for men, but not for women. According to the z-tests, this was the only variable whose causal effect was significantly different for men and women. Men with lower incomes were less likely than richer men to have handguns, and once men's income fell below 500 dollars per year in 1986 dollars, their likelihood of having handguns stopped decreasing and began to increase, significantly. Regional crime rate also had a strong positive effect on handgun possession. Every increase in regional crime rate of 1,000 arrests per 100,000 persons raised the likelihood of keeping handguns by almost eighty percent.

Table 3. Logistic Regression Coefficients, Standard Errors, and Related Statistics from Four Models of Handgun Ownership

Variable	Men				Women			
	Model 1		Model 2		Model 1		Model 2	
	Exp (B)	b	Exp (B)	b	Exp (B)	b	Exp (B)	b
Survey year	1.04	.04 *	1.04	.04 *	1.05	.04 *	1.04	.04 *
	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)
Predictors of Victimization Risk								
Race (African American)	1.01	.01	1.01	.01	.84	-.18	.86	-.15
	(.25)	(.25)	(.25)	(.25)	(.29)	(.29)	(.29)	(.29)
Age (in decades)	2.05	.72 *	2.07	.73 *	2.53	.93 **	2.52	.93 **
	(.29)	(.29)	(.29)	(.29)	(.35)	(.35)	(.35)	(.35)
Age (in decades) squared	.94	-.06 *	.94	-.06 *	.92	-.09 **	.92	-.09 **
	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
1 / Income	.06	-2.85 **††	.07	-2.72 **††	.68	-.39	.67	-.40
	(.95)	(.95)	(.95)	(.95)	(.34)	(.34)	(.34)	(.34)
1 / Income squared	2.32	.84 **	2.22	.80 **	.95	-.05	.95	-.05
	(.28)	(.28)	(.28)	(.28)	(.07)	(.07)	(.07)	(.07)
Sociability index	1.12	.11	1.11	.11	.97	-.03	.96	-.04
	(.08)	(.08)	(.08)	(.08)	(.10)	(.10)	(.10)	(.10)
Regional Crime Rates	1.63	.49 ***	1.64	.49 ***	2.12	.75 ***	2.13	.76 ***
	(.15)	(.15)	(.15)	(.15)	(.19)	(.19)	(.19)	(.19)
Perceived Risk								
Fear of walking alone at night								
Constant	.00	-78.47 *	.00	-75.71 *	.00	-96.26 *	.00	-90.05 *
	(31.62)	(31.62)	(31.59)	(31.59)	(40.79)	(40.79)	(40.93)	(40.93)
Cox and Snell pseudo-R ²	.04	.04	.04	.04	.02	.02	.03	.03
Nagelkerke pseudo-R ²	.06	.06	.06	.06	.05	.05	.05	.05
N	850	850	850	850	1,169	1,169	1,169	1,169

Note. Standard errors are in parentheses.

* $p < .05$. ** $p < .01$. *** $p < .001$ (significant coefficients by gender, two-tailed tests). † $p < .10$. †† $p < .05$. ††† $p < .01$ (significant differences across genders, two-tailed tests).

Men's Model 2. With the addition of fear in the second model, the relationship between income and handgun possession for men changed. The directionality was not altered but the statistical strength of the association was reduced. With every thousand-dollar decrease in total family income, men were about ninety-five percent less likely to have handguns. Once income fell below 500 dollars per year in 1986 dollars, men's likelihood of having handguns changed direction and began to increase 222 percent with every thousand-dollar income reduction.

African Americans and whites were still equally as likely to own handguns, but the addition of fear in the second model did statistically strengthen this association. Sociability remained weak and statistically insignificant. Handgun possession and age were still significantly related and the odds ratios were not very different from the first model. The effect of year on handgun possession remained unaltered. Regional crime rate also retained its strong relationship with handgun possession. Those men who feared walking alone at night were less likely to have handguns than those who did not fear.

The pseudo-R² values show that roughly four to six percent of the variation in men's handgun possession was explained by year, race, age, income, sociability, regional crime rate, and fear of walking alone at night.

Women's Model 1. In the first model that included only women, handgun possession was regressed upon predictors of victimization risk and survey year. The model's constant value was about negative ninety-six showing that overall women were not likely to possess handguns. On average, women's handgun possession increased about five percent every one to two years from 1986 to 2008. Black women were about seventeen percent less likely than white women to report having handguns, but this association was not very strong. As age increased, so did handgun ownership; but once women reached their late fifties handgun possession began to decrease by

about eight percent each decade. Income was not a strong predictor of handgun ownership for women. The less income women had, the less likely they were to have handguns, and once income fell below 1,000 dollars in 1986 dollars, women's' likelihood of having handguns decreased less steadily.

