

GUN OWNERSHIP, SUICIDE AND HOMICIDE: AN INTERNATIONAL PERSPECTIVE

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During the 1989 and 1992 International Crime Surveys² data on gun ownership in eighteen countries have been collected on which WHO data on suicide and homicide committed with guns and other means are also available. The results presented in a previous paper³ based on the fourteen countries surveyed during the first ICS and on rank correlations (Spearman's rho), suggested that gun ownership may increase suicides and homicides using firearms, while it may not reduce suicides and homicides with other means. In the present analysis, four additional countries covered by the 1992 ICS only have been included, and Pearson's correlation coefficients r have been used. The results confirm those presented in the previous study. Several possible interpretations will be considered, and special attention will be devoted to possible displacement effects.

Introduction

Among the situational factors which favour violent acts, gun ownership has been mentioned for some time⁴. Earlier research, however, has provided rather weak and inconsistent support for increased efforts at gun control⁵, although more recent time-series evaluations suggest more convincingly some effect of restricting access to guns on homicide⁶. So far, research has focused on cross-sectional analyses across the United States⁷, or on evaluations over time of specific gun control measures in American states or countries⁸, i.e. on American data which show extremely high gun ownership rates throughout the USA, with relatively little variance across space and time.

Given the lack of variation in American data, international comparisons may be an interesting way out of this dilemma. So far, cross-national research has received

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 - 3 Killias, M. (1993) "International correlations between gun ownership and rates of homicide and suicide", accepted for publication in *Canadian Medical Association Journal*.
 - 4 Clarke, R.V.G. and P. Mayhew (1980), *Designing out crime*, p. 6, HMSO, London.
 - 5 Wright, J.D., P.H. Rossi and K. Daly (1983) *Under the gun: weapons, crime, and violence in America*, Aldine, New York.
 - 6 Loftin, C., D. McDowall, B. Wiersema and T.J. Cottey (1991) "Effects of restricting licensing of handguns on homicide and suicide in the district of Colombia" *The England Journal of Medicine* 325/23:1615-1620.
 - 7 Zimring, F.E. and G. Hawkins (1987) *The citizen's guide to gun control*, Macmillan, New York.
 - 8 Cook, P.J. (1983) "The influence of gun availability on violent crime patterns" *Crime and Justice* 4:49-89.

rather limited attention⁹. Most of the few studies which exist are based on comparisons of two countries or cities only, thus leaving their conclusions open to many criticisms¹⁰, and they do not use direct measures of gun ownership¹¹. Using the proportion of suicides committed with guns and the accidental firearm death rate rather than survey data as (indirect) indicators of private gun ownership, Lester¹² found substantial correlations with the homicide rate by firearms in a sample of 16 European nations ($r=.42$ and $.59$, respectively). In a paper based on data from 14 countries surveyed in 1989, i.e. on survey data concerning gun ownership, even stronger correlations have been observed¹³. Thus, there are a few international studies suggesting some impact of the availability of guns in private households on homicide and suicide by firearms. It remains to be seen however, whether these obligations will be confirmed when the analysis is extended, as in the present study, to a larger sample of countries.

Research design

Hypothesis

Drawing from earlier studies on the impact of situational variables on crime in general¹⁴, and particularly from studies concerning the possible role of guns in the genesis of violent acts, the central hypothesis underlying this research is that the availability of guns increases the risks of homicides and suicides committed with guns; it is understood that guns are not merely a substitute to other lethal weapons.

Specifically, this hypothesis presupposes the following testable propositions:

- a) in countries with higher rates of households owning firearms, a higher percentage of homicides and suicides will be committed using firearms;
- b) countries with higher rates of households owning firearms will face higher rates of homicides and suicides committed with guns;
- c) countries with higher firearm ownership levels will not experience lower rates of homicides and suicides committed with other means than firearms;
- d) countries with higher firearm ownership levels will face higher overall rates of homicide and suicide.

Given the cross-sectional design of this research, the study of eventual displacement effects (proposition c) will be somewhat more complicated. The

⁹ Robin, G.D. (1991) Violent crime and gun control, Anderson, Cincinnati (Ohio).

¹⁰ Kopel, D.B. (1992) Gun control in Great Britain: saving lives or constricting liberties?, pp. 83-84, University of Illinois Press, Chicago.

¹¹ Clarke, R.V.G. and P. Mayhew (1988) "British gas suicide story & its criminological implications" *Crime and Justice* 10:107; Sloan, J.J., A.L. Kellermann, D.T. Reay et al. (1988) "Handgun regulations, crime, assaults, & homicide. A tale of two cities" *The New England Journal of Medicine* 319/19:1256-1262.

¹² Lester, D. (1991) "Crime as opportunity: a test of the hypothesis with European homicide rates" *British Journal of Criminology* 12, 31/4:186-188.

¹³ Killias, International..., op. cit.

