FIREARMS, HOMICIDES, AND GUN CONTROL EFFECTIVENESS

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AUTHOR'S NOTE: *I am indebted to Professors Richard Parks and William Landes for encouraging me to examine the effects of gun control legislation. I am similarly indebted to the National Science Foundation for a summer research fellowship administered through the Undergraduate Economics Thesis Research Program, Department of Economics, University of Chicago, 1968. The present paper is based on testimony I delivered to the Judiciary Committee of the Minnesota State Senate in 1971.*

Firearms and Violent Crimes

Today, few would deny that some relation exists between firearms and violent death and crime:[1]

> In 1967, firearms were involved in approximately 73,000 robberies, 53,000 aggravated assaults, 9,000 suicides, 7,000 homicides, and 2,900 accidental deaths in this country. Although firearms used in these deaths and crimes represent only a small fraction of the total guns in the United States, some relation clearly exists between firearms and violent death and crime (Newton and Zimring, 1970: 23).

Newton and Zimring of the Task Force on Firearms point out that 63% of all homicides, 37% of all robberies, and 21% of all aggravated assaults involve the use of a gun (Newton and Zimring, 1970: 39).[2] In turn, 76% of gun homicides are committed by handguns; similarly, 86% of aggravated assaults involving guns and 96% of robberies involving guns are committed by handguns (Newton and Zimring, 1970: 49).[3] In short, although approximately 27% of all firearms in the United States are handguns, they are the predominant firearm used in crime (Newton and Zimring, 1970: 49).

Yet substantial disagreement does exist among serious scholars regarding the nature of the relation between firearms (especially handguns) and violence. For many scholars the relation is merely coincidental. Wolfgang contends, for example, that few gun homicides could be avoided merely by restricting firearms accessibility, because the offender would select another weapon to achieve the same destructive goal (Wolfgang, 1958: 82-83). Basic to Wolfgang's "murder by substitution" hypothesis are two questionable assumptions: all or most deadly attacks are motivated by a single-minded intention

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to kill and all or most weapons which might be substituted for a firearm are as lethal as firearms. Challenging the substitution hypothesis, Franklin Zimring argues that a substantial part of the homicide rate is attributable to ambiguously motivated deadly attacks rather than single-minded intentions to kill. And pointing out that the rate of homicides per hundred police-reported attacks is about five times greater for firearms as for knives, Zimring concludes that the deadliness of a particular weapon in an attack situation is a significant determinant of the homicide rate (Zimring, 1968).

Given the substitution hypothesis, we have little reason to expect any correlation between the firearm homicide rate and the total homicide rate. In fact, if such a correlation does exist, the substitution hypothesis is apparently inadequate to explain the observed systematic relation, since the availability of firearms does vary from area to area. On the other hand, the substitution hypothesis leads us to believe that such a correlation does not exist. For in areas where firearms access is relatively restricted, we should expect some proportional decrease in the firearm homicide rate but observe no change whatsoever in the total homicide rate. In aggregate comparisons, therefore, there should be little or no correlation between firearm homicide rates and total homicide rates.

Wolfgang appears to support such a contention by arguing that the use of firearms in criminal homicides probably depends upon cultural factors such as the population's familiarity with firearms (Wolfgang, 1958: 79-83).[4] Thus we are led to believe that the causes of deadly attacks and the resultant criminal homicides are quite distinct from the causes motivating an individual to use a firearm in a deadly attack rather than some other weapon. In homicidal attacks the essential cause is a single-minded intention to kill; the use of firearms is little more than coincidental.

In point of fact, however, there is an astonishing .98 correlation between the firearm homicide rate and the total homicide rate based on aggregate data for the 50 states.

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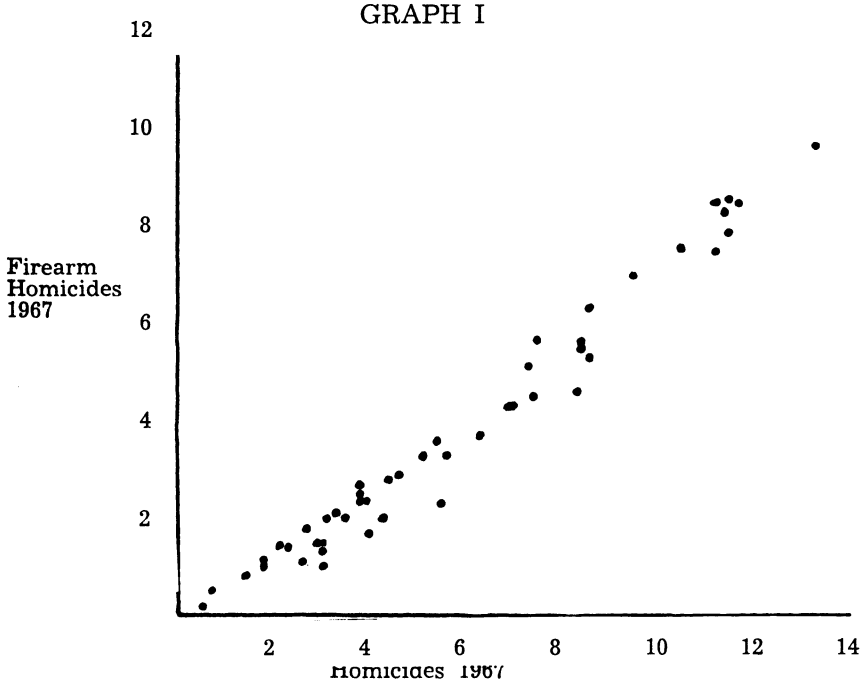
GRAPH I



Scattergram of homicide rates and firearm homicide rates, by states, 1967

Thus even if most deadly attacks were a result of a single-minded intention to kill, the substitution hypothesis in no way accounts for the systematic variation seen in Graph I between the firearm homicide rate and the total homicide rate. Hence it is almost impossible to conclude that the relation between firearms and criminal homicide is merely coincidental.

