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Uncleared Homicides

A Canada/United States Comparison

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Beginning in the 1960s, there has been a marked decline in clearance rates of homicides, a finding that has generated little interest among criminological researchers. This article presents a comparative analysis of homicide clearance in Canada and the United States using data generated by the Canadian Centre of Justice Statistics and the U.S. Federal Bureau of Investigation's Supplementary Homicide Reports. Using logistic regression, homicide clearance is predicted on the basis of specific victim and offense characteristics for cases in Canada versus the United States and in Ontario versus New York State. The results indicate that the model is a good fit for homicide clearance in both countries as a whole. Whereas the homicide weapon, circumstances surrounding the offense, age, and gender of the victim were found to be significant homicide clearance predictors in New York State, only the circumstances surrounding the offense emerged as an important predictor in Ontario.

In the past several decades there has been a substantial decline in the percentage of homicides cleared in both the United States and Canada. From 1961 to 1991, uncleared homicides in the United States rose from 7% to 33% (Cardarelli & Cavanagh, 1992), whereas in Canada, the uncleared homicide rate reached slightly more than 20% in 1993, compared to 5% in 1966 (Silverman & Kennedy, 1997).

The trend toward reduced rates of clearance is particularly worrisome if it is indicative of a change in the nature of homicide.

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Silverman and Kennedy (1987) suggest that this may be the case, noting that the rise in uncleared rates is possibly due to an increasing proportion of homicides occurring between individuals with little or no previous relationship (i.e., either complete strangers or people with little previous contact).

The social implications of this trend are alarming. Higher uncleared rates may reflect greater risk to individuals in society when the (unknown) perpetrators are recidivists or involved in felony-related offenses (Riedel, 1995a). The perception of an “at large” status of a substantial proportion of homicide offenders is likely to reduce the value of deterrence associated with arrest and conviction (Riedel & Rinehart, 1996); in effect, higher uncleared rates can reduce perceptions of certainty of punishment, an important deterrence factor. Also, the trauma suffered by victims’ family members is made worse by the absence of arrested offenders (Riedel & Rinehart, 1996). Finally, because clearance rates are often used as a measure of police effectiveness (Cordner, 1989; Riedel, 1995a; Waegel, 1981), rising uncleared rates of homicide could have an effect on both police morale and society’s perception of police effectiveness.

Despite the sizable decline in homicide clearances over the past several decades, surprisingly little research has been directed toward determining why these offenses remain uncleared. The literature to date is limited in both volume and quality. In particular, there is a noticeable absence of cross-national research on clearances, which should not be surprising given the more general tendency of research on crime and violence to be confined to one nation, the United States (Archer & Gartner, 1984). To date, comparisons of clearances in Canada and the United States are limited to the exploratory work of Silverman and Kennedy (1997). A cross-national approach may provide insights not available when examining a single nation.

LITERATURE REVIEW

Recently, a small number of researchers have addressed issues related to clearance of violent offenses. Findings from these studies can be summarized as follows.

Clearance rates vary by area of the country (Cardarelli & Cavanagh, 1992; Silverman & Kennedy, 1997). In the United States, uncleared homicides are highest in the northeastern region and in municipalities with populations of more than half a million. In Canada, British Columbia and Quebec have the lowest clearance rates.

Clearance rates vary for racial groups (Cardarelli & Cavanagh, 1992; Regoeczi, 1996; Silverman & Kennedy, 1997). Clearance rates are highest for African Americans and lowest for Hispanics in the United States, and are highest for Native Canadians in Canada. Clearance rates tend to be lowest in cases involving homicide combined with other felony-type offenses (Cardarelli & Cavanagh, 1992; Regoeczi, 1996; Riedel, 1995a; Silverman & Kennedy, 1997). Clearance rates for individuals 65 years of age and older tend to be low (Cardarelli & Cavanagh, 1992; Riedel & Rinehart, 1996), perhaps reflecting the fact that people in this age group are often involved in robbery-related homicides (Fox & Levin, 1991; Kennedy & Silverman, 1990).

Victim-offender relationship has proven to be one of the strongest predictors of clearance (Rinehart, 1994). Relationships involving family members have been much easier to clear than those involving more distant relationships. Silverman and Kennedy (1997) note that the uncleared homicide rate in the United States is almost 6 times that of Canada, where the overall homicide rate is between 3 and 4 times higher. This is consistent with research demonstrating that the United States has considerably higher proportions of stranger homicide, whereas in Canada, more intimate victim-offender relationships are prevalent. Riedel (1995b) finds that family-related murders as a proportion of all murders in the United States have declined from 27% to 15% between 1976 and 1989, indicating a simultaneous decline in murders most easily cleared by arrest.

Rinehart (1994) examined a series of police variables that she suggested may have an impact on murder clearances. However, police organizational changes between 1981 and 1991 did not seem to have an effect on clearance rates. Greenwood, Chaiken, and Petersilia (1977) argue that department-wide arrests and clearance rates do not constitute reliable indicators of the effectiveness of police investigative procedures. They find that clearances result from patrol officers' activities, the obtainability of

offender identification at the crime scene, or routine police operations. Behavior on the part of members of the public has a far more profound effect on the fate of cases than do police operations. Riedel (1994) suggests that there is a greater likelihood of both the availability of informants and their availability in larger numbers in dispute-related homicides as compared to those involving predatory violence, such as robbery homicides.