¹⁴ Clarke and Mayhew, Designing..., op. cit.

resulting difficulties of interpretation will be discussed in a later section of this chapter. On the other hand, a cross-sectional design allows to see very substantial variations in the dependent and independent variables, whereas studies on changes in gun control policies over time frequently suffer from a lack in variation of the independent variable (i.e. gun ownership levels).

The data

- *Gun ownership rates in eighteen countries*

So far, international research on the impact of gun ownership on homicide and violent crime has suffered from the unavailability of data on gun ownership. The first International Crime Survey (ICS), conducted in 1989 in 14 countries (United States, Canada, Australia, United Kingdom, with independent surveys being conducted in England & Wales, Scotland, Northern Ireland, France, Germany, the Netherlands, Belgium, Spain, Switzerland, Norway and Finland) by telephone (computer-assisted telephone interviews), provides some relevant data in this connection. A second international crime survey was conducted in 1992, using largely the same methodology, in 13 countries (England, the Netherlands, Belgium, Finland, Sweden, Italy, USA, Canada, Australia, New Zealand, Japan, Poland and Czechoslovakia) and in a large number of large cities throughout the world. From these two surveys, the data on gun ownership could be used for the purposes of this analysis. With the exception of four countries which had not participated in the 1989 survey but which had done so in the 1992 survey (CSSR, Italy, New Zealand, Sweden) all the data on gun ownership used here are from the first ICS; since the data concerning the dependent variables could be obtained for past years only, it seems logical to use the earliest available figures on gun ownership.

Unfortunately, the Japanese questionnaire did not include the questions on gun ownership, and from Poland no data on suicide and homicide with guns could be obtained. Not included here are the surveys conducted at the city level, since data on the dependent variables are available at the national level only. Since the methodology and other features of these surveys have been presented elsewhere¹⁵, we shall restrict our explanations in this chapter to the items related to gun ownership.

Respondents were asked whether there are any firearms (except air rifles) in their household. If so, they were asked whether it was a handgun, a rifle, or a shotgun. (In the 1989 survey, rifles and shotguns were combined into one response category.) In order to account for Switzerland's particular militia system¹⁶, Swiss respondents were asked whether it was a private or a military gun. In Table 1, the percentages of private households owning at least one firearm are given for the 18 countries which participated in at least one of the two international crime surveys, by type of firearm and year. (Note that the total rate of each country is different from the sums of the rates per firearms type. Many gun owners may have more than one

¹⁵ van Dijk et al., *Experiences...*, op. cit.

¹⁶ Killias, M. (1990) "Gun ownership and violent crime: the Swiss experience in international perspective" *Security Journal* 1/3:169-174.

type of gun; in some cases, the respondent was unable or unwilling to specify the type of firearm owned.)

Within the present surveys, it has not been possible to validate the information given by respondents, but studies which specifically addressed this issue by matching survey responses about gun ownership with official records found a high correspondence of the two measures¹⁷. Comparison of the gun ownership rates in 1989 and in 1992 - in six countries data on this variable have been collected in both surveys - shows rather small differences, suggesting that the survey measures of gun ownership might be satisfactory. (Some of the differences observed might be due to weighting effects, the 1992 data being unweighted.) Even if this is not taken for granted, minor inaccuracies of ICS measures of gun ownership would only marginally affect the results of correlational analyses, given that gun ownership varies so strongly across the eighteen countries considered here.

¹⁷ Kellermann, A.L., F.P. Rivara, J. Banton et al. (1992) "Validating survey responses about gun ownership among owners of registered handguns" *The New England Journal of Medicine* 1/3:169-174.

Table 1: Percentage of households owning firearms in 1989 and 1992

Country	1989		1992		With handgun		With any kind of firearm	
	rifle & shotgun	rifle	shotgun	1989	1992	1989	1992	
England & Wales	4.1	0.6	3.1	0.4	0.6	4.7	4.4	
Scotland	4.3			0.3		4.7		
Northern Ireland	7.0			1.4		8.4		
Netherlands	1.2	0.7	0.0	0.9	1.4	1.9	1.9	
Germany	3.0			6.7		8.9		
Switzerland	17.0			12.2		27.2		
Belgium	10.5	5.0	7.7	6.9	6.7	16.6	16.5	
France	18.7			5.5		22.6		
Finland	20.8	14.6	18.4	6.1	6.3	23.2	25.2	
Norway	29.0			3.8		32.0		
USA	38.4			28.4		48.0		
Canada	27.3	19.3	15.4	4.8	3.9	29.1	24.2	
Australia	17.7	12.5	6.9	1.5	1.6	19.6	15.1	
Spain	11.0			2.1		13.1		
CSSR		1.2	3.0		1.8		5.2	
Italy		10.7	1.8		5.5		16.0	
New Zealand		18.2	14.0		1.6		22.3	
Sweden		10.8	8.3		1.5		15.1	

- *Rates of homicide and suicide using firearms*

Through correspondence with experts in several countries, an attempt was made to gather data from WHO mortality statistics on homicide and suicide committed with guns (codes E955 and E965 of the WHO classification). The data on homicide and suicide concern the average number of fatalities by all sorts of firearms for the years 1983 to 1986, with the exception of Italy and New Zealand (where data for 1986 to 1989 have been used) as well as Czechoslovakia and Sweden (where the data pertain to 1987-1990).