It does seem somewhat unlikely, however, that the deadliness of firearms in an attack situation is the sole explanation of the systematic relation between firearms and criminal homicide, particularly since there appears to be a similar systematic relation between firearms and other violent crimes as well as criminal homicide (Newton and Zimring, 1970: 23-27).[5] Perhaps the most obvious complementary hypothesis is that the presence of firearms is a contributing factor in the incidence of violent crime. Newton and Zimring summarize this argument as follows:

> Data from three sources document that the proportion of gun use in violence rises and falls with gun ownership. Statistics from Detroit show that firearms violence increased after an increase in handgun acquisitions. Regional comparisons show that the percentage of gun use in violent attacks parallels rates of gun ownership. A study of guns used in homicides, robberies, and assaults in eight major cities shows that cities with a high proportion of gun use in one crime tend to have a high proportion of gun use in the other crimes (Newton and Zimring, 1970: 78).

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Unfortunately, the thesis as argued by the Task Force on Firearms describes the relation between the accessibility of firearms and the incidence of firearm violence rather than the total incidence of violent crimes. This distinction is of crucial importance because the effectiveness of gun control legislation must ultimately depend upon some prior linkage between firearms and the total incidence of violent crimes. And of course, as Graph I indicates, such a connection clearly exists. But although the Task Force on Firearms fails to consider explicitly the linkage to the total incidence of violent crimes, convincing evidence does exist establishing a connection between the accessibility of firearms and the total incidence of criminal homicide.

Zimring's research in Chicago, for example, demonstrates that the deadliness of a particular weapon in an attack situation is a significant determinant of the homicide rate (Zimring, 1968). By implication, if reduced accessibility of firearms tends to reduce the use of firearms in homicidal attacks,[6] even if the decreased accessibilty of firearms occasions the substitution of less dangerous weapons in homicidal attacks,[7] then the total criminal homicide rate will likely decline as a result of the decrease in firearms accessibility.

Circumstances under which most homicides occur suggest a further linkage between firearms accessibility and the criminal homicide rate. The Task Force on Firearms concluded, for example, that most homicides are committed in a moment of rage and thus are not a result of a single-minded intention to kill (Newton and Zimring, 1970: 43). Or as Francis Flanagan, Chief of the Homicide Section of Chicago's Police Department, describes the ambiguous motivations involved in deadly attacks: "There was a domestic fight. A gun was there and then somebody was dead. If you have described one you have described them all" (Newton and Zimring, 1970: 43). Given such highly circumstantial conditions surrounding deadly attacks, together with the reduced accessibility of firearms and either the substitution of a less dangerous weapon or no substitution at all, the *modus operandi* of death has been effectively restricted.

Perhaps the simplest yet most persuasive linkage between firearms and the total criminal homicide rate is suggested by the .98 correlation between firearm homicides and total criminal homicides. The almost perfect linear relation between firearm homicide rates and criminal homicide rates implies that if the proportion of guns used in homicidal attacks rises and falls

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with gun ownership as argued by the Task Force on Firearms, then so also must the total criminal homicide rate rise and fall with gun ownership.

There is yet a third possible account of the systematic relation between firearms and violence. Part of this explanation can be found in Wolfgang's writings, even though his conclusions are often incompatible with those presented here. This third hypothesis holds that firearms and knives, as pyscho-sexually significant symbols and socially essential instruments, are integrally related to the commission of violent crime, *sui generis*.

In a fairly recent work, Wolfgang argues that the age-sex category of youthful males is most highly associated with violent crime; in turn, he suggests that this physically aggressive behavior converges with notions about the masculine ideal (Wolfgang, 1967: 4). Further, with respect to the well-known conception of a "subculture of violence," Wolfgang asserts the existence of a life style, culturally transmitted, in which the individual expresses hostile feelings in personal interaction through physical force (Wolfgang, 1967: 11). In the subculture of violence the aggressive male is "socially castrated" when faced with external controls such as school and work. For within the subculture of violence, the ultimate and culturally favored weapon for controlling others is violence (Wolfgang, 1967: 11-12).

Of course, guns and knives can be instruments of violence. Guns and knives are an added advantage in personal attacks; they even make it possible for the physically or intellectually weaker individual to overpower his physical or intellectual superior. Hence a weapon is essential, quite likely, in a culture which favors violence as the ultimate means of controlling others. Additionally, since the syndrome of personal violence is held to be intricately bound with notions of the masculine ideal, and since both the gun and the knife are notorious instruments of sexual symbolism, it can be readily expected that guns and knives form an integral repertoire for attack in the "subculture of violence."[8]

Wolfgang also points out that statistics on violent crimes consistently show that blacks have crime rates four to ten times higher than whites (Wolfgang, 1967: 8). Similarly, data from *Vital Statistics* show the incidence of criminal homicide among blacks is approximately eight times the rate for the

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white population. This is to be expected for, as Wolfgang suggests, physically aggressive action and violent social responses characterize minorities subject to social, economic, and political disparities, as are the blacks (Wolfgang, 1967: 7-9). This is not to say, quite obviously, that the convergence of physically aggressive behavior and notions of the masculine ideal is a function of racial difference. Rather, the structural arrangements of society — its institutionalized racism and its class hierarchy — determine the avenues of expression for physically aggressive behavior, just as certain structural arrangements of society encourage violence as a culturally favored weapon for controlling others.

