RESEARCH NOTE

AN EXAMINATION OF THE IMPACT OF VICTIM, OFFENDER, AND SITUATIONAL ATTRIBUTES ON THE DETERRENT EFFECT OF DEFENSIVE GUN USE: A RESEARCH NOTE*

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This study used data on robberies and assaults from the 1992–99 National Crime Victimization Survey to determine whether victim, offender, and situational attributes moderate the deterrent effect of defensive gun use (DGU). The dependent variable examined in the study was victim injury, and the independent variables were victim, offender, and situational attributes, such as whether the victim engaged in DGU, victim gender, the number of offenders, and location of the incident. Multinomial logistic regression analyses indicated that the victim's gender, victim's household income, and location of the incident benefit for some, DGU does not significantly reduce the odds of injury for women or victims residing in low-income homes. The findings also indicate that the deterrent benefit of DGU is limited to urban settings.

Few topics are as hotly debated as those pertaining to the rights and ramifications of citizens' private ownership and use of firearms. Fueled by deep-rooted ideology and diverse political agendas, both sides of the debate continue to present research findings that endorse their policy initiatives and condemn those of the opposition. Recently, controversy has arisen from attempts to determine the prevalence of citizens' defensive use of firearms in response to

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criminal threats or attacks on their person or property (e.g., Cook & Ludwig, 1998). Depending on the data used, estimates of defensive gun use (DGU) have ranged from 55,000 to 2.5 million annual occurrences (Cook & Ludwig, 1998; Hemenway, 1997; Kleck & Gertz, 1995; Smith, 1997). Although the pervasiveness of DGU is important for weighing the societal costs and benefits of a privately armed citizenry, the mere number of DGUs holds little meaning if we do not also understand the dynamic outcomes of this form of resistance to crime.

The research literature has focused on comparing the outcomes of various forms of victim resistance and nonresistance against criminal victimization. It has found that resistance with a firearm is more likely than all other types of resistance, including nonresistance, to prevent a crime from being completed and that armed resistance generally decreases the likelihood that a victim will be injured during the course of the victimization (Kleck, 1988, 1997; Kleck & Delone, 1993; Kleck & Gertz, 1995, 1997; Kovandzic, Kleck, & Gertz, 1998; Lott, 1998).

Unfortunately, although Wolfgang (1958) noted that violent criminal incidents and their outcomes are a complex interaction between victims' and offenders' attributes and incident-specific characteristics, studies have not examined the effects of such variables on DGU outcomes. For example, armed resistance against an offender who is immersed in a "gang culture" could increase the likelihood of injury or property loss. Likewise, an old woman may be less capable than a young man of successfully defending herself with a firearm during a criminal victimization. This article examines how the likelihood of DGU outcomes differs on the basis of a set of theoretically relevant variables. Without understanding the factors that shape the consequences of armed resistance to crime, debates about the prevalence of armed resistance will provide little insight into the policy and public health concerns generated by our nation's high level of gun violence.

BACKGROUND

Most studies of victims' resistance have focused on the crime of robbery. Ziegenhagen and Brosnan (1985), who were the first to examine different kinds of forceful and nonforceful resistance, found that all forms of resistance lowered the probability that a victim would lose property as a result of the offense and that armed resistance was more likely to prevent property loss than unarmed resistance. These findings were supported by Kleck (1988), who found that resistance of any kind was better that nonresistance, but that victims who defended themselves with guns were most likely to drive away the offenders before the crimes were completed. In general, it appears that victims' resistance, especially resistance with guns, deters robbers from stealing victims' property (see also Kleck & Delone, 1993).

In addition to preventing property loss, armed resistance is commonly associated with a lower likelihood of the victims being injured than is compliance or other forms of resistance (Kleck, 1988, 1997; Kleck & Delone, 1993; Kleck & Gertz, 1995, 1997; Kovandzic et al., 1998; Lott, 1998). However, previous research (summarized in Kleck & Delone, 1993) has led some researchers to speculate that victims' resistance may provoke violence from offenders with no prior intention of causing injury. Block (1977) and Kleck (1988) presented findings contrary to this notion of victim-precipitated injury. They reported that a victim's resistance often occurs only after the offender has initiated a violent attack. Such evidence suggests that a violent offender's behavior may actually induce a victim's resistance.

Individual Variations in DGU Outcomes

Although findings suggest that victims benefit from armed resistance, both the variability of DGU outcomes and the roles that the victims and offenders play in this variability have remained largely unexplored. When one considers the polarizing nature of the American gun debate, it is easy to recognize how such an oversight could occur. That is, firearms and their use are argued to be unequivocally good or bad, leaving little room for notions of variability in their use. Nevertheless, the fact that guns are tools ensures individual variation in both their use and its outcomes. Just as a 60year-old woman and a 5-year-old child cannot use a 12-pound sledgehammer as effectively as a 25-year-old man or woman, not everyone is capable of fully capitalizing on the deterrence that a firearm may provide. To provide its maximum deterrent effect, a gun must be firmly held in one's hands, swiftly yet accurately aimed, displayed with intent to fire, and then controlled during firing. All these responsibilities fall squarely on the shoulders of the victim, not the weapon. Thus, regardless of a gun's appearance or caliber, its deterrent effect is partially contingent on various physiological attributes of the individual who is holding it. Individual differences, such as strength, reflexes, eyesight, and dexterity, make implausible the assumption that firearms provide uniform advantage or disadvantage to the variety of persons who make use of them.