In sum, the focus and conclusions of much of the research on homicide clearance vary. It is also largely descriptive. A comparison of clearances in the United States and Canada may be instructive; although the countries share a great deal, they are also quite different in some notable respects. Most notably, the proportion of domestic-related homicides is still far greater in Canada than it is in the United States, a fact that would lead us to expect some differences in the countries' clearance rates.

HYPOTHESES

Research on homicide has pointed to the significance of several variables with regard to whether an offense will be cleared. On the basis of this literature, we can develop a model for predicting homicide clearance, which seeks to integrate these previous findings. Of course, we are restricted by variables available in the two secondary data sets used. The model we employ incorporates the variables of gender, race, age, weapon, and circumstances surrounding the offense. By employing a multivariate analysis, we are able to test whether each individual variable has an impact on the likelihood of clearing a case while the effects of other variables are held constant. In this way, we can rule out the possibility that the influences of some variables are confounded with others.

Hypothesis 1: Gender—Uncleared homicides are more likely to involve male victims than are cleared homicides.

Males are predominantly the offenders and the victims of homicide (Block, 1986; Miller, 1983; Riedel, Zahn, & Mock, 1985; Silverman & Kennedy, 1993; Wilbanks, 1984; Wilson, 1993; Wolfgang, 1958; Zahn & Sagi, 1987). However, they may be even more overrepresented as victims in uncleared cases. We argue that females will be underrepresented as victims of uncleared ho-

micides in light of a significant body of literature indicating that a small proportion of female victims are murdered by someone not known to them (Browne & Flewelling, 1986; Hazlett & Tomlinson, 1987; Miller, 1983; Silverman & Kennedy, 1993; Wilbanks, 1984). Given the finding that clearance is most difficult when the crime involves strangers, we expect that uncleared homicides will most often involve male victims.

Hypothesis 2: Race—Uncleared homicides are more likely than cleared homicides to involve White victims.

Previous research has revealed high proportions of White victims in stranger homicides (Riedel et al., 1985; Silverman & Kennedy, 1993; Wilbanks, 1984). If, as Riedel (1995c) suggests, homicides between strangers are more difficult for police to solve, this pattern suggests a greater likelihood of a homicide remaining uncleared when the victim is White, as they are more often killed by strangers than are visible minorities.

Due to the unique racial make-up of the Canadian population, the race variable is necessarily different for Canada than for the United States. In Canada, Native Canadians are used as a comparison population for Whites (see, for example, Silverman & Kennedy, 1993). Silverman and Kennedy (1997) found higher clearance rates for Native Canadians than for Whites, which they suggest relates to Native homicides being predominantly family- and alcohol-related and occurring on Native reserves (see also Doob, Grossman, & Auger, 1994, and Strang, 1991, for similar findings involving Aboriginals in Australia). Because Whites likely compose a substantial proportion of the victims in stranger and acquaintance homicides, there is a greater probability of White victims in uncleared homicides. Consequently, we expect a greater proportion of White victims in uncleared than cleared homicides.

Hypothesis 3: Age—Uncleared homicides are more likely than cleared homicides to involve victims 65 years of age and older.

Although the previous literature indicates slight variation with regard to the age group with the highest risk of homicide victimization, the general trend shows that victims are typically slightly older than offenders (Block, 1986; Curtis, 1974; Riedel et al., 1985;

Silverman & Kennedy, 1993; Wolfgang, 1958; Zahn & Sagi, 1987). Furthermore, there is significant evidence suggesting that the elderly are disproportionately represented among stranger homicides (Kennedy & Silverman, 1990; Maxfield, 1989; Silverman & Kennedy, 1987, 1993). Consequently, these individuals are at a greater risk of becoming the victim of an uncleared homicide. Wolfgang (1958), for example, found that individuals 65 years of age and older are 4 to 5 times more often victims in unsolved than solved cases. In Dade County, Wilbanks (1984) found that homicides in which the victim is 65 years of age or older have a clearance rate of only 46.9%. Cardarelli and Cavanagh (1992) interpret their finding that no relationship between the victim and offender is indicated in 33% of homicides involving victims aged 65 and older with respect to the fact that “many of the nation’s elderly reside in large urban areas where they may be isolated from the wider community and easy prey for criminal victimization” (p. 7). We expect, therefore, that there will be a higher proportion of victims aged 65 years and older within the category of uncleared homicides compared to cleared homicides.

Hypothesis 4: Weapon—Uncleared homicides are more likely to be committed with a firearm than are cleared homicides.

Weapon types vary by the nature of the homicide (Gillis, 1986; Silverman & Kennedy, 1987; Wolfgang, 1958; Zahn & Sagi, 1987). Various studies indicate that handguns are the most frequently used weapon in stranger homicides (Riedel & Przybylski, 1993; Riedel et al., 1985; Silverman & Kennedy, 1987).