The codes E955 and E965, as defined by the WHO classification manual of 1977, include suicides and homicides, respectively, committed with any kind of firearm or with explosives. Unfortunately, for many countries no detailed data are available on suicides/homicides by type of firearm, i.e. with handguns (codes E955.0, E965.0) vs. hunting rifles/shotguns (codes E955.1-2, E965.1-2), military weapons (E.955.3, E.965.3) or other firearms (E955.4, E965.4). Therefore, only global data on firearm suicides and homicides could be used here. This seems justified, however, also in view of the substantial proportion of suicides and homicides which are committed with rifles and shotguns, according to the detailed data from the few countries where they are available. In Sweden, for example, there were (in 1987-1990) 3.7 suicides and 3.4 homicides committed with a rifle/shotgun for every handgun suicide/homicide; for 1986 to 1990, the corresponding figures are 34.4 and 19.5 for New Zealand, 12.4 and 14.9 for France, 1.3 and 0.8 for Northern Ireland, and 0.5 and 0.25 for Italy which is the only one of these five countries where killings with handguns consistently outnumber those with rifles/shotguns. In all countries except Northern Ireland, killings with explosives are included in the figures used here. They make up for less than 2 percent of killings included in the codes E955 and E965, respectively, in all of these five countries except in Italy (where 2.2% of suicides are committed with explosives), in Sweden in connection

with homicide (4.2%), and in Northern Ireland where about one homicide in three is committed with explosives. Thus, the proportion of suicides/homicides committed with explosives can be neglected in all countries except Northern Ireland where they have been excluded for the present analysis.

Table 2: Homicides and suicides committed with a gun, in the 18 ICS-countries

Country	Homicide per 1 million		Suicide per 1 million	
	Total (E 960-969)	With a gun (E 965)	Total (E 950-959)	With a gun (E 955)
England & Wales	6.7	0.8	86.1	3.8
Scotland	16.3	1.1	105.1	6.9
Northern Ireland	43.3	21.3	82.7	11.8
Netherlands	11.8	2.7	117.2	2.8
Germany	12.1	2.0	203.7	13.8
Switzerland	11.7	4.0	244.5	57.4
Belgium	18.5	8.7	231.5	24.5
France	12.5	5.5	223.0	49.3
Finland	29.6	7.4	253.5	54.3
Norway	12.1	3.0	142.7	38.7
USA	75.9	44.6	124.0	72.8
Canada	26.0	8.4	139.4	44.4
Australia	19.5	6.6	115.8	34.2
Spain	13.7	3.8	64.5	4.5
CSSR	13.5	2.6	177.8	9.5
Italy	17.4	13.1	78.1	10.9
New Zealand	20.2	4.7	137.7	24.1
Sweden	13.3	2.0	182.4	21.2

Table 2 gives the total and the firearm suicide and homicide rates for the 18 countries considered here. There is a huge variation across countries in firearm and total homicide and suicide rates, thus providing ideal conditions for studying the correlations with gun ownership rates which, as has been noted above, vary about as widely among the countries included.

Results

Overall impact of gun availability

Before looking at the impact of gun availability specifically on suicide and homicide, it might be useful to start with the overall trends as they are summarised in Table 3.

Correlational and regression analyses, as least-square techniques in general, are extremely sensitive to extreme cases ("outliers") whenever the sample is rather small¹⁸. In the present case, two such outliers are identified by the data shown in Tables 1 and 2, namely the USA (with respect to gun ownership, homicide, and

¹⁸ Blalock, H.M. (1979) Social statistics, p. 402, McGraw-Hill, New York.

suicide without firearms) and Northern Ireland (with respect to homicide, the extreme scores being obviously the result of the civil war situation). In order to eliminate this problem, Spearman's rank-order correlation coefficient (ρ) has been used in previous publications on this research¹⁹. However, given the larger sample, due to the inclusion of four additional countries surveyed during the second International Crime Survey, the use of Pearson's correlation coefficient (r) seems justified in the present context. But, as a precaution, the following analyses have been conducted with and without the USA and Northern Ireland, and differences in results between the two procedures will be given due consideration in the text. Spearman's rank order correlation coefficient (ρ) will also be indicated wherever appropriate. Given its insensitivity to extreme scores, it has been computed for all the 18 countries.

Table 3: Simple correlations (Pearson's r , 16 countries without USA and Northern Ireland) and rank order correlations (Spearman's ρ , 18 countries) between:
a) percent households owning firearms; and
b) four dependent variables measuring the impact of guns (propositions A, B, C and D)

Dependent variable	Suicides		Homicides	
	r	ρ	r	ρ
Percent suicides/homicides committed with firearms (proposition A)	.912 $p < .0001$	.922 $p < .0001$	.418 $p < .054$	.543 $p < .025$
Rate of suicides/homicides committed with firearms, per 1 million population (proposition B)	.858 $p < .0001$	.922 $p < .0001$	.476 $p < .031$	.542 $p < .021$
Rate of suicides/homicides committed without firearms, per 1 million population (proposition C)	.107 $p < .347$	.020 $p < .936$	.212 $p < .215$	.211 $p < .385$
Overall rate of suicide/homicide, per 1 million population (proposition D)	.353 $p < .09$	.430 $p < .077$	.441 $p < .044$	.354 $p < .144$

In the following sections, the results given in Table 3 will be commented in detail before looking also at some alternative measures of gun ownership.