Willingness to Shoot

The willingness actually to fire a weapon in self-defense is an important element in the outcomes of armed resistance to crime. The deterrent effect of DGU is positively associated with the potential for the offender to be wounded or killed by a bullet. If this potential does not exist, as is the case with a victim who is unwilling to fire, then a gun should be no more of a deterrent than any blunt object. However, the effectiveness of DGU is not entirely contingent on a victim's willingness to fire. As long as the offender believes that the victim may pull the trigger, the weapon will remain a deterrent. It is reasonable to assume, however, that offenders are capable of assessing victims' reluctance to shoot by observing the manner in which victims defend themselves. For example, the statement, "Please don't make me use this!" conveys a greater reluctance to fire than the warning, "One more step, and I'll blow your head off!" If the offender perceives that the victim is reluctant to fire, then the display of the firearm will provide less than its full deterrent effect, and the offender is less likely to be dissuaded from completing the crime. Therefore, armed resistance should be less effective for victims who are reluctant to fire than for those who are willing to discharge their weapons in defense of themselves or their property.

A significant correlate of the willingness to shoot that has been reported in the research literature is gender. Whitehead and Langworthy (1989) found that women were less willing than men to fire on nighttime intruders in their homes. Of all the variables included in Whitehead and Langworthy's study (including age, race, education, and prior victimization), gender was the strongest predictor of a willingness to shoot. Other studies have also found that women are significantly less likely than men to engage in violent resistance, especially resistance with a weapon (Block & Block, 1991; Marshall & Webb, 1992).

The Role of the Offender in DGU Outcomes

Despite a focus on the characteristics of victims in studies of resistance to crime, offenders' attributes also play a significant role in the outcomes of defensive behaviors. If an offender is armed, any deterrent effect of a victim's gun may be mitigated or eliminated. Moreover, armed resistance against an armed offender may result in greater injury for the victim. Kleck and Delone (1993), however, demonstrated that armed robbers are less likely than unarmed robbers to injure their victims, indicating that the lethality of offenders' weapon is inversely related to the prevalence of victims' injuries. The explanation of this finding is that offenders use violence primarily as a means of gaining victims' compliance during the initial stages of criminal events (e.g. Wright & Decker, 1997). For an armed offender, the mere display of a firearm generally procures the victim's compliance, and the use of force becomes unnecessary and indeed inexpedient. When an armed offender encounters an armed victim, however, the stakes for gaining control are significantly raised. Neither the offender nor the victim is likely to submit at the sight of the other's gun because the power dynamic between the two is now balanced. Therefore, an armed offender who is facing a victim's gun is forced either to use his weapon or to flee the scene. Consequently, it is apparent how armed resistance against an armed offender may present the greatest likelihood for the severe injury or even death of a victim.

The number of offenders should also have an impact on the outcomes of armed self-defense. Multiple offenders have many advantages over single offenders, such as those pertaining to the size and strength of a group as compared to that of an individual, as well as numerous tactical advantages, such as the ability to launch an attack simultaneously from many directions. Because of these advantages, it is more difficult to defend oneself from numerous offenders than from a single offender, and, therefore, DGU incidents involving multiple offenders should have a significantly lower probability of success than those involving a single offender.

As with victims, the psychological processes of offenders—particularly the estimation of the costs and benefits of behavior—are important elements of DGU outcomes. Research has demonstrated that most offenders respond to victims' resistance by leaving the scene before the offenses are completed (Kleck, 1988, 1991, 1997; Kleck & Delone, 1993). Viewed through a rational-choice/deterrence framework, this finding would indicate that in the eyes of the typical offender, the costs of facing an armed victim (the potential of being injured or killed) outweigh the potential benefits of such conduct. However, the result of this rational calculus is not uniform across all offenders.

In a discussion of honor in his study of Philadelphia homicides, Wolfgang (1958, pp. 188-189, quoted in Cooney, 1998, p. 114) noted that "The significance of . . . a weapon in the hands of an adversary [is a stimulus] differentially perceived and interpreted by . . . lower socio-economic males of both races." This differential perception may be attributed to the norms and values inherent in a "culture of honor." Honor cultures, comprised of society's powerless—namely, young and poor urban residents—place supreme value on traits of masculinity, toughness, and fearlessness. In addition, they are founded on a code of conduct that prescribes the use of violence in response to conflicts that involve a perceived breach of honor (Anderson, 1999; Cooney, 1998; see also Polk, 1994).

An excellent example of an honor culture in American society is the street gang. Because of their honor culture membership, gang offenders are likely to view victims' resistance differently from other types of offenders. Gang members may perceive victims' resistance as a threat to the honor on which they base their identities. Because members of honor cultures value the tenets of honor above all else—including personal safety—the costs of facing an armed victim would not outweigh the costs associated with losing honor if the offender were to flee. Thus, the rational calculus of gang offenders is such that the use of a firearm is unlikely to be a sufficient deterrent. Indeed, resistance against gang offenders may actually increase the probability of victims' injury.

Although the street gang is perhaps the purest embodiment of an honor culture, Anderson (1999) illustrated that the "code of the street" extends well beyond the boundaries of organized delinquent groups. In impoverished and alienated urban neighborhoods, where the authority of the law has been greatly weakened, ordinary citizens also become indoctrinated into a culture of honor. These individuals, however, use the rules of honor as a means of selfpreservation. According to Anderson (1999, p. 10), "Possession of respect—and the credible threat of vengeance—is highly valued for shielding the ordinary person from the interpersonal violence of the street." In other words, honor cultures make their members highly willing to use violence, which, in turn, makes them less attractive as targets of crime and violence. Wright and Decker (1997) presented evidence that the threat of vengeance intrinsic to honor cultures may indeed deter the violent victimization of its members. Several of the armed robbers that Wright and Decker studied preferred to victimize whites because they believed that poor and urban black victims posed a more credible threat of resistance. Expressing this belief, one offender was quoted as saying: "[Whites] usually don't resist. A black person will try and grab the gun out of your hand. They will make you shoot them if you have to. . . . Black people say, 'I don't care if you do have a gun. . . . No, you got to kill me. You ain't gonna take my money like that'" (Wright & Decker, 1997, p. 84).