The climbing rate of uncleared homicides in the United States may in part be a product of the increasing use of guns in homicides. For example, Farley (1980) reports that between 1960 and 1975, the employment of guns in all homicides increased from 55% to 67%. We suspect that a larger proportion of uncleared homicides than cleared homicides will involve the use of a gun.

Hypothesis 5: Circumstances surrounding the offense—Uncleared homicides are more likely than cleared homicides to occur during the commission of another offense.

Riedel and Rinehart (1996) found that the most significant variable in predicting whether a murder will be cleared is whether it is

a felony homicide. In contrast, Zahn and Sagi (1987) found that in stranger nonfelony homicides, 89% are witnessed by at least one person (which should lead to easier clearance). Research indicates that there is a disproportionate number of felony homicides in the uncleared category (Cardarelli & Cavanagh, 1992; Regoeczi, 1996; Rinehart, 1994). Felonies such as rape and robbery, which may culminate in murder, have an inherent hit-and-run nature, resulting in fewer police arrests at the crime setting (Black, 1970). Consequently, we expect that victims who are murdered during the commission of another offense will be disproportionately represented in uncleared homicides.

METHOD AND MEASUREMENT

The data for this study were derived from two sources. The Canadian data were generated by the Canadian Centre for Justice Statistics, Statistics Canada, and cover the years 1961 to 1983, providing a data set of 9,642 cases.¹ The U.S. homicide data were generated from the Federal Bureau of Investigation's Supplementary Homicide Reports (SHR) for the years 1976 through 1992, resulting in a data set of 341,369 cases. In both instances, the analyses were carried out using victim-level data. Although the U.S. and Canadian homicide data do not provide information covering identical time spans, data covering the 8 years between 1976 and 1983 are available in both data sets. Whereas analyses involving comparisons of disparate years are not uncommon in the literature (e.g., Galanter, 1983), potential difficulties that could arise from the use of incongruous data sets should be offset by the existence of long-term trends. In particular, although the Canadian homicide data begin and end earlier than the U.S. data, patterns in the nature of uncleared homicides should not change at a rate fast enough to make comparisons between the countries problematic.²

This study employs parallel analyses of the Canadian and U.S. homicide data. Comparative analyses of uncleared homicides in Canada and the United States make it possible to determine whether different variables had an impact on homicide clearance in the two countries. This comparison should also reveal explanations for the higher uncleared homicide rate in the United States than in Canada.

Two analyses are undertaken. To reveal factors that differentially impact uncleared homicides in Canada and the United States, the first analysis includes all homicide cases reported for the two countries during the time periods available. However, comparing two very large countries may result in regional and cultural variation being subsumed in the average. We therefore undertake a second analysis that compares Ontario and New York State in an effort to compare areas with very different racial compositions. This analysis provides a comparison of major demographic groups in contiguous states or provinces. Despite being home to more than half of Canada's visible minority population, Ontario is still largely White in its racial composition, whereas New York has a substantial African American population. Thus, these two regions provide an investigation of areas having diverse racial and cultural constitutions. Further differentiating the two, gun laws and attitudes toward guns are very different in the two areas³ and drug- and gang-related crime occurs at a much lower rate in Ontario.

With respect to this study, clearance of a homicide refers to those cases in which an offender has been identified. This may involve the arrest of a suspect, laying a charge without apprehending a suspect, or solving the case in some other manner. Clearance does not provide any indication of whether the suspect is at any point tried and convicted for the offense because a range of other factors come into play in the criminal justice process beyond the arrest of a suspect.

The dependent variable, clearance status, was dichotomized into cleared homicides and uncleared homicides. With respect to the Canadian data, this involved collapsing the categories of "cleared by charge,"⁴ "cleared otherwise," and "cleared by suicide" into a single category of "cleared homicides," coded as 1. The remaining category of "unsolved," coded as 0, was relabeled "uncleared homicides."

The SHR do not provide clearance categories for homicide offenses such as those available in the Canadian data set. However, the variable labeled "situation of offense" provides two categories that indicate that the homicide case is uncleared. These categories are labeled *single victim(s)/unknown offender(s)* and *multiple victim(s)/unknown offender(s)*. These categories were

combined to create a single category of uncleared homicides. The remaining four categories of "one victim/one offender," "one victim/multiple offenders," "multiple victims/one offender," and "multiple victims/multiple offenders" were collapsed into one category, cleared homicides. For the purposes of this research, uncleared homicides with respect to the U.S. data refer to murders in which the offender is unknown.⁵

The independent variables are the five predictor variables contained in both data sets. The variables are victim gender, age, race, means of offense, and apparent motive/circumstances. For the purposes of analyses, the age variable was collapsed into the following six categories: younger than 10 years, 10 to 19 years, 20 to 29 years, 30 to 49 years, 50 to 64 years, and older than 65 years. This breakdown corresponds to that used by Cardarelli and Cavanagh (1992) and Riedel and Rinehart (1996). The gender of the victim is coded as 0 = male or 1 = female and the unknown values are coded as missing. The race variable from both data sets was recoded into a dichotomous variable, such that 0 = White and 1 = non-White (all other races). The weapon variable is constructed so that all types of guns are coded as 0 = firearm and all other weapons are coded as 1 = nonfirearm.