In suburbia, for instance, the convergence between physically aggressive behavior and notions of the masculine ideal appears to focus more readily upon such instruments as the automobile. Like the gun and the knife, the automobile can be a symbolic extension of the youthful male's masculinity. In suburbia, where the youthful male is cloistered by middle-class security and righteousness, the physically aggressive behavior can be seen nevertheless in reckless driving and speeding (and such aggressive behavior is clearly reflected in the youthful driver's insurance rates). But for the ghetto youth, such avenues of expression for physically agressive behavior are less viable alternatives than the gun or the knife. For on the one hand, ghetto life encourages interpersonal violence; on the other hand, social and economic conditions render the gun and knife more accessible than the automobile.

Gun Control and Criminal Homicide

We have considered thus far three likely explanations of the systematic relation observed between firearms and violence. With respect to criminal homicide, we found that firearms are more deadly than other weapons in an attack situation, regardless of whether the attacker had a single-minded intention to kill. We also found that firearms violence seems directly related to the availability of firearms. And in the specific case of criminal homicides, we saw that the availability of firearms is particularly significant in determining the criminal homicide rate, for a substantial number of deadly attacks are likely due to ambiguous motivations rather than a single-minded intention to kill, thus linking the incidence of criminal homicide rate to circumstantial conditions likely involving the presence of a firearm. Finally, we saw that in certain social contexts, particularly among young black males, the gun and knife are in-

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strumental and symbolically integral aspects of a syndrome of violence. Each of these explanations is important to consider because it is within the context of the systematic relationships between firearms and violence that we need consider the effectiveness of gun control legislation.

Intuitively, the most probable linkage between gun control laws and criminal homicide lies in reducing the accessibility of firearms. The argument above holds that a reduction in firearms accessibility would likely result in a reduction of criminal homicides, partly due to the substitution of less dangerous weapons and partly due to a lack of single-minded intention to kill in the first place. Given this revision of the original argument proposed by the Task Force on Firearms,[9] we can agree with the Task Force's conclusion that gun control legislation which substantially reduces total gun ownership reduces the use of guns in volence and hence the total incidence of certain forms of violence such as criminal homicides (Newton and Zimring, 1970: 127).

There are several reasons to expect, in turn, that gun control laws do effectively reduce gun ownership. Purchasing restrictions, for example, increase the "cost" and "effort" an individual need spend to acquire a firearm. In some cases, purchasing attempts motivated by rage or intoxication might belie the more deliberative procedures imposed through purchasing restrictions. Similarly, carrying restrictions tend to reduce the number of firearms carried because of the added "costs" of obtaining a legal permit (if indeed one can be obtained) and the subsequent illegality of a failure to obtain such a permit together with the concomitant penal sanctions. These connections between gun control laws and the accessibility of firearms are even more plausible due to the highly circumstantial conditions under which homicidal attacks are likely to occur.[10]

Equally important are the effects of gun control laws in reducing gun ownership over long periods of time. The Task Force on Firearms reports that the expected attrition rate of firearms in civilian possession, holding new acquisitions constant, is substantial due to such factors as wear, loss, breakage, confiscation, and destruction (Newton and Zimring, 1970: 3-7). Since gun control laws are likely most effective in reducing new acquisitions, the net effect over time is to reduce total gun ownership. Also, since almost half of all second-hand acquisitions are required through a retail outlet, gun control laws might be expected to reduce the total gun ownership by re-

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stricting second-hand weapons transactions (Newton and Zimring, 1970: 13-14).

Less obvious are the possible direct linkages between gun control laws and the incidence of violent crime, particularly homicide. For instance, the presence of carrying restrictions, apart from reducing gun ownership, might function to reduce the incidence of violent crime by rendering preventive intervention by legal authorities at least possible if not strictly prescribed.

Another direct linkage between gun control laws and the incidence of violent crime lies in the functional nature of law. Earlier we saw that violence is the culturally favored weapon for controlling others in the subculture of violence. In the larger culture, on the other hand, interpersonal violence at the community level is disfavored. Anthropologists of law point out that society is possible only the basis of order (Hoebel, 1954). Broadly speaking, this order defines the parameters of admissible behavior: the social norms. Our ability to interact with one another depends upon such regularities. Yet "normal" behavior is not necessarily automatic (thankfully); if the intrinsic reward of "normal" behavior is insufficient to prevent deviancy, or if the rewards of "abnormal" behavior are particularly great, then the "normal" behavior is likely to be enforced by the application of sanctions. Regarding such sanctions, Durkheim distinguishes between diffuse repressive sanctions and organized repressive sanctions (Durkheim, 1964: 64). Whereas organized repressive sanctions refer to the enforcement of penal law, diffuse repressive sanctions generally involve the common morality and the concomitant social pressures without institutionalized juridical sanction. Now in the larger culture, it appears that not only is interpersonal violence at the community level antithetical to the "social norms," but that this interpersonal violence is proscribed by diffuse repressive sanctions and perhaps organized repressive sanctions.