Although members of an honor culture may be less attractive as potential victims of crime and violence, their residence in highcrime urban neighborhoods often makes them targets by default. In instances in which *both* the victim and offender are members of an honor culture, as are likely to occur in such low-income urban settings, the predicted relationship between DGU and the honor culture becomes somewhat ambiguous. The honor culture may increase the effectiveness of DGU through its effects on victims (an increased willingness to use violence), or it may decrease the effectiveness of DGU through its impact on offenders (a reluctance to back down in the face of conflict). However, on the basis of evidence that offenders are deterred by what they perceive to be a credible threat of violent resistance from poor urban victims (Wright & Decker, 1997), the more plausible scenario may be that the "code of the street" will increase the effectiveness of armed resistance to crime in urban settings.

Finally, the impact of drug and alcohol use on an offender's ability to weigh rationally the costs and benefits of behavior must be considered. Offenders who are drunk or high at the time of the offense have a diminished capacity for rational thought, as well as distorted perceptions of risk and reward. It has also been noted that the pharmacological effects of drugs, particularly alcohol, may induce aggressive responses from individuals who are facing conflict (Oliver, 1994). Therefore, armed self-defense against an offender on drugs or alcohol should have a lower probability of success than should resistance against other types of offenders.

The hypotheses tested in the present research were derived largely from deterrence theory. As was noted earlier, although firearms are traditionally referred to as great equalizers, the fact that they are tools ensures individual variation in their capacity to deter victimization. The defensive use of a firearm should not have a uniform deterrent effect because of individual variations in the physical abilities required to make use of a firearm most effectively. Therefore, a victim's age should moderate the negative relationship between DGU and a victim's injury (the deterrent effect of DGU), with victims aged 60 or above receiving significantly less benefit from armed resistance to crime. Victims' attitudes should also play a role in the deterrent effect of armed resistance to crime. The willingness to fire a gun defensively is likely to be reflected in the actions of an armed victim and influence the outcomes of a DGU. Victim's gender should therefore moderate the deterrent effect of DGU, resulting in women benefiting less than men from their participation in armed self-defense. Offenders' characteristics are also likely to moderate the deterrent effect of DGU. An offender's gun, as well as the presence of multiple offenders, will reduce the ability of DGU to prevent injury during assault or robbery incidents. If an offender is enmeshed in a belief system that encourages violence,

such as a street gang, or is temporarily incapable of rationally calculating risk because of drug use, the deterrent benefit of DGU will again be moderated and reduced. Finally, the relationship between DGU and injury is likely moderated by the location of the incident. In urban areas where honor culture is prevalent, the elevated willingness of victims to use force, coupled with offenders' perceptions of this willingness, should increase the overall deterrent effect of DGU. In the following sections, I examine how these victim, offender, and situational attributes moderate the deterrent effect of armed resistance to crime.

DATA AND METHODS

The data used in the study were from the National Crime Victimization Survey (NCVS), conducted by the U.S. Bureau of the Census for the Bureau of Justice Statistics, and were obtained through the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan (see U.S. Department of Justice, 2000). The NCVS uses a stratified multistage cluster sampling design to select a probability sample of approximately 50,000 housing units (with approximately 80,000 respondents) in the United States. The survey uses a rotating panel design and interviews housing units included in the sample once every six months for a three- to five-year period. The target population of the NCVS is all persons aged 12 or older residing in U.S. households. The NCVS interviewer initially asks household respondents if they have been the victims of a crime during the past six months. If a respondent reports a threatened, attempted, or completed criminal victimization, the interviewer then gathers specific details on the incident.

Although the NCVS is a rich data set, its suitability for measuring the phenomenon of armed resistance to crime has been vigorously debated in the research literature. As was previously mentioned, there is considerable controversy about the annual frequency of DGUs, with estimates ranging from 55,000 to 2.9 million occurrences per year (Cook & Ludwig, 1998; Hemenway, 1997; Kleck & Gertz, 1995; Smith, 1997). The source of this controversy is the data used to calculate DGU estimates. Estimates of 80,000 incidents have come from the NCVS, whereas much higher estimates have been derived from self-report instruments, such as the National Self-Defense Survey.

Because the NCVS uncovers far fewer DGUs than virtually all other self-report surveys of gun use, critics have claimed that it contains an extremely high number of false-negatives (Kleck & Gertz, 1995, 1997; Smith, 1997). That is, NCVS respondents fail to report their DGUs to interviewers for fear of exposing illegal behaviors or out of uncertainty that their actions were legally justified. Critics also attribute possible NCVS undercounts to the fact that the NCVS, unlike the self-report DGU surveys, does not specifically ask the respondents if they have defensively used guns. Rather, the NCVS first asks the respondents if they have been the victims of attempted or completed crimes. Of the respondents who report being victimized, only those who report that they saw the offenders are then questioned about any self-protective actions they might have taken. If a large number of DGUs occur in response to crimes not included within the scope of the NCVS (such as trespass and other minor infractions), then the NCVS is unfit for estimating the prevalence of armed resistance to crime (Kleck & Gertz, 1995).

Although the NCVS may undercount DGUs, other survey instruments are likely to overestimate their frequency (Cook & Ludwig, 1998; Hemenway, 1997; Smith, 1997). A definite strength of the NCVS is that it is bounded from each six-month interview. As a result, the respondents are less likely to "telescope," that is, include events beyond the designated recall period in subsequent interviews. Self-report DGU surveys do not have this capability, and some have argued that the variation in DGU estimates may be a by-product of memory telescoping (Cook & Ludwig, 1998).