The apparent motive variable in the Canadian data set is coded into the following categories: revenge, jealousy, anger/hatred, argument/fight, robbery/theft, sexual assault/rape, self-defense, escape, with other criminal act, inadvertent act, other motive, and mentally ill/insane. This variable was recoded so that the categories of robbery/theft, sexual assault/rape, and with other criminal act were collapsed into 0 = another criminal act, and all other categories were collapsed into 1 = no other criminal act. The circumstances surrounding the homicide cover 32 categories in the SHR. These were recoded as follows: 0 = felony⁶ (which includes the categories of rape, robbery, burglary, larceny, auto theft, arson, prostitution, other sex offense, narcotics laws, gambling, other felony, and suspected felony) and 1 = nonfelony (which includes the categories of abortion, lovers' triangle, killed by babysitter, brawl under alcohol, brawl under drugs, argument over money, other arguments, gangland killing, youth gang killing, institution killing, sniper attack, felon by citizen, felon by police,⁷ and other). The unknown category was recoded as a

missing value. The recoding of the homicide circumstances in the SHR was based on a determination of whether the homicide occurred at a time when another act that could be deemed illegal was being perpetrated.

Logistic regression is used as the statistical means of analysis.⁸ As discussed in the results, interpretation of logistic coefficients makes it possible to determine the odds of a homicide being cleared.

RESULTS

Homicide Clearance in Canada and the United States

A forward conditional regression analysis was run separately using the Canadian and U.S. homicide data. Deviation coding is used for all of the independent variables, allowing for a comparison of the effect of each category to the average effect of all categories.

The most notable difference between homicides committed in Canada and the United States is the sheer volume of murder that occurs in the United States. Our data sets reveal that the average number of victims of homicides in Canada annually is 419, whereas the U.S. average is 20,080. Homicide counts fluctuate in both countries on a year-to-year basis. In Canada, the number of homicides increased from 175 in 1961 to 603 in 1983, peaking in 1977 with 635 homicides. Homicides in the United States increased from 17,616 in 1976 to 22,710 in 1992, reaching a peak in 1980 with 23,088 homicides.

The uncleared homicide rate is also higher in the United States. In Canada, an average of 14.5% of homicides per annum remain uncleared (1961 to 1983), whereas in the United States there is an average of 27.3% uncleared (1972 to 1992). This percentage also fluctuates over time. Particularly in the United States, however, the trend is toward an increasing proportion of cases remaining uncleared. This percentage increased from 20.9% in 1976 to its peak in 1992 of 34.4%. In Canada, the percentage increased from 6.3% in 1961 to 18.6% in 1983. It was lowest in 1966 at 4.8% and highest in 1975 at 19.2%.

Canada

There were 7,917 Canadian cases included in the analysis.⁹ Looking specifically at the predictor variables, the findings shown in Table 1 provide general support for the model; all of the variables have a significant effect except for two of the age categories. The effects on the likelihood of homicide clearance of the victim's age falling between 10 and 19 years or 50 and 64 years are not statistically significant in comparison to the average effect of all the age categories. The only age group that increases the odds of the homicide being cleared is victims younger than 10, in which the odds are increased by a factor of 3.4. Odds ratios¹⁰ below a value of 1.00 for the remaining age categories of 20 to 29, 30 to 49, and older than 65 indicate that for cases involving victims whose ages fall within one of these categories, the odds of clearing the homicide are decreased, although this is more so the case for the victims in the two younger age groups. The higher likelihood of clearance for victims younger than 10 compared to the remaining age groups is likely due to the lifestyle, limited interaction, and consistent presence of guardians that characterizes the early stages of life for most North Americans. As Cardarelli and Cavanagh (1992) suggest, children younger than 10 have a much greater probability of being under the constant surveillance of a caregiver, making them considerably less likely to be the murder victim of a stranger. The routine activities of young children thus may substantially reduce their chances of being killed by someone unknown to them in comparison to the remaining age groups who, having attained more freedom, are more vulnerable to stranger victimization. The greater likelihood of young children being killed at the hands of a relative or friend also suggests that the nature of family violence may be linked to higher clearance rates for child victims. Finally, greater investigative efforts devoted to child murders by police may increase the likelihood of clearance in these homicides as well.

The effects of the remaining predictor variables on the odds of homicide clearance all provide support for the hypotheses derived from the homicide clearance model. More specifically, when the homicide is not committed with another criminal act, the odds of the homicide being cleared are increased by a factor of 2.2. When the victim in the homicide case is not White, the odds of clearing the case are increased by a factor of 1.9. Finally, when the

TABLE 1
Logistic Regression Results for the Prediction of Homicide Clearance in Canada

<i>Variable</i>	<i>B</i>	<i>SE</i>	<i>R</i>	<i>Odds Ratio</i>
Younger than 10	1.221**	.302	.052	3.392
Age 10-19	-.052	.135	0	.949
Age 20-29	-.725**	.094	-.105	.484
Age 30-49	-.516**	.090	-.077	.597
Age 50-64	.082	.116	0	1.086
Older than 65	-.011 ^a	—	—	.990
No concomitant criminal act	.805**	.044	.249	2.236
Non-White victim	.660**	.078	.115	1.934
Female victim	.282**	.045	.083	1.325
No firearm used	.265**	.041	.088	1.303
Constant	2.698**	.103		

NOTE: Model chi-square = 630.107, $p < .001$. Improvement = 40.977, $p < .001$.

a. The value of the coefficient for the last category is not displayed in the output, and thus has to be calculated by hand.