The regional crime rate was positively and significantly associated with women's handgun possession; every increase in regional crime rate of 1,000 arrests per 100,000 persons raised the likelihood of keeping handguns by almost 212 percent. The pseudo-R² values show that roughly two to five percent of the variation in women's handgun possession was explained by year, race, age, income, sociability, and regional crime rate.

Women's Model 2. With the addition of fear in the second model, we see that the constant value has changed considerably from negative ninety-six to negative ninety showing that fear does have an effect on women's handgun ownership, however this difference was not very strong. The relationship between income and handgun possession for women also changed somewhat, but was still weak. The association for age and handgun possession did not change at all with the addition of fear in this model. The effect of sociability on women's handgun possession did not change substantially, and African American women were still less likely than white women to have handguns.

The effect of regional crime rate on women's handgun possession remained unchanged. Those women who feared walking alone at night were about twenty five percent less likely to have handguns than women who did not fear. The pseudo-R² values show that roughly three to five percent of the variation in women's handgun possession was explained by year, race, age, income, sociability, regional crime rate, and fear of walking alone at night.

V. DISCUSSION

This study hypothesized that perceived risk of victimization had a stronger effect than actual exposure to victimization risk on handgun ownership and that this relationship was stronger for women than men of handgun possession. However, produced findings contrary to the research hypothesis. The predictors of victimization risk had a strong effect on handgun possession, but perceived risk did not. Perceived risk affected men's and women's handgun possession equally and did not significantly alter the effects of other variables on handgun possession. Findings did reveal statistically significant gender differences for income's effect on handgun possession. Income had a strong association ($p=.003$) with men's handgun possession, but a weak effect on women's ($p=.243$) (Table 4).

Within the sample, about twelve percent of women and about twenty-six percent of men reported handgun possession. Previous research supports this finding (Smith and Smith 1995; Hepburn et al. 2007), however, when considered within the current study's theoretical framework that links victimization risk and defensive gun ownership, men's higher odds of having handguns might be explained by their higher risk of victimization. In the first regression model, men were three times as likely as women to have handguns. When fear was added to the second model, this association was not weakened, but the gender gap in handgun possession waned slightly where men went from being three times as likely to about two and a half times as likely as women to have handguns. This indicated that fear partially accounted for the gender gap in handgun possession because more women than men in the sample reported that they feared walking alone in their neighborhood at night. Sixty-one percent of women, but only twenty-seven percent of men reported that they feared walking alone at night. Women were also less likely than men to

engage in activities that expose them to victimization risk, for example, going to bars or spending time with friends.

When handgun possession was regressed upon predictors of victimization risk, regional crime rate, and survey year in the first model, the only strong predictors of handgun possession were year, gender, age and regional crime rate. Adding fear to the models did not change them. Overall handgun possession increased about four percent each year from 1986 to 2008. Women's handgun ownership increased by about five percent every year and men's handgun ownership increased by about four percent every year.

Young and elderly persons had a higher risk of victimization than persons from age thirty to sixty-five, but results showed that likelihood of handgun ownership increased with age then decreased once persons reached their fifties. Thus, contrary to my hypothesis, young persons with the highest risk of victimization do not have a higher propensity to have handguns than persons who are a decade older. Older persons have a high risk of victimization, but results show that once persons reached their fifties, their likelihood of having handguns decrease. Age was a strong predictor of handgun possession for women and men, but in the women's models this association was slightly stronger, and statistically unaffected by the inclusion of fear. Handgun possession increased with age, but once persons reached their fifties handgun possession decreased by about eight percent each decade.

African Americans have a higher risk of victimization than white persons, but were thirteen percent less likely to have handguns. African American women are also more subject to risk than white women, but African American women were seventeen percent less likely than white women to have handguns.

Consistent with the research hypothesis, persons who resided in regions with high crime rate shared a high propensity to have handguns. Every increase in regional crime rate of 1,000 arrests per 100,000 persons raised the likelihood of keeping handguns by almost 180 percent in the first model. When the sample was separated by gender and the models were re-estimated, increases in regional crime rates increased likelihood of handgun possession by about 111 percent for women and about sixty-four percent for men. Regional crime rate had the strongest effect on women's handgun possession.

Interestingly, income had a weak effect on handgun possession for persons in the first model and the women's model sets, but in the men's model sets, income had a strong effect ($p=.003$; $b= -2.85$) on men's handgun possession. Men with lower incomes were less likely than affluent men to have handguns, but once income fell below 1,000 dollars per year in 1986 dollars, men's likelihood of having handguns stopped decreasing and increased. This indicates that men at the lowest income levels were more likely to have handguns than men at the mean income level. Thus, persons, especially men, at the lowest income levels share a high victimization risk and a high likelihood of handgun possession. African American men have a higher risk of victimization than white men, and results showed that African American men were more likely than white men to have handguns.

Sociability was not a strong predictor of men's handgun possession, however, the model indicated that handgun possession was positively related to how men's sociability. Highly sociable women were about three percent less likely to have handguns than women who were less sociable. When fear was added to the models, the effect of sociability on handgun possession became weaker and the odds of having a firearm due to sociability decreased slightly,

indicating that fear partially explained the effects of sociability on handgun possession for both men and women.