Utilizing an experimental design to study the disparity in DGU estimates, McDowall, Loftin, and Presser (2000) demonstrated that the differences between NCVS and self-report DGU estimates are partially attributable to the fact that the surveys measure intrinsically different types of defensive behavior.¹ Because the NCVS questions only crime victims about their self-protective behaviors. DGUs captured by the survey consist entirely of armed resistance in response to crime. The self-report surveys, on the other hand, appear to measure a much broader array of defensive behavior. These surveys include respondents' reports of preemptive armed defense directed at suspicious persons who had not yet made clear any criminal intentions toward the victims. The goal of such behavior was to engage the potential offender *before* he or she has the opportunity to commit a crime. Unfortunately, victims cannot be certain that a crime would have occurred had they not taken selfprotective actions. In those situations in which a crime would not have occurred anyway, the victim's use of a firearm fails to meet any standard for armed resistance to crime. On the basis of this

¹ McDowall et al. (2000) also found that methodological differences between the two types of surveys account for some of the range in DGU estimates. However, the proportion of variation accounted for by different methodologies and different questions is unknown.

standard, it appears that the NCVS does provide the more valid measure of armed resistance to crime.

To construct the current study's sample, I selected only assault and robbery incidents from the 1992–99 NCVS.² Doing so created a sample of 18,706 incidents to be included in subsequent analyses. There were two reasons for constructing the sample with these types of crime. First, robbery and assault are the types of predatory personal victimizations that should exemplify the benefits generally associated with DGU (a lower likelihood of both victim injury and property loss). Second, on the basis of the NCVS data, DGU occurs most frequently in response to these kinds of criminal victimizations. Of the 276 DGU incidents reported in the 1992–99 NCVS, 227 were in response to crimes against persons, and of these 227, 184 occurred during a robbery or assault.³

The dependent variable examined in the study was whether victims sustained injuries during the course of their victimizations. Victim injury was operationalized as a trichotomous variable indicating whether victims were severely injured (enough to have received medical care), mildly injured (injured but did not receive medical care), or not injured at all. Because DGU may either prevent injury or merely reduce the severity of injuries sustained by victims, the use of a trichotomous measure is advantageous because it allowed me to examine either of these possibilities. Therefore, given the nature of the dependent variable and the manner in which the research question was framed, the appropriate statistical methodology for the analyses was multinomial logistic regression (DeMaris, 1995).

The independent variables represented victim, offender, and situational attributes, and each was measured as a binary variable. The key independent variable was whether or not an incident involved a victim who either used or threatened to use a gun in self-defense (DGU = 1, no DGU = 0). Other independent variables included victim gender (female = 1, male = 0), victim age 60 or older (age 60 or older = 1, age 59 or younger = 0), multiple offenders (multiple offenders = 1, single offender = 0), offender had a gun (gun = 1, no gun = 0), victim presumed that the offender was a gang offender (gang member = 1, nongang = 0), victim presumed that the offender was drinking alcohol or using drugs at the time of the offense (either drinking or drugs = 1, neither drinking nor drugs = 0), and

 $^{^2\,}$ Although the results are not reported, the study's analyses were also conducted using a sample of all personal crime incidents included in the 1992–99 NCVS. The results were nearly identical to those obtained using the assault-and-robbery subsample.

 $^{^3}$ Approximately 1% of the robbery and assault incidents involved a victim who engaged in DGU, compared with .5% for other types of personal victimizations.

incident occurred in an urban setting (urban = 1, rural = 0).⁴ Because the NCVS is a victim-based survey, measures of offenders' attributes, such as gun or drug use are based solely on victims' assumptions about the offender. These measures may therefore have questionable validity. Control variables included in the study were victim socioeconomic status (victim's reported household income was in the bottom 20th percentile = 1, victim's reported household income was in the upper 80th percentile = 0),⁵ and both victim's and offender's race (black = 1, nonblack = 0).⁶

RESULTS

Frequency distributions for the dependent, independent, and control variables are presented in Table 1. As the table illustrates, 66.5% of the study's assault and robbery incidents did not result in any form of injury to victims. Incidents involving mild injury were the next most frequent category at 18.6%, and severe injury was the least likely outcome, with only 14.9% of the 18,706 incidents involving an injury serious enough for the victim to seek medical attention. Approximately 1% of the sample incidents involved a victim who engaged in self-protective behaviors with a firearm. Forty-two percent of the incidents involved female victims, while 13.6% involved black victims.

Table 2 displays the results of a cross-tabulation between DGU and the other variables included in the study. It provides an instructive look at the types of victims and situations that were most likely to involve a DGU and cursory evidence of the relationship between armed resistance and injury. It is interesting to note that approximately 21% of the reported DGU incidents involved female victims. This percentage is similar to previously noted distributions of female gun ownership (Smith, 1997). Table 2 also indicates that DGU was approximately twice as likely in situations involving single or unarmed offenders and that over three times as many DGUs occurred in urban settings as in rural ones. The results of chi-

⁵ Missing values for victim's household income were replaced with the calculated median household income before percentiles were estimated.

⁴ Responses of "don't know" for these variables were coded as "no" responses. For example, if a victim reported that he or she did not know if an offender was a gang member, then the gang offender variable was coded as nongang. This coding procedure, applied to the offender gun, multiple offenders, offender gang, and offender drinking/drugs variables, was used to minimize the loss of valid cases available for analysis. It is important to note that these coding procedures do not alter appreciably the conclusions drawn from the study's analyses. Models were estimated in which the "don't knows" were treated as distinct categories, and the results (not shown), both for the main effects and for the interactions examined, were nearly identical to those reported later.

⁶ Multiple offender incidents were coded by the race of the majority of offenders. Three cases with an equal number of black and white offenders were coded as involving a black offender.