** $p < .01$.

victim is a female or the weapon used in the homicide is not a firearm, the odds of the homicide being cleared are increased by a factor of 1.3.

Examining the R statistics¹¹ reinforces the finding that the circumstances surrounding the offense have the strongest impact on the likelihood of homicide clearance. The multivariate nature of the analysis indicates, however, that the circumstances are not the only factor influencing whether or not a homicide is cleared because the remaining variables all have significant effects after controlling for the circumstances surrounding the offense, thereby allowing us to conclude that the effects of these other variables are not spurious. The race variable has the next strongest effect after the circumstances variable. The gender and weapon variables have the smallest R values, suggesting that the partial contribution of these variables to the model is minimal.

The United States

The logistic regression analysis using all of the homicide cases contained in the SHR for the years under examination included 305,482 cases.¹² The findings provide general support for the predictor model.

TABLE 2
Logistic Regression Results for the Prediction of Homicide Clearance in the United States

<i>Variable</i>	<i>B</i>	<i>SE</i>	<i>R</i>	<i>Odds Ratio</i>
Younger than 10	.617**	.034	.037	1.852
Age 10-19	-.261**	.016	-.033	.771
Age 20-29	-.210**	.012	-.036	.811
Age 30-49	-.041**	.012	-.007	.960
Age 50-64	-.040*	.017	-.004	.961
Older than 65	-.120 ^a	—	—	.887
No concomitant felony	1.013**	.006	.360	2.754
Non-White victim	.016**	.006	.005	1.016
Female victim	.136**	.007	.039	1.145
Constant	1.575**	.010		

NOTE: Model chi-square = 34430.999, $p < .001$. Improvement = 7.954, $p < .01$.
a. The value of the coefficient for the last category is not displayed in the output, and thus has to be calculated by hand.
** $p < .01$. * $p < .05$.

As shown in Table 2, the only variable that is not included in the final model is the homicide weapon. Unlike homicide clearance in Canada, whether or not the homicide weapon is a firearm does not significantly affect the odds of clearing a homicide case in the United States. U.S. homicides overwhelmingly involve firearms as weapons (65.4% compared to 39% in Canada). The substantial levels of gun ownership in the United States may result in their use in a variety of homicide types, balancing out their involvement in those that are more difficult to solve (i.e., those that are felony-related). Furthermore, there is evidence suggesting that the proportion of spousal homicides in the United States involving firearms has increased (Silverman & Kennedy, 1993). As a result of a lack of variation in the use of guns in U.S. homicides, weapon type does not predict the likelihood of homicide clearance.

The remaining predictor variables are statistically significant at a .01 level, with the exception of the age category of 50 to 64, which is statistically significant at a .05 level. Examining the *R* values in Table 2 indicates that, in general, the various age categories have a small partial contribution to the model. Similar to homicide clearance in Canada, the odds of clearing the case are increased only for victims in one age category, those younger than 10 years. However, for the United States, the odds of clearance in these cases are increased by a factor of 1.85, whereas the odds are increased in

Canada by a factor of 3.5. This suggests that cultural factors may be influencing homicide patterns. In particular, previous research has found that some homicides involving African American children are distinct in that they are the victims of nonfamily members, implying the possible existence of youth conflict (Silverman, Riedel, & Kennedy, 1990). This pattern may reduce the generally solvable nature of homicides involving child-aged victims, resulting in a smaller increase in the odds of homicide clearance in the United States. For all other age variables, there is a decrease in the odds of homicide clearance when the victim belongs to one of these age categories, compared to the average effect of all age categories, although the decreases are not substantial.

The circumstances surrounding the offense variable have the largest partial contribution to the model ($R = .360$). The odds ratio signifies that when the homicide does not involve a concomitant felony, the odds of clearing the case are increased by a factor of 2.75. Thus, the prediction derived from the homicide clearance model is supported. The circumstances variable appears to have a similar influence on homicide clearance in both Canada and the United States, in each case having the greatest impact on the odds of clearing a homicide. Thus, the much higher proportion of U.S. homicides involving the perpetration of another criminal offense (compared to the Canadian case) is most likely causing their significantly greater uncleared rates. The partial contribution of the gender variable to the model is small ($R = .039$). However, the odds ratio shows that when a homicide involves a female victim, the odds of clearing the case are increased (by a factor of 1.15), which does support the hypothesis that males are more likely to be victims of uncleared homicides. Nevertheless, the likelihood of homicide clearance in both Canada and the United States in general does not appear to be significantly affected by the gender of the victim. There are reasons to suggest that the proportion of female victims who are killed by strangers or acquaintances may be rising, which may in turn increase the number of women who are victims in uncleared homicides.¹³ Research examining the relationship between the changing sex-roles of women and the risk of female homicide victimization suggests the possibility of women's more frequent exposure as potential victims today than in the past (Gartner, 1990; Gartner, Baker, & Pampel, 1990; Smith, 1987).