VI. CONCLUSION

This study drew from multiple theoretical perspectives, both related and unrelated to gun ownership, to hypothesize that perceived risk of victimization had a stronger effect on handgun possession than actual victimization risk. This study also hypothesized that this relationship would be stronger for women than men. Numerous studies have found that women are more fearful of crime than men, however it was unclear whether the effect of fear on handgun ownership varies by gender. Studies that consider fear of crime as a motivator of gun ownership have produced contradictory results (Bryant and Shoemaker 1988; DeFronzo 1979; Young 1985; Smith and Uchida 1995; Kleck 1991; Sheley et al. 1994; Cao et al. 1997; DeJong 1997), and even fewer studies that consider risk of victimization also demonstrate inconsistent findings (Cao et al. 1997; Felson and Pare 2010). Using a national sample from 1986 to 2008, this research demonstrated that fear did not have a strong effect on handgun ownership, nor did fear have a stronger effect on handgun ownership than victimization risk.

Results show that predictors of victimization risk are more reliable predictors of handgun possession than indicators of perceived victimization risk. While these results are not conclusive, they offer support for the inclusion of variables of victimization risk in studies of protective gun ownership. The current study aimed to determine whether fear was a strong positive indicator of handgun possession. However, this study found that fear had a negative effect on handgun possession.

The predictors of victimization risk, especially gender and regional crime rate, had highly significant effects on handgun possession, while perceived risk appeared to have absolutely no effect on handgun possession. Those persons in the highest risk categories with respect to age, race, income, were the least likely groups to possess handguns. The significantly

positive correlation between regional crime rate and handgun ownership was consistent with previous research (Bordua and Lizotte 1979; Sheley et al. 1994; Cao et al. 1997; Hepburn et al. 2007; Kleck and Kovandzic 2009). Previous research also supports the finding that men are more likely than women to own handguns (Young 1986; Bryant and Shoemaker 1988; Smith and Smith 1995; Cao et al. 1997; Gleaser and Glendon 1998).

These findings also shed light on how men and women's motivations to obtain handguns compare. Contrary to the research hypothesis, fear affected men and women's handgun possession equally (Tables 3-4). Men and women who feared walking alone at night were about twenty-five percent less likely than those who did not fear to have handguns. Thus as women are more likely to fear crime, they are not necessarily more or less likely than men to obtain a handgun in response to that fear. In contrast, income, age and sociability, affected men and women's handgun possession differently. Men's handgun possession was strongly associated with income, but women's handgun possession was not affected by income. Age had similar effects on men and women's handgun possession, but age had a stronger effect on women's handgun possession than men's. Women who were more sociable were less likely to have handguns, whereas men who were more sociable were more likely to have handguns. Prior studies accounting for risk found contrasting results (Cao et al 1997; Felson and Pare 2010). Results from the present research may help account for this discrepancy as results demonstrate that gender determines how risk affects handgun possession.

Limitations and Suggestions for Future Research

The current research was unable to account for respondents' reasons for keeping handguns. Using handgun ownership as the dependent variable was the best available means for measuring protective gun ownership as most handgun owners reported self-defense as the

primary reason for owning handguns. Also, as handguns are smaller than rifles and shotguns, it was assumed that the smaller firearm was ideal for self-defense (Kleck 1991). Employment status was also considered as a predictor of victimization risk, as persons who are unemployed have a higher risk of victimization than persons who are employed, but when the variable was included in the model the number of valid cases dropped from 2,019 to 814. The inclusion of employment did not yield significant results, so it was excluded from the analysis allowing me to examine a larger sample. Squared and cubed terms for survey year were estimated, however, results showed no substantial variations in slope for these added terms. Thus they were excluded from the analysis.

I also encountered a problem that has limited past researchers in that analysis of the association between fear and gun ownership. The data did not allow me to control the direction of causality for this relationship and the resulting statistics showed that fear did not have a significant impact on handgun possession. One explanation is that once persons acquire firearms, they no longer fear walking alone at night because they have acquired a sufficient means of self-defense. Thus this study's inability to accurately account for when the fear was experienced—before acquiring the handgun or after the handgun was acquired has ultimately yielded insignificant results.

Future research on firearm ownership might consider the implementation of a national survey of gun ownership focused on how perceptions of risk motivate persons to purchase firearms. The current study found that fear partially explained the relationship between sociability and handgun possession, thus, future research may further examine how fear affects people's leisure activities and gun ownership by considering the research question, Do persons that fear crime prefer to acquire handguns for self-defense or do they prefer to reduce the

frequency of their leisure activities instead? Also, the current study found gendered differences in how sociability and income affect men and women's gun ownership. Thus future studies should consider separating men and women when conducting analyses of gun ownership.

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