Variables	Frequency	Percentage
No injury	12,435	66.5
Mild injury	3,477	18.6
Serious injury	3,794	14.9
DGU	184	1.0
Non-DGU	18,522	99.0
Victim 60+	550	2.9
Victim < 60	18,156	97.1
Female victim	7,850	42.0
Male victim	10,856	58.0
Offender gun	2,471	13.2
No offender gun	16,235	86.8
Multiple offenders	4,506	24.1
Single offender	14,200	75.9
Gang offender	1,670	8.9
Nongang offender	17,036	91.1
Offender drugs	5,766	30.8
No offender drugs	12,940	69.2
Urban	15,342	82.0
Rural	3,364	18.0
Victim household income bottom 20th percentile	4,912	26.3
Victim household income upper 80th percentile	13,749	73.7
Black victim	2,545	13.6
Nonblack victim	16,161	86.4
Black offender	5,286	28.3
Nonblack offender	13,420	71.7

Table 1. Frequencies of Dependent, Independent, and
Control Variables (N = 18,706)

square analyses (not shown) indicated that all these differences were statistically significant. As for the relationship between DGU and injury, approximately 10.3% of the DGU incidents involved victims who were severely injured, while another 8.7% involved those who sustained mild injuries; 81% of DGU incidents resulted in no injury at all. The percentage of non-DGU incidents that involved either severe or mild injury were significantly higher (chi-square results not shown) than their DGU counterparts—with 15% resulting in severe injury and 18.7% resulting in mild injury. On the basis of this evidence, it appears that DGU reduces one's likelihood of sustaining either a severe or mild injury during the course of a criminal victimization.

To explore this finding further, I estimated a multinomial logistic regression model that contrasted the log odds of serious injury, mild injury, and no injury, respectively. The results are found in Table 3. As this table shows, the DGU coefficients are negative and statistically significant in both the "serious versus no injury" and "mild versus no injury" models. Assault and robbery incidents involving a DGU had odds of severe or mild injury, respectively, which were 39% (39% = $100(e^{-.49})-1$) and 51% (51% = $100(e^{-.71})-1$) lower than their non-DGU counterparts. In other words, engaging in DGU significantly reduced the odds that a victim would sustain

		DGU				
		No	Column %	Yes	Column %	Total
Victim injury	Severe	2,775	15.0	19	10.3	2,794
	Mild	3,461	18.7	16	8.7	3,477
	None	12,286	66.3	149	81.0	12,435
	Total	18,522	100.0	184	100.0	18,706
Victim age 60+	No	17,982	97.1	174	94.6	18,156
-	Yes	540	2.9	10	5.4	550
	Total	18,522	100.0	184	100.0	18,706
Female victim	No	10,711	57.8	145	78.8	10,856
	Yes	7,811	42.2	39	21.2	7,850
	Total	18,522	100.0	184	100.0	18,706
Offender gun	No	16,108	87.0	127	69.0	16,235
0	Yes	2,414	13.0	57	31.0	2.471
	Total	18,522	100.0	184	100.0	18,706
Multiple offenders	No	14,082	76.0	118	64.1	14.200
•	Yes	4,440	24.0	66	35.9	4.506
	Total	18,522	100.0	184	100.0	18,706
Gang offender	No	16,879	91.1	157	85.3	17.036
	Yes	1,643	8.9	27	14.7	1.670
	Total	18.522	100.0	184	100.0	18,706
Offender drugs	No	12,845	69.3	95	51.6	12.940
0	Yes	5.677	30.7	89	48.4	5,766
	Total	18.522	100.0	184	100.0	18,706
Urban	No	3,320	17.9	44	23.9	3.364
	Yes	15.202	82.1	140	76.1	15,342
	Total	18,522	100.0	184	100.0	18,706
Low-income home	No	13.646	73.7	148	80.4	13,794
	Yes	4.876	26.3	36	19.6	4,912
	Total	18,522	100.0	184	100.0	18,706
Black victim	No	16.003	86.4	158	85.9	16,161
	Yes	2,519	13.6	26	14.1	2 545
	Total	18.522	100.0	184	100.0	18,706
Black offender	No	13.324	71.9	96	52.2	13,420
	Yes	5.198	28.1	88	47.8	5.286
	Total	18,522	100.0	184	100.0	18,706

Table 2.Cross-tabulation of DGU and Victim, Offender,
and Situational Attributes

any type of injury. This finding is highly consistent with previous findings on the relationship between DGU and victim injury (Kleck, 1988, 1997; Kleck & Delone, 1993; Kleck & Gertz, 1995, 1997; Kovandzic et al., 1998; Lott, 1998). However, the fact that the DGU was nonsignificant in the "severe versus mild injury" model indicates that although DGU reduced the odds of injury overall, it did not reduce the seriousness of injury among those who were injured.⁷

⁷ When interpreting these findings, however, one must keep in mind that because of the scope of the NCVS, incidents in which the offender killed the victim were excluded from the analysis. It is possible that including DGU and non-DGU incidents in which the victim died would substantively alter both the study's findings and the conclusions that one would draw from them.

	Serious Injury Vs. No Injury		Mild Injury Vs. No Injury		Serious Injury Vs. Mild Injury	
Predictors	В	Exp(b)	b	Exp(b)	Ь	Exp(b)
DGU	49*	.61	71**	.49	.22	1.25
Victim 60+	07	.94	41^{**}	.66	.34*	1.41
Female victim	.22**	1.24	.36**	1.44	15**	.86
Offender gun	-1.08^{**}	.34	-1.61^{**}	.20	.54**	1.71
Multiple offenders	.35**	1.42	.04	1.04	.31**	1.36
Gang offender	.12	1.13	.08	.92	.20*	1.22
Offender drugs	.38**	1.46	.27**	1.31	.11*	1.11
Urban	.04	1.04	06	.95	.09	1.10
Low income home	.31**	1.37	.24**	1.27	.07	1.07
Black victim	.38**	1.47	02	1.00	.39**	1.47
Black offender	.02	1.00	19**	.83	.19**	1.21
Constant	-1.86^{**}		-1.33^{**}		52^{**}	_
Degrees of freedom	22		22		22	
-2 log likelihood	1058.84		1058.84		2786.36	
Model significance	.00		.00		.00	

Table 3.Multinomial Logistic Regression Model for the
Log Odds of Victim Injury (N = 18,706)

 $*p \le .05, **p \le .01$ (two tailed).