An interesting finding emerged with respect to the race variable. The odds ratio of 1.02 signifies that when the homicide involves a victim who is not White, the odds of clearing the case are increased. However, the partial contribution of this variable to the model is negligible ($R = .005$). Thus, the likelihood of homicide clearance is barely distinguishable by the race of the victim.¹⁴ The influence of the victim's race on the odds of homicide clearance is clearly greater in Canada, where clearance was almost twice as frequent when the victim was not White. This finding reflects the different homicide patterns of the non-White victims in the two countries. In Canada, the majority of non-White victims are Native Canadians, whereas in the United States, the category of non-White victims is overwhelmingly made up of African Americans. Homicides among Native Canadians occur predominantly on reserves between family members, which poses little difficulty in terms of identifying the perpetrator (Silverman & Kennedy, 1997). On the other hand, the U.S. data indicate that a substantial proportion of African American homicide victims are killed by friends and acquaintances (42.2%). Furthermore, fewer African Americans than Whites are killed at the hands of a family member (13.7% compared to 17.6%). Thus, the disproportionate presence of White victims in both those homicides most easily cleared by arrest (family-related murders) and those more difficult for police to clear (stranger murders) may create a contradictory effect that functions to reduce the influence of the race variable as a predictor of uncleared homicides in the United States.

Homicide Clearance in Ontario and New York State

Nearly one third of all reported homicides in Canada between 1961 and 1983 were committed in Ontario (28.8%). The number of homicides in New York State accounts for about one tenth of all cases reported to the SHR from 1976 through 1992 (9.8%). The uncleared homicide rate in Ontario is lower than the national average (9.7% compared to 14.5%). New York, on the other hand, has a substantially greater rate of uncleared homicides than the United States as a whole (45.7% compared to 27.3%). Large urban areas such as New York City are likely driving the uncleared rate in this state, where drug- and gang-related conflicts are not uncommon.

TABLE 3
Logistic Regression Results for the Prediction of Homicide Clearance in Ontario

<i>Variable</i>	B	SE	R	<i>Odds Ratio</i>
No concomitant criminal act	1.389**	.115	0.422	4.012
Constant	2.761**	.115		

NOTE: Model chi-square = 161.217, $p < .001$. Improvement = 161.217, $p < .001$.
 ** $p < .01$.

Ontario

The logistic regression analysis for homicides reported in Ontario contains 2,215 cases.¹⁵ The final model, presented in Table 3, includes only the circumstances surrounding the offense. The results signify that when a homicide case does not involve the commission of another criminal offense, the odds of clearing the case are increased by a factor of 4.01. Thus, the predicted relationship between the circumstances surrounding the case and homicide clearance is supported.

The variables of weapon, victim age, gender, and race were not in the final model. That the likelihood of homicide clearance in this province is not distinguishable on the basis of gender may be the result of homicide trends in the large metropolitan areas such as Toronto and Hamilton, where high levels of mobilization, single-parent households, and anonymity may put females at a greater risk of stranger homicide victimization than in provinces characterized by more rural communities. As noted by Cardarelli and Cavanagh (1992), there is more interaction with strangers during everyday routine activities in large urban areas than in smaller rural or suburban locations.

The weapon and the age of the victim do not appear to be important predictors of homicide clearance in Ontario. The observation that the use of a firearm does not affect the odds of clearing a homicide in Ontario is consistent with the findings of Silverman and Kennedy (1997), who found variations in clearance rates by weapon only for Quebec. The province of Quebec, which often has gang-related homicides, drives Canada's uncleared rate. Other research has shown that more gang than nongang homicides involve guns (Bailey & Unnithan, 1994; Maxson, Gordon, & Klein, 1985).

TABLE 4
Logistic Regression Results for the Prediction
of Homicide Clearance in New York State

<i>Variable</i>	<i>B</i>	<i>SE</i>	<i>R</i>	<i>Odds Ratio</i>
Younger than 10	.388**	.098	.026	1.474
Age 10-19	.017	.051	0	1.017
Age 20-29	-.132**	.037	-.023	.877
Age 30-49	-.014	.037	0	.986
Age 50-64	.126*	.053	.013	1.135
Older than 65	-.386 ^a	—	—	.680
No concomitant felony	.474**	.018	.181	1.610
Female victim	.241**	.025	.066	1.270
No firearm used	.284**	.019	.102	1.330
Constant	1.072**	.030		

NOTE: Model chi-square = 1344.750, $p < .001$. Improvement = 59.984, $p < .001$.

a. The value of the coefficient for the last category is not displayed in the output, and thus has to be calculated by hand.

* $p < .05$. ** $p < .01$.