Suicide and gun availability

As has been known from earlier work, the percentage of suicides committed with a firearm increases dramatically with increasing gun ownership levels ($r = .912$, and $.933$ when the USA and Northern Ireland are included). Increases in the number of suicide using firearms per 1 million population increases at almost the same rate ($r = .858$, and $.902$ respectively). Figure 1 reveals no outliers in the general distribution. Thus, the overall correlation is not contingent upon a few countries with

¹⁹ Killias, International..., op. cit.

extreme scores on the dependent and independent variable, and propositions A and B are confirmed independently of the inclusion or exclusion of the USA and Northern Ireland.

Does the increase in suicide using a firearm go along with a decrease in suicides committed with other means? In other words, is there a displacement process at work? Figure 2 and correlations observed (.107 and -.104 respectively, when all 18 countries are included) suggest that this is not the case.

Figure 1: Relationship between gun ownership (in 18 countries) and rates of suicides using firearms per 1 million population

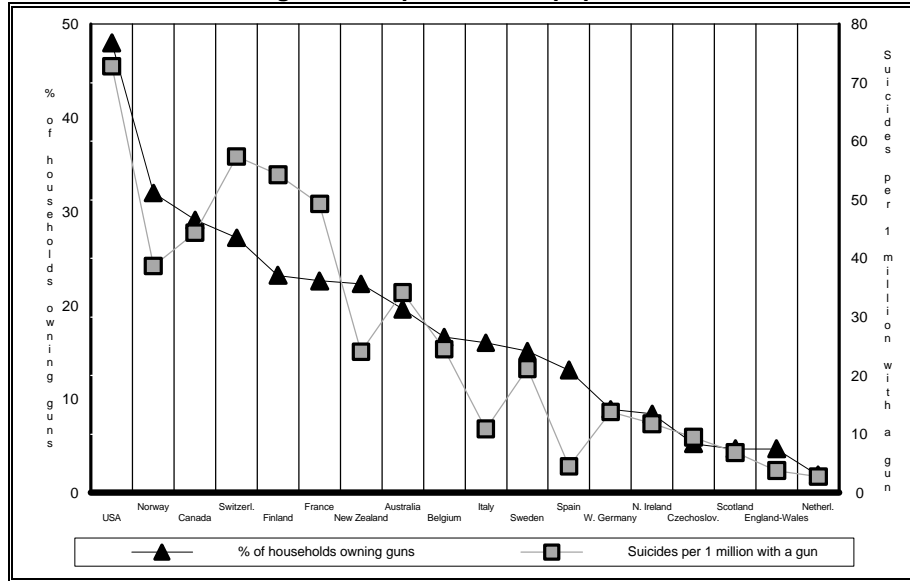
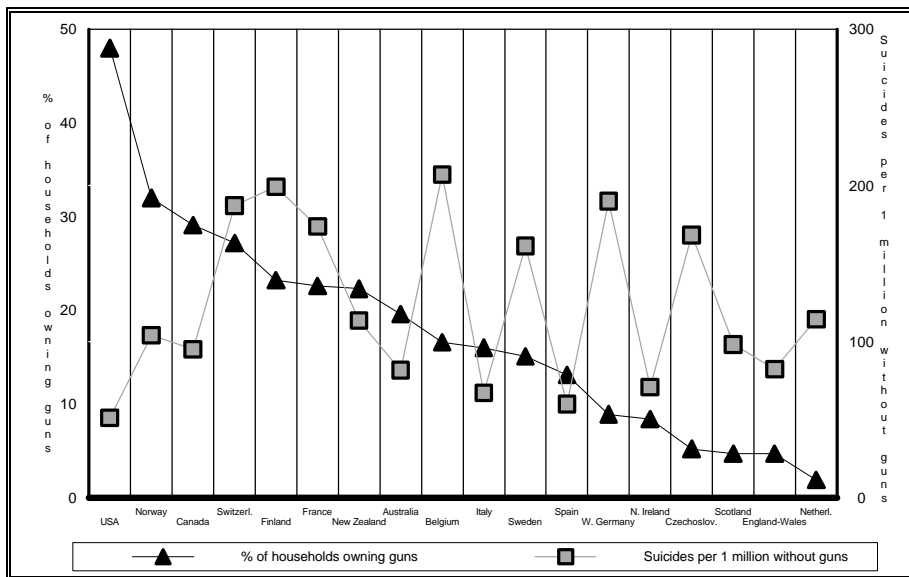


Figure 2: Relationship between gun ownership (in 18 countries) and rates of non-gun suicides



Thus, as suggested by proposition C and in line with previous research on displacement effects in connection with suicide²⁰, countries with widespread gun ownership do not experience less suicides with other means.