Although not the focus of the present study, other interesting patterns emerge in Table 3 that are noteworthy. Assault and robbery incidents involving female victims had odds of severe or mild injury (as compared to no injury) that were significantly greater than those involving male victims. However, a significant negative coefficient for the "serious versus mild injury" model suggests that of those victims who were injured, females were significantly less likely than males to sustain a severe as compared to a minor injury. The strongest predictor of the log odds of victim injury estimated in Table 3 was whether or not the offender was armed. Incidents in which the offender was armed were significantly less likely to result in either a severe or mild injury (66% less and 80% less, respectively). This finding supports the notion that the lethality of an offender's weapon is inversely related to the prevalence of victim injury. However, the model comparing only those victims who were injured suggests that when armed offenders did inflict injuries, those injuries were most likely to be severe. Other findings reported in Table 3 that deserve brief mention are that multiple offender incidents had significantly greater odds of severe injury than no injury and that among those who were injured, multiple offenders increased the odds of a severe injury. Finally, incidents involving victims from poor households had odds of severe and mild injury that were significantly greater than those of victims from wealthier homes. However, household income played no significant role in either increasing or decreasing the odds of a severe injury, given that an injury was sustained.

The negative relationship between armed victim resistance and victim injury reported in Table 3 illustrates the deterrent effect of DGU to which the research literature has often referred. The central objective of the present study was to evaluate whether various victim, offender, and situational attributes moderate this deterrent effect in a meaningful way. To test the hypotheses outlined earlier, the multinomial logistic regression models shown in Table 3 were reestimated with the relevant two-way interaction terms. The interaction terms represent the product of the DGU variable and the various moderating variables considered in the analyses (victim gender, victim age, offender gun, urban setting, and so forth). These interaction terms were considered one at a time (in all, 10 multinomial models were estimated) in models that also included all the independent variables included in Table 3; only the resulting DGU and interaction coefficients from each model are reported in Table 4.

As seen in Table 4, the urban interaction coefficients in the "serious versus no injury" and "mild versus no injury" models were the sole coefficients to be estimated as statistically significant at the .05 level (two tailed). These coefficients signify that the location of the victimization (urban versus rural) significantly influenced the deterrent effect of DGU. More specifically, the results indicate that the effect of DGU on severe injury was -.77 in urban areas, compared to .26 in rural areas. From this evidence, it appears that urban DGUs decreased the odds of severe injury compared to no injury, while rural DGU increased these odds. To substantiate this finding further, separate multinomial models for the urban and rural incidents were estimated (both the "severe versus no injury" and "mild versus no injury" models were reestimated separately for urban and rural incidents, respectively). Again, these models included all the study's independent variables (except for the urban/rural variable, because it would have been invariant in both models). As illustrated by the results of the urban and rural "severe versus no injury" models in Table 5, the estimated DGU coefficients confirmed the initial interaction results by indicating that rural DGUs increased the likelihood of severe injury as compared to no injury, though this finding was nonsignificant (b = .311, p = .485), while DGUs occurring in urban environments significantly lowered the odds of severe victim injury (b = -.775, p = .012). Although not reported, the results of the "mild versus no injury" models also indicated that while DGU significantly reduced the likelihood of mild injury in urban areas, no such relationship existed for rural DGUs.

Although not quite statistically significant, some of the results reported in Table 4 appear to be meaningful, especially considering

	Serious Injury Vs. No Injury		Mild Injury Vs. No Injury		Serious Injury Vs. Mild Injury	
Predictors	В	Exp(b)	ь	Exp(b)	Ь	Exp(b)
DGU	49 ^b	.62	67**	.51	.18	1.20
DGU x victim 60+ ^a	15	.86	-18.12	1.35E-8	18.97**	1.72E-8
DGU	83**	.43	66*	.52	18	.84
DGU x female victim	.97 ^b	2.65	17	.85	1.14	3.12
DGU	51^{b}	.60	84**	.43	.34	1.40
DGU x offender gun	.03	1.03	.90	2.46	87	.42
DGU	55	.58	95**	.39	.40	1.50
DGU x multiple offenders	.15	1.17	.66	1.93	51	.60
DGU	45	.64	81**	.45	.36	1.43
DGU x gang offender	34	.71	.67	1.95	-1.00	.37
DGU	52	.59	-1.07*	.35	.54	1.17
DGU x offender drugs	.07	1.07	.58	1.78	51	.60
DGU	.26	1.29	.05	1.05	.21	1.23
DGU x urban	-1.03*	.36	-1.10*	.33	.07	1.08
DGU	79**	.46	77**	.46	02	.98
DGU x low income home	.97°	2.64	.29	1.33	.69	1.99
DGU	60*	.55	80**	.45	.20	1.22
DGU x black victim	.51	1.66	.54	1.72	.04	.96
DGU	31	.73	52	.59	.21	1.23
DGU x black offender	39	.68	50	.61	.11	1.11

Table 4.DGU and DGU Interaction Coefficients for
Various Multinomial Logistic Regression Models
of the Log Odds of Victim Injury (N = 18,706)

Note: Each DGU term and its corresponding interaction term were placed in a multinomial logistic regression model that included all of the study's independent variables.