New York State

The logistic regression analysis for homicide clearance in New York State includes 20,779 cases.¹⁶ The results are shown in Table 4, and suggest that, in general, the model is a better fit in terms of homicide clearance in New York State than Ontario.

The final model contains four predictor variables. Only the race of the victim does not have a significant effect on the odds of clearing a homicide case. Race of the victim was not in the final model for either Ontario or New York State. The absence of victim race in the Ontario model may in part be a reflection of lower percentages of non-White victims in this province than for Canada as a whole. In the absence of high murder rates of Native Canadians in Ontario, the positive influence on homicide clearance of this group is reduced, rendering the variable insignificant. An intriguing finding concerns the absence of the race variable in the homicide clearance model for New York State, particularly because it has a significant impact for the United States as a whole. Moreover, the proportion of White homicide victims in New York State does not differ substantially from that found for the United States generally (49.5% and 52.5%, respectively). It is possible that there are two different phenomena operating here that function to cancel each other out, making race an insignificant predictor of homicide clearance in New York State. As noted earlier, the higher

frequency of White victims in stranger homicides may result in a greater probability of victims of uncleared homicides being White. However, the high homicide rate in New York State may be a reflection of substantial levels of social disorganization believed to characterize large urban areas such as New York City.

The African American population living in big U.S. cities is frequently exposed to economic deprivation, discrimination, and the discontent that plagues most inner cities (Silverman & Kennedy, 1993). The nature of homicide in such neighborhoods is often quite different than that in predominantly White neighborhoods. Gang- and drug-related homicides that often occur in these neighborhoods do not lead to clearances largely because of the lack of cooperation by witnesses. It is possible that if very different patterns of clearance are occurring in the two kinds of neighborhoods, they effectively cancel each other out in the model.

Examining the R values in Table 4 indicates that the circumstances surrounding the offense make the largest partial contribution to the model ($R = .181$). Looking at the odds ratio, we find that when a homicide does not involve a concomitant felony, the odds of clearing the case are increased by a factor of 1.61. Consequently, it appears that the influence of the circumstances surrounding the offense on homicide clearance is much stronger for homicides reported in Ontario than New York. However, the variables of homicide weapon, age, and gender of the victim are all incorporated in the homicide clearance model for New York State, whereas the model for Ontario contains only the circumstances variable. It should be noted that the percentage of crime-related homicides in New York State is more than double that of Ontario, and higher than the U.S. national average. In fact, whereas one of every three homicides reported in New York State occurred during a concomitant felony, nearly one in two homicides in New York State are uncleared. Therefore, the difficulties posed to New York State Police Departments with respect to solving homicide cases are clearly not limited to those that are crime-related.

The weapon variable makes the next largest partial contribution to the model ($R = .102$). For homicides not involving a firearm, the odds of clearing the case are increased by a factor of 1.33. This supports the hypothesized relationship between the homicide weapon and clearance of the case. The partial contribution to the

model of the gender of the victim is very small ($R = .066$). However, the odds ratio signifies that a homicide case involving a female victim increases the odds of clearing the case by a factor of 1.27, supporting the hypothesized prediction.

Finally, with respect to the age variable, the effect on the odds of clearing a homicide case when the victim's age falls between 10 and 19 and 30 and 49 are not significant in comparison to the average effect of all age categories. The impact on clearance when the victim's age falls between 50 and 64 is statistically significant at a .05 level. Interestingly, the odds ratio for this age category denotes an increase in the odds of clearing the case by a factor of 1.13 compared to the average effect of all of the remaining age categories, which is different than the results for both the United States and Canada in general. However, the impact of this age category on the likelihood of clearance is minimal. For the remaining significant age categories, the odds of clearing a case are increased only when the victim is younger than 10. The odds ratios for the age categories of 20 to 29 and older than 65 signify that when a homicide case involves a victim in one of these age groups, the odds of clearing the case are decreased, as predicted. The decrease in odds was greatest for victims older than 65.

CONCLUSION

A summary of the results is provided in Table 5. It can be seen here that the influence of various victim and offense characteristics on whether a homicide is cleared varies both cross-nationally and regionally. Whereas cultural differences may be implicated in this variation, it is possible the link is only an indirect one. Cultural differences have been offered as an explanation for the disparity in violent crime rates between the two countries (Hagan, 1989). Hagan and Leon (1977), for example, argue that the two countries differ in their responses to crime, with Canada tending toward a crime control model, whereas the United States has adopted more of a due process model of law enforcement.¹⁷ One implication of this is the differential impact on the disadvantaged and subordinated groups in the two societies. In contrast to the United States, less latitude is given in Canadian society for these individuals/groups to deviate (Hagan, 1989). The greater

TABLE 5
Summary of Logistic Regression Findings:
Factors Influencing the Probability A Homicide Is Cleared