Substantively, Hoebel tells us, law consists of a specially demarked set of social norms maintained through the application of "legal" sanctions (Hoebel, 1954: 15). Hence gun control laws greatly increase the cost of violating social norms proscribing interpersonal violence. In this sense, at least in the larger culture, gun control laws are likely to have a direct effect on the incidence of violence, particularly criminal homicide, apart from the indirect effect or reducing gun accessi-

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bility. For the behavior which gun control laws attempt to proscribe is also likely limited by diffuse repressive sanctions. That is to say, in the larger culture, gun control laws are likely to intensify the functioning of diffuse repressive sanctions against interpersonal violence as a weapon for controlling others at the community level. This is likely, in addition to increasing the costs of such "deviant" behavior," partly because the gun control laws intensify "awareness" of the "abnormal behavior" and partly because the laws bring into sharper relief the diffuse repressive sanctions similarly proscribing this particular avenue of behavior. All of this implies, of course, that gun control laws will be more effective in the larger culture (where interpersonal violence is not a favored weapon for controlling others at the community level) than similar laws might be in the "subculture of violence."

An Empirical Model

Thus far we have considered theoretical evidence linking firearms to criminal homicide. One factor is the extreme deadliness of the firearm in an attack situation when compared to other weapons. Another factor is the highly circumstantial conditions under which deadly attacks occur; since most of these deadly attacks are ambiguously motivated, it is less likely that a criminal homicide would have occurred had the firearm been less accessible. Still another factor in the linkage between firearms and criminal homicides lies in the integral role of the firearm and knife in the subculture of violence — both as an extension of masculinity and as favored weapons in the context of interpersonal violence. We have also considered theoretical evidence linking gun control laws to the incidence of criminal homicide and violence. One factor is the effective reduction of firearms accessibility, both in terms of immediate costs and in terms of long-range effects. Another factor is the legally guaranteed potential for preventive intervention. Still a third factor in the linkage between gun control laws and violent crime and criminal homicide lies in the "functional" nature of law as we discussed it above. It remains, therefore, to specify an empirical model reflecting these theoretical considerations and to examine the model using aggregate data for the fifty states from the *Vital Statistics* (1967) and the Federal Bureau of Investigation *Uniform Crime Reports* (1967).[11]

From the argument thus far it is clear that any analysis of criminal homicide must account for differences in the cultural context within which the homicide occurs. The argument above

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suggests a dichotomy between the "subculture of violence," within which the firearm is an integral aspect, and the antithetical larger culture, within which the use of firearms in interpersonal violence is more likely proscribed through diffuse repressive sanctions at the community level. Controlling for such differences in cultural context might have been a totally insurmountable task, were it not for the associated racial differences between the subculture of violence and the larger culture. Since for our purposes the subculture of violence is tolerably coterminous with the nonwhite population, especially the black population, it is relatively simple to control for the differences in cultural context by merely separating white and nonwhite criminal homicide rates.[12]

In each model the dependent variable is the total incidence of criminal homicide for the given population rather than the incidence of firearm homicides for each group. This is necessary because the effectiveness of gun control legislation ultimately depends upon some linkage with the total incidence of criminal homicide, not merely those criminal homicides involving the use of firearms. Also, the data on criminal homicides have been adjusted, where necessary, to reflect as closely as possible willful killings without due process (murder and nonnegligent manslaughter).

Given the theoretical considerations above, no significant linkage should obtain directly between the presence of gun control laws and the incidence of nonwhite criminal homicide, since the firearm is an integral aspect of the subculture of violence and, as a result, there is likely to be no direct influence of gun control laws upon the incidence of nonwhite criminal homicide. On the other hand, it is likely that the presence of gun control laws indirectly reduces the total incidence of nonwhite criminal homicide by reducing the accessibility of firearms for criminal and extra-legal purposes.

The argument is somewhat different for the larger white culture. Here a direct linkage likely exists between the presence of gun control laws and the total incidence of white criminal homicides, because the concomitant presence of organized repressive sanctions and diffuse repressive sanctions tends to effectively proscribe the indiscriminate use of firearms. However, like the subculture of violence, the presence of gun control laws should also indirectly affect the incidence of white criminal homicides by reducing the accessibility of firearms for criminal purposes.

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The two models presented here do not account for the effectiveness of gun control legislation over time. Because of the methodological considerations involved in this type of longitudinal analysis, it is beyond the scope of this paper. Preliminary results of this longitudinal analysis, to be fully described in a future paper, do confirm the basic model as herein described. To ensure that the present model has been correctly specified, all higher order interaction terms and several other socioeconomic variables were considered. All proved inconsequential.

In Figures I and II below, each model has been schematically represented. In the diagrams, double-headed arrows represent correlation coefficients while single-headed arrows represent path coefficients or beta weights.

FIGURE I: NONWHITE CRIMINAL HOMICIDE MODEL

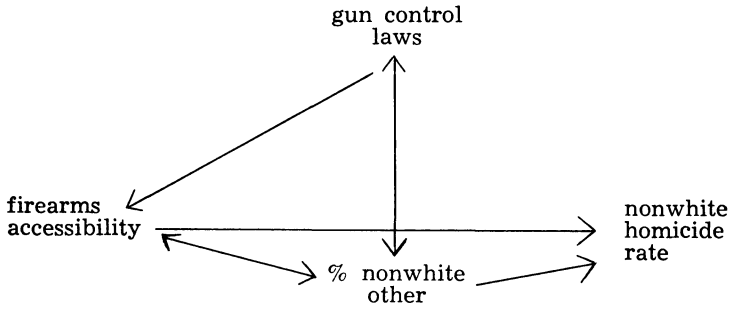
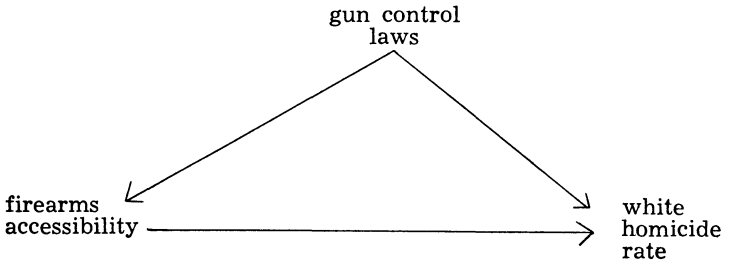