^a Because of the low frequency of DGU involving old victims, this interaction term created separation in the model from which the reported coefficients were estimated. ^b The coefficient is significant at .06 (two tailed).

° The coefficient is significant at .07 (two tailed).

 $*p \le .05, **p \le .01$ (two tailed).

the acknowledged statistical difficulties in detecting interactions and moderating effects using nonexperimental designs (e.g., Mc-Clelland & Judd, 1993). The first of these potentially important findings concerns the moderating effect of victim gender. The DGU*female interaction coefficient of .97 (p = .060, two tailed) indicates that the deterrent effect of DGU for robbery and assault incidents likely differs by the victim's gender. Summing the DGU and interaction coefficients to determine the effect of DGU for females indicates that not only is DGU nonbeneficial for women, but such behavior may actually increase the odds of severe injury. The appropriate manner to explore this finding further was again to estimate separate models for each category of the moderator variable (in this case, victim gender). Table 5 displays the results of these model estimations. The "all-female" model revealed that female DGU incidents did not significantly alter the odds that the victim would sustain a severe injury compared to no injury (b = .138, p =.728). By comparison, the DGU coefficient in the male-only sample was strongly and significantly related to severe victim injury. The male DGU coefficient of -.840 (p = .012) indicates that men who engaged in DGU had odds of severe injury that are 57% lower than their non-DGU counterparts. These findings illustrate that although DGU provided a significant deterrent effect for men by reducing the odds of severe injury compared to no injury, it provided no such benefit for women and may have actually increased women's odds for injury.

Table 5.Coefficients for Various Multinomial Logistic
Regression Models of the Log Odds of Serious
Injury vs. No Injury Using Samples Censored on
the Study's Moderating Variables

Predictors	Urban Sample	Rural Sample	Female Sample	Male Sample	Low- Income Sample	Upper- Income Sample
DGU	78*	.31	.14	84*	.13	77*
Victim age 60+	05	18	.00	10	03	09
Female victim	.20**	.29**			.21**	.21**
Offender gun	-1.00**	-1.64**	-1.24**	-1.00**	-1.14^{**}	-1.04**
Multiple offenders	.32**	.50**	02	.54**	.15	.43**
Gang offender	.19*	36	.11	.13	.20	.09
Offender drugs	.35**	.50**	.57**	.22**	.45**	.34**
Urban	_		.02	.05	11	.09
Low-income home	.28**	.45**	.32**	.28**		
Black victim	.39**	.18	.40**	.38**	.36**	.35**
Black offender	.00	.01	06	.04	.21*	08
Constant	-1.80**	1.96**	-1.61**	-1.88**	-1.47 **	-1.88**
N	15,342	3,364	7,850	10,856	4,912	13,794
Degrees of freedom	20	20	20	20	20	20
-2 log likelihood	2009.97	746.36	1186.86	1499.89	1154.10	1604.66
Model significance	.00	.00	.00	.00	.00	.00

* $p \leq .05$, ** $p \leq .01$ (two tailed).

Another potentially meaningful finding reported in Table 4 involves the DGU*low-income household interaction coefficient estimated in the "serious versus no injury model." This coefficient of .97 (p = .07) signifies that the deterrent effect of DGU is weaker for victims who reside in low-income households than it is for their nonpoor counterparts and that DGU may slightly increase the odds of injury for poor victims. Again, separate multinomial logistic regression models were estimated for the two categories of victim's household income. Reported in Table 5, the results of these analyses demonstrate that the effect of DGU on severe injury was non-significant for victims living in poor households. On the other hand, DGU was highly effective at reducing the odds of severe injury for victims residing in nonpoor households (b = -.774, p = .016).

None of the hypothesized interactions and moderating effects of offenders' attributes was supported by the results reported in Table 4.⁸ It would appear that the deterrent effect of DGU is the same whether or not you are victimized by an armed offender, a presumed gang member, multiple offenders, or an offender who is presumed to be under the influence of drugs or alcohol. Race of the victim and race of the offender also did not moderate the relationship between gun use and injury. The victim age interaction variable was both statistically insignificant and somewhat problematic. Because of the low frequency of older victims who engaged in DGU, this interaction term created partial separation in the model and, in turn, resulted in grossly inflated coefficients and odds ratios for the "mild versus no injury" and "severe versus mild injury" models.

DISCUSSION

The aim of the study was to determine whether or not various victim, offender, and situational attributes moderate the deterrent benefit of DGU. In other words, does DGU provide uniform benefit for all persons in all places in all types of incidents? Or do incidentspecific characteristics, such as race, gender, and number of offenders, significantly alter the effectiveness of armed resistance to crime? Overall, the results of the statistical analyses indicate that many incident-specific characteristics, particularly offenders' characteristics, do not appear to moderate the relationship between DGU and injury to victims.

None of the DGU*offender attribute interaction terms was estimated as significant in any of the multinomial logistic regression analyses. However, when interpreting these findings, it is also important to keep in mind the acknowledged difficulty in finding significant moderator effects using a nonexperimental design (McClelland & Judd, 1993). The analyses indicated that DGU was equally effective against single and multiple offenders, perhaps suggesting that the physical and tactical advantages that multiple offenders have over a single offender were made inconsequential by the presence of a victim's firearm. The presence of an offender's gun also failed to alter significantly the odds that a DGU would result in

⁸ Considering the statistical difficulties of detecting interactions and moderator effects (e.g., McClelland & Judd, 1993), the study's inability to uncover these hypothesized moderating effects is not entirely unexpected. As McClelland and Judd demonstrated, the use of a nonexperimental design makes the detection of interactions much more difficult than with experimental designs. They attributed the difference between the two designs to "the differential residual variances of such interactions once the component main effects have been partialed out" (p. 376). In the end, the authors remind us that researchers who seek to discover interaction or moderating effects using a nonexperimental design must keep in mind that the odds are not in their favor.

injury. Although a highly interesting finding, it is one whose interpretation becomes somewhat clouded when one considers that incidents in which the victim died are not included in the NCVS. An offender's drug and alcohol use also does not appear to make a DGU incident more dangerous for the victim. Despite a diminished capacity for rational thought, offenders who were on drugs or alcohol were no more likely to injure resisting victims than were their nondrug counterparts.