Interestingly, the strong correlation between gun ownership levels and suicides by firearms and the absence of any displacement effect do result in only moderately increased overall suicide rates (proposition D). Without the USA and Northern Ireland, the correlation is .353 and significant only at the .10 level; when Northern Ireland is added, the correlation becomes slightly stronger (.392) but when the USA (with its extremely low rate of non-gun suicides, see Table 2) is also included, it drops to .229 and becomes non-significant. The reason for the low impact of gun ownership on total suicide rates probably is the generally modest proportion of suicides which are committed with a firearm, the percentage ranging in the 18 countries from 2.4% in the Netherlands to 31.9% in Canada, with the USA (58.7%) being an outlier. Therefore, even a massive increase in suicides using firearms will result in only a moderate increase in overall suicide rates. Given the small sample size, any increase would need to be very large in order to reach statistical significance.

The correlation between gun ownership levels and suicide using firearms is stronger (.858 vs. .716) when, in the case of Swiss respondents, military firearms are included, instead of considering the impact of private firearms only. (No data are available on the number of victims specifically of military weapons in Switzerland.) We might conclude from this that, in the case of suicide at least, the mere presence of a lethal weapon shapes the outcome of an acute crisis, whatever the legal status or the technical characteristics of that weapon may be.

All these findings are confirmed by Spearman's rho.

Gun ownership and homicide

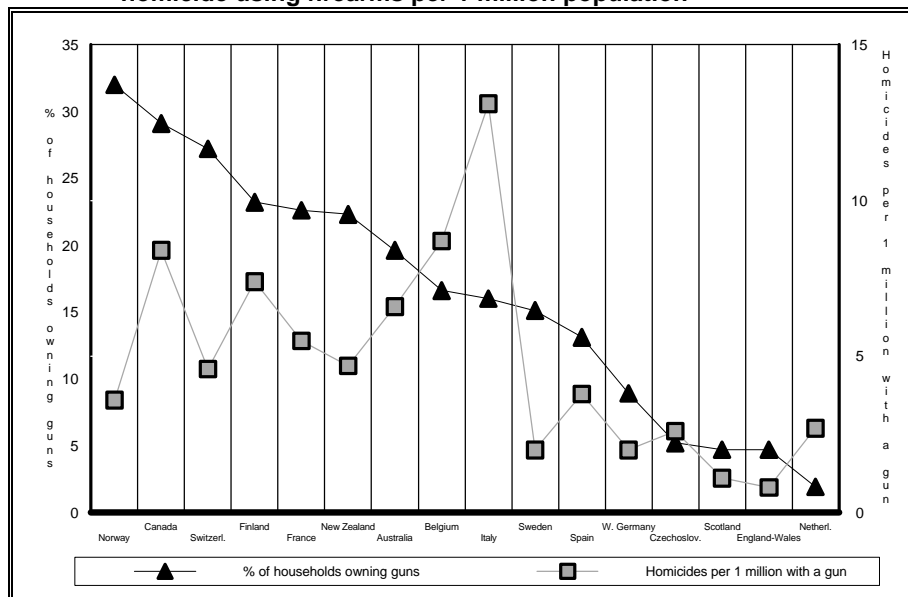
The correlation coefficients indicated in Table 3 show for homicide a somewhat similar pattern as for suicide, though the coefficients are different in size. The strongest correlation has been found between gun ownership and homicide rates (.476). This correlation becomes stronger when the USA and Northern Ireland are included (.610). Figure 3 allows to locate the 16 countries on both variables. The correlation is obviously reduced by the odd positions of Italy and Belgium.

The correlations given in Table 3, as well as in Figure 3, take into account all categories of firearms (handguns, rifles/shotguns, military guns). Given the predominance of homicides committed with rifles and shotguns over those committed with handguns, according to the data from five countries on which detailed information is available (see the above section on rates of homicide/suicide using firearms), it does not seem reasonable to conduct this analysis specifically for handgun ownership only. When, in the case of Switzerland, military guns are excluded from the present analysis, three out of four correlations become somewhat stronger (.369, .506, .313, and .539, instead of .418, .476, .212 and .441); however, since the number of victims killed with military weapons is not known for

²⁰ Clarke, R.V.G. and P.R. Jones (1989) "Suicide and increased availability of handguns in the United States" *Social Science & Medicine* 28/8:805-809; Clarke and Mayhew, Designing..., op. cit.

Switzerland, it is impossible to decide whether military weapons should be included or not in the present context.