FIGURE II: WHITE CRIMINAL HOMICIDE MODEL



For purposes of this analysis, gun control laws are restricted to carrying restrictions and purchasing restrictions. Thus, if a state has both carrying and purchasing restrictions, it is assigned a value of 1.0 for use in the regression equation. If the state has no carrying and purchasing restrictions, or if the state has one type of restriction but not the other, the state is assigned a value of 0.0 for use in the regression equation.[13] This is the usual coding procedure for using dummy variables in regression analysis.[14]

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Finally, in order to examine the empirical models above, it was necessary to devise an index of the accessibility of firearms for criminal and extra-legal purposes. This index was constructed in light of a significant theoretical consideration proposed by the Task Force on Firearms. In the Staff Report on Firearms to the National Commission on the Causes and Prevention of Violence, the entire second part of the report is devoted to one simple proposition: more firearms — more firearms violence (Newton and Zimring, 1970: 23-78).[15] Unfortunately, there is no aggregate data available which directly indicates the level of gun ownership by state.[16] But additionally, and quite significantly, there is no necessary one-to-one correspondence between an index of firearm ownership and an index of the accessibility of firearms for criminal and extra-legal purposes; yet we are specifically interested in the latter.

Aggregate data are available for the 50 states on a variety of indices of violent crime and extra-legal violence. These include the incidence of rape, robbery, aggravated assault, burglary, larceny, auto theft, firearm accidents, suicides, firearm suicides, and firearm homicides.[17] Following the reasoning below, these indices were factor analyzed in order to construct an index of firearm accessibility.

If there is a monotonic relation between more firearms, and more firearms violence, then one dimension underlying these indices of violent crime should be a firearms accessibility factor. We know, for example, that firearm accident rates roughly parallel levels of gun ownership across the census regions (Newton and Zimring, 1970: 29). Data from the Task Force on Firearms show the following:

	% of U.S. Households Owning Firearms	Accidental Civilian Firearms Deaths per 100,000
South	59	2.46
North Central	51	1.25
West	49	1.25
Northeast	33	.59

And using published data from the Federal Bureau of Investigation (*Uniform Crime Reports*) we can see the same pattern holds for the homicide rate and the comparative rates of aggravated assault, as can be seen easily in Graph II.

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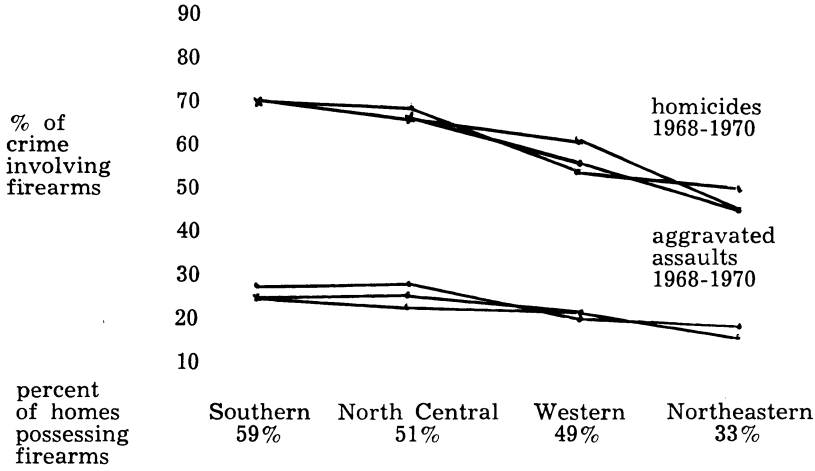
GRAPH II: COMPARISON OF % OF HOMICIDES AND AGGRAVATED ASSAULTS INVOLVING FIREARMS, BY CENSUS REGIONS, 1968-1970



Homicides, we noted above, are more likely a result of ambiguously motivated deadly attacks than a result of a single-minded intention to kill. Both firearm accidents and aggravated assaults similarly lack a single-minded intent. In fact, aggravated assaults occur more likely under circumstantial conditions involving highly ambiguous motives, quite similiar to deadly attacks resulting in criminal homicides. All of the other indices of violence clearly involve unambiguous motivations. We should expect, therefore, that indices of firearm accidents, homicides, and aggravated assaults are more sensititive to the accessibility of firearms in aggregate data analysis across geographic regions. In the other indices, such as robbery, the clearly defined intentions involved should function to insulate the rate of occurrence from the accessibility. Hence although robbery involves a slightly higher percentage of firearms than does aggravated assault, availability of firearms might affect the percentage of robberies committed with firearms from region to region, but this should not affect the total incidence of robbery. Thus in the type of aggregate analysis proposed here, the indices of firearm homicides, aggravated assaults, and firearm accidents should have primary loadings on the hypothesized firearms accessibility dimension, while other indices such as robbery do not.[18] The results of the Varimax factor solution were precisely as predicted on the basis of the considerations above.[19] In turn, the index of accessibility was calculated by assigning factor scores for the firearms accessibility dimension to each of the fifty states.[20]