The study's inability to estimate a significant gang interaction demonstrated that presumed gang offenders responded to armed resistance in a manner indistinguishable from other types of resistance or compliance. As was noted earlier, a possible explanation for this finding is that victims' perceptions of offenders' attributes, particularly gang membership, are inaccurate or biased.⁹ If we assume that the study's gang measure is valid, the lack of a significant moderating effect may be explained another way. Some evidence suggests that the maintenance of honor may outweigh personal safety only in the presence of third parties. Cooney (1998) noted that the presence of third parties increases the probability that disputes over honor will result in violence. If others are not present to verify your display of honor in the face of an armed victim, it may not be worth risking your life. The reverse also holds true. Acts of cowardice can become known only if they are witnessed by others. Since co-offenders are witnesses and may help reinforce the code of honor, incidents involving a single gang offender may be less likely than those involving multiple gang offenders to end in violence. Since only half the sample's gang incidents involved multiple offenders, any significant effect of the honor culture may have been muted by those cases involving single gang offenders.

Although many of the hypothesized interactions and moderating effects were undetected by the study's analyses, some meaningful interactions were uncovered. The first was that the deterrent effect of DGU differed in rural and urban locations. While urban DGUs significantly reduced the log odds of any type of injury to victims, DGUs that occurred in rural settings had no significant deterrent effect. This finding may be interpreted by considering that the study's urban variable may provide an indirect or proxy measure of the type of street culture described by Anderson (1999). Simply put, the code of the street, which is ubiquitous in many poor urban settings, may create a pool of potential victims who are more than willing to defend themselves, their property, and their honor

⁹ However, the manner in which such bias could account for the inability to detect any significant offender interactions is not readily apparent.

by capitalizing on the deadly force that a firearm provides. If this is the case, and offenders perceive this increased willingness to use force, then urban DGUs may be expected to be more of a deterrent than their rural counterparts. However, without a direct measure of honor culture, such an explanation is merely speculation.

A second interaction detected in the multinomial logistic regression analyses concerned the effect of victims' gender on the ability of DGU to reduce the odds of injury. The study found evidence that although DGU deterred severe injury for men, it had no significant effect for women. In fact, in the all-female model, DGU was associated with increased odds of severe injury, though again this association was not statistically significant. Although the study is incapable of reporting with certainty why this gender interaction occurred, one potential explanation may be found in the notion of willingness to shoot. On the basis of the work of Whitehead and Langworthy (1989), which found that gender was the strongest predictor of the willingness to fire a gun at a nighttime intruder, it is not unreasonable to assume that the study's gender variable may have provided an indirect measure of willingness to shoot. If women are less willing to fire and deterrence theory's assertion that objective threats are positively related to an offender's perceived level of threat is correct, then one would expect women to benefit less from DGU than men.

Although this scenario may explain why women do not benefit from DGU, it fails to address the possibility that DGU may actually increase women's odds of injury. One possible explanation may be that offenders are angered by female resistance and respond to this anger by committing physical violence against their victims. Victim-offender relationship may account for this anger response. Of the female DGU incidents in the sample, nearly 30% involved offenders who were intimate family members, compared to less than 1% of male DGUs. In a generally patriarchal setting, it is not difficult to envision a man becoming extremely angry and violent when his intimate partner directs a gun at him in self-defense. In cases such as these, one would expect not only that DGU would provide no deterrent benefit, but that such behavior would increase the likelihood of injury. To examine this possibility briefly, a DGU* intimate-offender interaction coefficient was estimated in a model identical to those whose results are reported in Table 4 (results not shown). The resulting interaction coefficient (b = 1.511, p = .043)indicated that the victim-offender relationship had a significant impact on the deterrent effect of DGU. Separate models were then estimated for intimate and nonintimate offender incidents (results not shown). The resulting models indicated that armed resistance

against nonintimate offenders significantly reduced the odds of severe injury, while such behavior directed at intimate offenders significantly increased the odds that a victim would be injured.

On the basis of this evidence, the all-female model reported in Table 5 was reestimated. This time, however, incidents involving intimate offenders were excluded from the sample. The resulting coefficients indicated that female DGU against nonintimate offenders did deter severe injury, although the observed effect was small and statistically insignificant (b = -.193, p = .727). From this evidence, it appears that the victim-offender relationship may account for the possibility that DGU may actually increase women's odds of injury.

Finally, the study found that a victim's socioeconomic status moderated the deterrent effect of DGU. Victims with household incomes in the bottom 20th percentile did not have their odds of injury reduced by DGU, while their wealthier counterparts experienced significant benefit from their armed resistance. As with the previous interactions discovered by the study, a precise explanation of the meaning of this interaction will require future research.

CONCLUSION

The findings presented here provide evidence that DGU is not uniformly effective at reducing the likelihood of injury during assaults and robberies. Armed resistance in select situations, such as those in rural settings and those involving either female victims or victims from poor households, does not deter injury to victims. However, future research is needed to explore the meanings of these findings further. The results also suggest that firearms are surprisingly effective at preventing many individual and situational variants, such as old age, the number of offenders, or the presence of an armed offender, from moderating the deterrent effect of DGU. Uşing a gun will likely alter a situation, but some incident-specific characteristics nonetheless appear to have an important impact on the outcomes of armed resistance to crime.

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