Figure 3: Relationship between gun ownership (in 16 countries) and rates of homicide using firearms per 1 million population

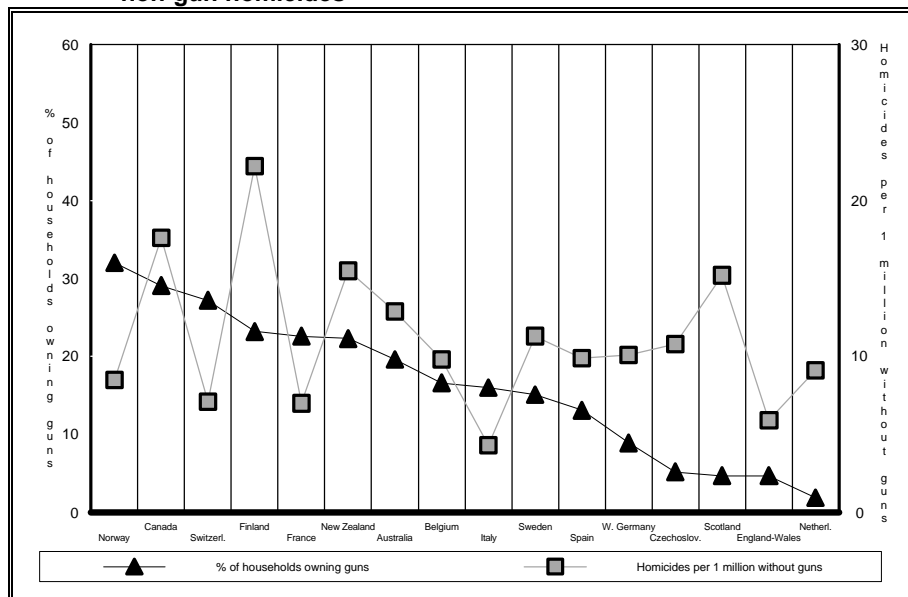


In sum, the safest way may be to take the overall gun ownership rate as the independent variable, and to restrict the analysis to the 16 countries without extreme scores on either variable. When these adjustments are made, the correlations are reasonably strong (Table 3) and support propositions A and B also for homicide.

Do increasing gun ownership rates and increasing rates of homicide using firearms go along with lower rates of other sorts of homicide, as suggested by the so-called displacement hypothesis? As the correlation given in Table 3 (.212) suggests, this may not be the case; proposition C is thus confirmed. As in the case of suicide, there is no indication that countries with high gun ownership rates and any gun-related homicides experience less homicides of other kinds. However, when - despite their extreme scores and the problems this implies in correlational analyses with small samples - the USA and Northern Ireland are included, this correlation becomes considerably stronger (.473) and significant ($p < .024$), though not as strong as the one between gun ownership and gun-related homicide (.610). One may conclude from this that the correlation between gun ownership and homicide with guns is stronger than the one with homicide with other means, suggesting that guns may increase homicide rates beyond a country's "natural" propensity to killings. However, the difference between the two correlations (.610 vs. .473, or .476 vs. .212 in the sample of the 16 countries) is not so strong as to rule out the possibility of an underlying third variable which might simultaneously increase gun ownership and (gun as well as non-gun) homicide. We shall return to this question in the discussion.

Figure 4 illustrates the position of the 16 countries without extreme scores regarding gun ownership and homicide with other means than a gun.

Figure 4: Relationship between gun ownership (in 16 countries) and rates of non-gun homicides



As suggested by proposition D, higher gun ownership rates seem to result in higher overall homicide rates. The tendency is even stronger than in the case of suicide ($r=.441$ vs. $.353$ respectively $.593$ vs. $.229$, when all 18 countries are included). This may be due to the generally higher proportion of homicides committed with firearms (see Table 2), which increases the chance that any change in homicides using firearms will affect the overall rate of homicides. However, Spearman's rho does not confirm proposition D, probably because certain countries with very similar scores have rather unexpected ranks. With this exception, Spearman's rho confirms all the other propositions (A,B,C).

In sum, the data concerning the relationship between gun ownership and homicide present many similarities with what has been observed for suicide; however, there are also some marked differences in the size of the correlations concerning suicide and homicide. We shall return to the questions raised by these findings in the discussion.

Alternative measures of gun availability

As Cook, Lester and others have argued,²¹ the percentage of suicides using firearms can be considered a valid proxy measure of gun ownership, either in itself

²¹ Cook, P.J. (1991) "The technology of personal violence: a review of the evidence concerning the importance of gun availability and use in violent crime, self defense, and suicide" *Crime and Justice* 14:1-

or in combination with other proxy measures. The present data tend to confirm this, since the correlation between that measure and the ICS measure of gun ownership is .912 (Table 3), a result which underlines the validity of both measures of gun availability in private households. When the percentage of suicides committed with firearms is used instead of the ICS measure, most of the correlations are almost identical with those shown in Table 3.

Table 4: Two different measures of gun ownership (percentage of suicides by firearms, ICS) and their correlations with different measures of homicide (16 countries, without USA and Northern Ireland)

	Percentage of suicides committed with firearms	ICS (direct question concerning presence of any guns in the household)
1. Percent homicides committed with firearms	.410	.418
2. Rate of homicides using firearms per 1 million population	.474	.476
3. Overall rate of homicides per 1 million population	.508	.441

The correlations shown in Table 4 suggest that the differences between the two measures of gun ownership are not large, and that either one will allow reasonably valid analyses.