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The research findings for both the white and nonwhite models are presented in Figures III and IV below.[21]

FIGURE III: FINDINGS: NONWHITE CRIMINAL HOMICIDE RATE

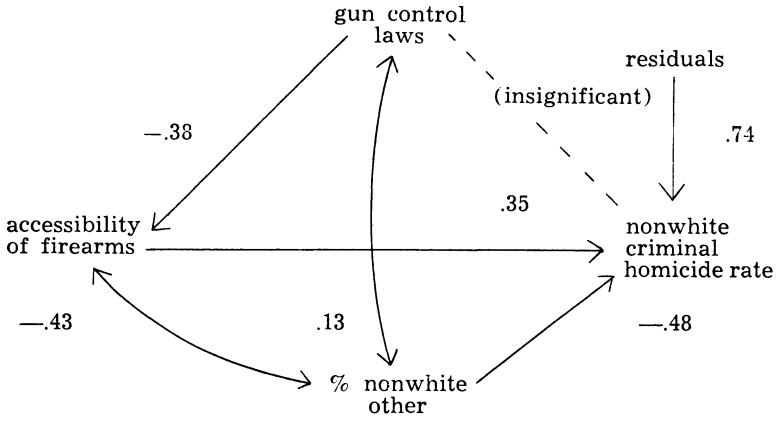
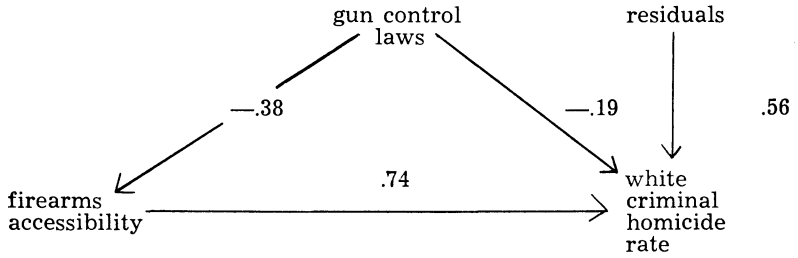


FIGURE IV: FINDINGS: WHITE CRIMINAL HOMICIDE MODEL



The research findings in both applications of the causal model clearly support the theoretical arguments. As expected, there is no direct path linkage between the gun control laws and the incidence of nonwhite criminal homicides. Because the estimates of gun control effectiveness are minimal estimates, the lack of any direct linkage between gun control laws and nonwhite criminal homicide still rests primarily on the theoretical considerations above. The marked difference between the nonwhite model and the white model is strikingly consistent, nonetheless, with the theoretical expectations.

In both models, there is an indirect linkage between gun control laws and the incidence of criminal homicide by reducing the accessibility of firearms for criminal purposes. This indirect effect is double in the white culture (−.28) what it is in the nonwhite culture (−.13) again based on minimal estimates. This too is expected since the firearm is an integral aspect of the nonwhite culture, and hence a reduction in the accessibility of firearms through gun control laws expectedly advances at a much more modest pace.

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In the white culture, the total effect of the gun control laws, both direct (−.19) and indirect (−.28), is −.46. In the nonwhite culture, the total effect of the gun control laws in equivalent to the indirect effect of the laws at −.13. This difference between the two cultures is similarly supported by the large residual path coefficient for the nonwhite homicides (.74) than the residual path coefficient for the white homicide rate (.56).[22] Indeed, a larger residual path coefficient is expected in the nonwhite model application because of the hypothesized integral role of physical aggression and violence in the "subculture of violence."

Although comparatively modest, the path coefficients reported here involving gun control laws are minimal estimates of gun control effectiveness. Further, the number of lives involved in the reduction of criminal homicides is quite substantial. In the white culture, gun control laws can reduce the incidence of violent crime approximately 56% on the average for the 50 states. This implies a substantial decrease in the white criminal homicide rate of 1.9 persons per 100,000 population. In the nonwhite culture, on the other hand, gun control laws reduce the incidence of criminal homicide by a meager two percent, although this implies a decrease in the nonwhite homicide rate of over .5 persons per 100,000 population. Thus, even though the effects of gun control laws are extremely limited in the nonwhite culture, the number of lives that could be saved through gun control laws is clearly quite substantial.

It does appear, in conclusion, that gun control legislation is an effective means of reducing the incidence of criminal homicide, particularly in the larger white culture. But however many lives can be saved in the nonwhite culture through firearms control, it is not at all clear whether gun control is the singularly effective means of restricting the use of interpersonal violence as a means of controlling others at the community level in the "subculture of violence." Indeed, if my theoretical argument has been at all persuasive, and if we consider violent behavior "abnormal" in some objective sense, then our attention would be better directed if we sought to alleviate the socioeconomic conditions underlying the "subculture of violence." It is all but a truism to point out that an organized repressive sanction enforcing behavior at best tangential to culturally prescribed behavior is somewhat arbitrary and perhaps even dictatorial.

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FOOTNOTES

[1] The notable exceptions are the gun clubs lobbying against gun control legislation at all levels of government. The National Shooting Sports Foundation and its Director of Research, Alan S. Krug, have variously maintained that there is no significant relation between firearms and crime (Krug, 1968b), that there is no significant difference in crime rates between states with firearm laws and those without (Krug, 1967), and that fewer people with guns do not mean less crime (Krug, 1968a). Using essentially the same types of statistics and techniques as Mr. Krug, while avoiding the rather obvious errors in his research designs, this paper seriously questions Krug's findings.

[2] Based on 1967 *Uniform Crime Reports.*

[3] Criminal homicide data based on 1967 *Uniform Crime Reports.* Aggravated assaults and robbery data based on reports from police departments of ten large cities.

[4] Note that my argument here is not the same as Wolfgang's. Wolfgang is interested in variations in the percent of murders involving firearms; I am interested in variations in the total murder rate as well. It seems to me that factors such as a population's willigness to fight things out with weapons is as directly related to the latter as it is to the former.

[5] The Task Force on Firearms concludes that cultural factors affect the suicide rates far more than the availability, and use of firearms. There is, however, a .80 correlation between the firearm suicide rate and the total suicide rate (the 50 states). This relationship, together with the fact that firearm suicides are a function of the accessibility of firearms as we shall see later in this paper, renders the Task Force conclusion less definitive.

[6] This is the hypothesis supported by the Task Force on Firearms' research.

[7] The gun is generally considered the most dangerous weapon in an attack situation, as Zimring argues in the Chicago study. This hypothesis supposes that substitutions will always be made; of course, this will not always be the case. The net result should be to further decrease the total criminal homicide rate.

[8] A fairly similar argument can be made in terms of the differences between males and females in respect to the total homicide rate. Since the incidence of attack is greater among males than females in both the white and nonwhite population., there is additional evidence of an intricate connection with the masculinity syndrome.

[9] Newton and Zimring argue that "when care is exercised to focus not upon the number of crimes committed but solely upon the proportion of crimes involving guns, the inference can be drawn that control systems that substantially reduce the number guns are effective in reducing gun violence" (Newton and Zimring, 1970: 128). This conclusion is meaningless in terms of the overall reduction of violent crime, for it simply does not follow that the incidence of crime is *ipso facto* reduced by reducing crimes involving guns. The problem seems to stem from the Task Force's observation that other factors are involved in firearms use than the mere presence or absence of gun laws coupled with an unquestioning acceptance of biased research comparing crime statistics from states without such gun control laws to states which do have them. The results obtained by researchers such as Krug (National Shooting Sports Foundation, Inc.) fail to control for certain relevant variables in assessing the effectiveness of gun control laws. This does not imply, as the Task Force seems to have inferred, that such controls are impossible in aggregate research. Rather than challenging these findings through more sophisticated research designs, the Task Force appears to have rather naively assumed that the entire gun control controversy could be circumvented by examining the proportion of crimes involving guns as the sole index of gun control effectiveness rather than examining the total incidence of violent crime.

[10] Zimring found that in Chicago, over two thirds of all killings involved spouses or lovers (20%) and friends and acquaintances (41%), and other family, neighbor or business associates (13%) as victims and attackers. Similarly, 82% of the homicides studied by Zimring were results of altercations, the more important being domestic (17%), money (9%), and liquor (7%). Finally, in 54% of the situations leading to homicides in 1967, the victim or attacker had been drinking (Zimring, 1968: 722-723).

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[11] Aggregate data used in this analysis is primarily restricted to the year 1967, except for census statistics which have been taken from the 1970 census data. The year 1967 was chosen primarily because in that year the research staff of the American Bar Foundation (1967) prepared a compendium of existing gun control laws. This compendium is in turn supported and corrected by a compendium prepared by the Task Force on Firearms approximately two years later, with the assistance of the states' attorneys general. This latter procedure allowed greater reliability regarding enforcement of the laws. Unfortunately, at the time of this writing, the Vital Statistics data is unavailable for an analysis of the effect of laws adopted in 1967 and 1968 as reflected in the Task Force compendium. In a future paper, this new data will be incorporated into a longitudinal analysis of criminal homicide and violent crime.

[12] There is a complicating factor, however. The subculture of violence is more closely related to the black minority group than any other minority group. Unfortunately, aggregate data is not available such that the black homicide rate might be separated from the total incidence of nonwhite criminal homicides. As a substitute for this unavailable data, the percentage of the nonwhite population which is a nonblack minority is used as a control variable in the analysis of nonwhite criminal homicides. (Even if the data were available, the total number of cases would prove highly unstable in calculating a criminal homicide rate for the "nonwhite other" category.)

[13] There is a wide variety of carrying and purchasing restrictions. The data used here are taken from the American Bar Foundation (1967: no. 6) and Newton and Zimring (1970). Methodologically it would have been possible to consider carrying restrictions only or purchasing restrictions only. However, because of the nature of dummy variables, together with the serious problems of multicollinearity, it is impossible to include all three variables (carrying restrictions only, purchasing restrictions only, and the carrying restrictions plus purchasing restrictions variable) in the regression equation. The use of all three dummy variables in the regression equation assumes an additive interactive relation between and among the three variables which the dummy variable coding is too insensitive to uncover adequately. Finally, and perhaps singly most important, recent proposals for gun control legislation are usually omnibus gun control bills, so the policy maker is generally interested in the effects of gun control laws involving both carrying and purchasing restrictions.