The relatively weak correlation between the ICS measure of gun ownership and percentage of homicides using firearms (.418) illustrates how problematic this latter measure is when it is used as an indicator of gun ownership, as in the study by Sloan et al. and in several studies reviewed by Cook²². Whereas the percentage suicides using firearms may measure gun ownership as validly as direct questions (like those in the ICS), the percentage of homicides, robberies and perhaps also other violent crimes committed with firearms should no longer be used as indicators of gun ownership in cross-sectional analyses, whenever other measures (such as those used in the ICS) are available.

Discussion

Given the low number of countries considered, as well as some difficult problems of a temporal (i.e. causal) order, we prefer to insist on the preliminary and qualitative character of the present research. On the one hand, and for obvious reasons, the homicide and suicide rates had to be collected for past years; on the other hand, the data on gun ownership concern the time of data collection, i.e. the situation in 1989 and 1992, respectively. Even if we assume stability over time of

71; Lester, D. (1992) Gun control in Great Britain: saving lives or constricting liberties?, University of Illinois Press, Chicago.

22 Sloan et al., Handgun..., op. cit.; Cook, J. (1991) "The technology of personal violence: a review of the evidence concerning the importance of gun availability and use in violent crime, self defense and suicide" *Crime and Justice* 14:1-71.

cross-country variations in the relevant variables, it remains to be seen whether gun ownership rates affect crime rates, or whether the opposite is true. In general and contrary to time-series analyses, cross-sectional research does not allow the assessment of the causal order of the phenomena observed. Sometimes, however, it may be possible to rule out a concurring interpretation on the base of common sense. In the present case, suicide may be such an instance. It does indeed make sense that gun availability affects the proportion of suicides committed with guns, but one can hardly see how a high rate of suicides committed with guns should motivate people to buy guns. If one accepts this reasoning, one may infer from the role of guns in connection with suicide that high gun ownership rates increase gun homicides - and not the other way round.

But even if this is taken for granted, there still remains the possibility of eventual third variables which have not been considered here and which indeed might account for high scores on the independent and the dependent variables, rendering the correlations between gun ownership and gun-related events (suicides, homicides) spurious. In connection with homicide, one might consider the possibility that some cultural or structural variable, such as for example a general acceptance of violent solutions of conflicts in a given country, might be responsible for a high gun ownership rate as well as for a high rate of homicide using firearms²³. One might, for example, see the American West as a "gun culture" where the general acceptance of guns increases their presence as well as their use in violent encounters. Since, in all countries considered except the USA, Italy and Northern Ireland, only a minority of homicides are committed using firearms (see Table 2), one should expect, however, that a culture of general acceptance of violent solutions goes along with higher non-gun homicide rates, too. There is indeed a positive correlation between gun ownership rates and non-gun homicide rates (.212 and .473 respectively, in Table 3, when the two countries with extreme scores are included), but it is not as strong as the correlations found between gun ownership and homicide with guns, and neither is it significant (in the sample of 16 countries). The hypothetical third variable would, in order to render the correlation between gun ownership and homicide with guns spurious, need to produce high gun ownership levels and high homicide rates using firearms, but only marginally increase homicides through other means. Our data do not rule out the possibility that such a variable may exist, but one can hardly imagine what it might look like.

In the case of suicide, the problem is theoretically the same, but with a correlation close to zero (.107) between gun ownership and non-gun suicide, and with almost perfect correlations between gun ownership on one hand and percent suicides using firearms (.912) and gun suicide rates (.858) on the other hand, the chances are small that any third variable could render them spurious in a multivariate analysis. In the case of suicide, it might be even more difficult than in the case of homicide to imagine a hypothetical third variable which could account for high gun ownership rates as well as for widespread use of these weapons in suicides, and which would leave unaffected the rates of suicide committed with other means. To the extent that such intervening variables have been discussed in the literature, they are intuitively not very plausible; this may be true, for example,

²³ Kleck, G. (1991) Point blank, guns and violence in America, Aldine de Gruyter, Hawthorne, New York.

for depression as a cultural characteristic which Kleck²⁴ supposes to be responsible not only for high suicide rates, but also for strong reliance on self-defence and, concomitantly, widespread gun ownership.

Overall, therefore, it might be plausible to interpret the correlations between gun ownership and gun-related fatal events as a consequence of the formers' presence on the latter. In this connection, it is noteworthy that our data do not lend any support to the displacement hypothesis: whatever the outcome measure (suicide, homicide) considered, a high presence of guns does not go along with less non-gun events. Thus, there is no indication that people will, in the absence of guns, turn to knives or other lethal instruments. It is unclear, however, whether countries with high gun ownership rates experience higher (gun-related and total) suicide and homicide rates because guns increase the propensity of individuals to turn to violent solutions²⁵, or whether the risk of a fatal outcome is increased whenever a gun is involved, as studies reviewed by Cook and Rand, as well as a more recently published study suggest²⁶. WHO statistics count actual fatalities only, and police statistics are notoriously invalid in the present context since the use of a gun increases the probability that an incident will be recorded as an attempted murder rather than as an assault²⁷. Thus, the data used here or otherwise available at national levels do not allow to compare actual and attempted homicides concerning the relative involvement of guns.