[14] The effect of using a dummy variable for the presence of gun control laws rather than some ordinal or interval comparative grouping indexing the presence of gun control laws is to invariably attentuate the slope estimate of the dummy variable *vis-à-vis* the dependent variable That this is true can be easily shown in the following manner. Consider the general regression model:

$$Y_{ij} = \beta_0 = \beta_1 W_j + \beta_2 X_{ij} + \beta_3 W_j X_{ij} + E_{ij}$$

where W_j is the variable grouping the states according to the presence or absence of gun control laws (using a dummy variable, the maximum number of groupings is two);

X_{ij} is some variable with a value perculiar to each of the fifty states (e.g., the percentage of the nonwhite population which is nonblack). Since all states within each grouping of variable W_j have the same value (for a dummy variable, this would be either a 0 or a 1), the model can be respecified as:

$$Y_{ij} = a_j = b_j X_{ij} + E_{ij}$$

where $a_j = \beta_0 + \beta_1 W_j$

$b_j = \beta_2 + \beta_3 W_j$

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For simplicity, let us consider the case where X_{ij} is zero; under this condition the estimate of Y_{ij} will equal the estimate of a_j.

Now the estimate of the contextual effects of the presence of gun control laws is:

$$\hat{b}_1 = \frac{\sum_j (a_j - \bar{a}_t)\ (W_j - \bar{W}_t)}{\sum (W_j - \bar{W}_t)^2}$$ where $\bar{a}_t$ and $\bar{W}_t$ are grand means

Next consider the formula for the variance of W_j:

$$\text{Var}\ (W_j) = \frac{\sum_{j=1}^{N} (W_j - \bar{W}_t)^2}{N - 1}$$

Hence, as the variance of W_j increases, the slope estimate $\hat{b}_1$ decreases, since the expression

$$b_1 = \frac{\sum_j (a_j - \bar{a}_t)\ (W_j - \bar{W}_t)}{\sum (W_j - \bar{W}_t)^2}$$

as the variance increases the denominator will geometrically increase with respect to the numerator. Now it happens that Var W_j) is greatest precisely when W_j is a dichotomous variable. This is because in assigning dichotomous values as scale codes, the extreme scale positions are implicitly made the group mean value for each of the two groups. Hence this appears to be an inherent problem in the use of dummy variables.

In terms of the research presented here, the implications of this problem are that the estimated effect of gun control laws both on the accessibility of firearms and on the incidence of criminal homicide will be minimal estimates. That is to say, with a more appropriate index of the relative stringency of gun control laws, the slope estimates of the gun control variable should be unquestionably larger *vis-à-vis* the absolute value of the slope estimate.

[15] Much of the evidence presented by Newton and Zimring has been discussed in the first two sections of this paper.

[16] Alan Krug (1968a) attempts to use the number of hunting licenses issued per 100,000 population as an index of firearms ownership. This measure is severely biased because of the overexaggeration of rifles and shotguns *vis-à-vis* handguns, while handguns are singularly important in the incidence of violent crime. Additionally, Krug's indices favor western states where criminal homicides tend to be low due to population homogeneity and the subsequent lack of a large black minority.

[17] The incidence of rape, robbery, aggravated assault, burglary, larceny, and auto theft were gathered from the F.B.I. (1967), while the incidence of firearm accidents, suicides, firearm suicides, and the adapted firearm homicides were gathered from the U.S. Vital Statistics (1967).

[18] Since the relation between accessibility of firearms and homicides is examined here, the incidence of criminal homicide was deliberately excluded from the factor analysis, in view of some methodological considerations when the intercorrelation of variables is as high as that between firearms homicide and total criminal homicide (.98): the problem of variable redundancy. By doing so, there can be little question of biasing the index of accessibility by exaggerating the importance of homicides in the index construction.

[19] The Varimax rotation solution for the factor analysis was chosen because of the possible causal interpretation using orthogonal factors. The solution yielded three factors, accounting for an impressive 86% of the total variance. The first factor was a general crime factor, the second the firearms accessibility dimension, and the third factor a suicide dimension. These findings clearly support the conceptual distinction between outward and inward directed aggression (factors one and three) as well as the existence of violence clearly related to firearms. The causal interpretation can be diagrammed in the following manner:

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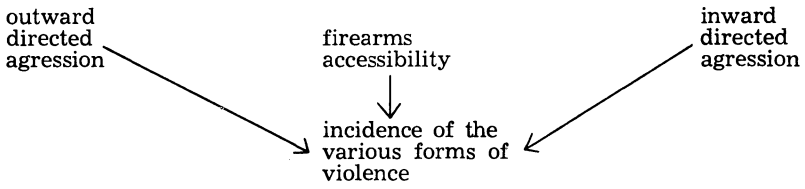

The primary loadings on the accessibility dimension are:

firearm homicides	.91
aggravated assaults	.74
firearm accidents	.70

The secondary loadings are:

rape	.46
firearm suicides	.35

We expect firearm suicides to load on this dimension since the total suicide rate is also included in the analysis. The difference in variance between the firearm suicide rate and the total suicide rate is then partly due to the greater accessibility of firearms in some areas. This is consistent with the earlier discussion regarding the deadliness of the firearm when compared to other weapons. Robbery, as expected, had a modest loading at .17.

[20] The factor scores were calculated using factor score coefficients for all the variables in the factor matrix, rather than just those which had primary loadings on the firearms dimension.

[21] All path coefficients in the two diagrams are significant well above the $\alpha = .05$ level.

[22] Much of the unexplained variance in both the residual path coefficients is due to the yearly flucuations in homicides from state to state. In the longitudinal study underway by this writer, the residual path coefficients are markedly reduced by averaging the homicide rate for each state over a number of years, controlling for any changes in the laws. The relative differences between the two residual path coefficients (white and nonwhite) are maintained, however. To stabilize the estimates obtained for the research presented here, all states ($N = 7$) were excluded from the nonwhite model which had a total nonwhite population less than 25,000 persons.

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