It has been noted that the effects of gun ownership on suicide and homicide are similar, although they seem to be somewhat stronger concerning suicide. This difference may be a matter of the setting where these events occur, i.e. in a home (where guns may ordinarily be kept) or outdoors. Contrary to the USA where homicide most of the time occurs between strangers²⁸, it has remained in most European countries a crime involving predominantly intimates and close acquaintances²⁹; thus, homicide may occur in many cases in a setting not too different from suicide, though a smaller fraction of such acts is committed at home. This also highlights the importance of the availability (and not only of ownership) of

²⁴ Kleck, Point..., op. cit. p. 188.

²⁵ As de Fazio et al., drawing on earlier work by Berkowitz on the "weapons effect", hypothesizes; see de Fazio, F., S. Luberto and I. Galliani (1985) "Il ruolo criminogenetico e criminodinamico delle armi da fuoco nell'omicidio" in Canepa, G. (ed.) *Fenomenologia dell'omicidio*, Giuffrè, Milan, Italy.

²⁶ Cook, *The technology...*, op. cit.; Rand, M.R. (1990) *Handgun crime victims*, Bureau of Justice Statistics, Washington D.C.; Saltzman, L.E., J.A. Mercy, P.W. O'Carroll, et al. (1992) "Weapon involvement and injury outcomes in family and intimate assaults" *Journal of American Medical Association* 267/22:3043-3047.

²⁷ Bandini, T., U. Gatti and G.B. Traverso (1983) *Omicidio e controllo sociale*, Franco Angeli Editore, Milan, Italy; Sessar, K. (1981) *Rechtliche und soziale Prozesse einer Definition der Tötungskriminalität*, Freiburg, Germany.

²⁸ Rand, M.R. (1990) *Handgun crime victims*, Bureau of Justice Statistics, Washington D.C.; Maxfield, M.G. (1989) "Circumstances in supplementary homicide reports: variety and validity" *Criminology* 27/4:671-695.

²⁹ Massonet, G., R. Wagner and A. Kuhn (1990) "Etude des homicides dans les cantons de Zurich et de Vaud, en considérant plus particulièrement la relation victime-agresseur" *Bulletin de criminologie* 16/1-2:75-103; Bandini et al., *Omicidio...*, op. cit.; Sessar, *Rechtliche...*, op. cit.

guns. As Cook suggests,³⁰ future measures of the presence of guns in private households (such as any future ICS) should try to assess to whom guns are available, at what time, under what circumstances, and in what setting.

Conclusions

The present study, based on a sample of eighteen countries, confirms the results of previous work based on the 14 countries surveyed during the first International Crime Survey.³¹ Substantial correlations were found between gun ownership and gun-related as well as total suicide and homicide rates. Widespread gun ownership has not been found to reduce the likelihood of fatal events committed with other means. Thus, people do not turn to knives and other potentially lethal instruments less often when more guns are available, but more guns usually means more victims of suicide and homicide.

Since the present analysis is based on a cross-sectional design, the interpretation of the correlations observed is complicated by the ambiguity of the causal order and the presence of eventual third variables. Although we have seen above that alternative interpretations are intuitively not very plausible, the ultimate answer is that they cannot be ruled out. However, it seems not reasonable to trust that any such - theoretically possible, though yet unknown - intervening variable will be responsible for the correlations observed. What we know is that guns do not reduce fatal events due to other means, but that they go along with more shootings. Although we do not know why exactly this is so, we have a good reason to suspect guns to play a - fatal - role in this.

Where should we go from here? In terms of the research agenda, an increase in the number of countries participating in the next ICS would allow a more robust test of the hypothesis at stake. The questions on the type and number of weapons owned and the way they are kept would also need to become more detailed, as discussed earlier. In the longer run, one could also try to evaluate the impact of eventual policy changes on the relevant dependent variables by using a longitudinal design. Finally, more detailed information on the exact circumstances of gun-related and other homicides would be desirable, such as, for example, the kind of relationship between the author and victim by weapon type.

In terms of the political agenda, the main question is whether measures to stop the ever increasing trend in gun ownership will be judged unacceptable as long as available research and knowledge does not allow to rule out the eventuality that guns are not as dangerous and fatal as common sense, as the observed correlations seem to suggest. Waiting for more convincing evidence risks jeopardizing the potential benefits from more rigorous approaches to gun control, since, as the American example illustrates, reducing the number of guns in the hands of the private citizen may become a hopeless task beyond a certain point. The crucial policy question is, then, how much time may we allow ourselves to wait for more convincing research before we take any steps to curb gun ownership rates.

³⁰ Cook, *The technology...*, op. cit.

³¹ Killias, *International...*, op. cit.