<i>Variable</i>	<i>Canada</i>	<i>United States</i>	<i>Ontario</i>	<i>New York State</i>
Female victim	Increase	Increase	n.s.	Increase
Non-White victim	Increase	Increase	n.s.	n.s.
Younger than 10	Increase	Increase	n.s.	Increase
Age 10-19	n.s.	Decrease	n.s.	n.s.
Age 20-29	Decrease	Decrease	n.s.	Decrease
Age 30-49	Decrease	Decrease	n.s.	n.s.
Age 50-64	n.s.	Decrease	n.s.	Increase
Older than 65	Decrease	Decrease	n.s.	Decrease
No concomitant criminal act	Increase	Increase	Increase	Increase
No firearm used	Increase	n.s.	n.s.	Increase

freedom in the United States is evident in the availability of guns. Such differing approaches to responding to crime may be linked to the diverse nature of homicide in the two countries. In particular, intrafamily homicides are more prevalent in Canada, whereas stranger homicides are more common in the United States (Kennedy, Forde, & Silverman, 1989). The higher rates of stranger killings in the United States may be connected both to higher levels of exposure to violence of Black and Native minorities in America (Hagan, 1985) and the widespread availability of handguns. In contrast, the suppression of Natives in Canada was less violent and access to handguns has remained difficult (Hagan, 1989). In turn, homicides among Native Canadians occur primarily among family members (Silverman & Kennedy, 1997) and in nonmetropolitan areas (Kennedy et al., 1989). It is these U.S. and Canadian homicide patterns that may form the link between cultural differences and geographical variation in homicide rates.

More dramatic differences emerge in the regional than national comparisons. The final logistic regression models for Ontario and New York State included different sets of predictor variables from the models for the countries taken as a whole. This finding suggests that the difficulties posed to police in clearing homicide cases may not be consistent across the two countries. Certain victim and offense characteristics impact on the likelihood of homicide clearance in some areas but not others. Regional-level analyses revealed that particular victim and offense characteristics

sometimes impact on the odds of clearance in opposite ways to those that occur for the country as a whole. Rather than a reflection of police officers' ability to investigate a homicide and identify a suspect in the case, these diverging predictor models of homicide clearance are likely a reflection of diverse patterns concerning the nature of homicides in the various regions of Canada and the United States. Consequently, solutions seeking to increase clearance rates of police forces will be less effective when approached from a universal standpoint because all police operations do not appear to be facing identical problems in solving the crimes committed within their jurisdictions.

Fairly or not, clearance rates are often equated with police effectiveness. Most detectives, for example, know that their performance is evaluated on the basis of how many arrests they produce (Waegel, 1981). Upward trends in uncleared rates for homicide and other serious violent offenses have resulted in a great deal of pressure and criticism aimed at law enforcement agencies across Canada and the United States. The implications of the current findings suggest that these accusations are misguided. Our results signify that the odds of clearing a case are, for the most part, substantially affected by whether the homicide is crime-related. The ability of police to make an arrest in such cases is often dependent on the willingness of eye witnesses, police informants, and the public at large to provide them with helpful knowledge about an offense known to have been committed (Riedel, 1994). Thus, alterations to police investigative practices as a solution to low clearance rates will likely be futile. To boost clearance rates, action must be taken that precedes the commission of the offense in the first place. For example, there is some evidence to suggest that the relative increase of felony-related homicides is much greater than for nonfelony homicides (Rushforth, Ford, Hirsch, Rushforth, & Adelson, 1977; Wilbanks, 1984; Zimring & Zuehl, 1986). If stricter gun control reduces felony offenses, it should also raise clearance rates. Conversely, factors obstructing police from solving murders are often beyond their control, and increases in crime-related homicides may lower clearance rates where no simultaneous changes in the performances of law enforcement agents have occurred. Riedel (1995a) suggested that difficulties posed to police in clearing offenses by arrest may extend beyond homicide to other serious violent

offenses. City-specific approaches should be taken to both understanding and improving the decline in homicide clearance rates in both Canada and the United States.

The results of this comparative analysis highlight various other possible directions for future research. The greater predictive value of the circumstances surrounding the offense in only some areas suggests that future research should consider a closer examination of the types of crime-related homicides that occur in the various regions, as well as a more qualitative assessment of the success of investigations of the different kinds of crimes that result in fatalities. The relative inability of gender to distinguish between cleared and uncleared homicides in each of the analyses leads us to encourage the examination in future research of other demographic variables that may help to differentiate victims. Alternatively, provinces and states could be analyzed with respect to a breakdown of socioeconomic class and compared with their various effects of gender on homicide clearance. The inclusion of the weapon variable in only two of the models (Canada and New York State) implies that future research should investigate the impact of higher levels of gun ownership in particular regions, as this may be counteracting the disproportionate use of handguns and other illegal firearms in homicides involving unknown offenders.

In particular, this study emphasizes that the race variable requires further investigation. In terms of Canadian homicides, this variable was only significant for the country as a whole. Consequently, future research should consider investigating the effects of race on the odds of clearing a homicide in various metropolitan areas across Canada, as previous research has indicated that Native Canadian murder rates vary substantially across urban centers of Canada (Silverman & Kennedy, 1993). Future research could pursue these findings by examining race patterns in terms of victim-offender relationships for various regions of the country. Moreover, whereas some cases in which the offender is unknown undoubtedly involve strangers, the extent to which this holds true is uncertain and would be an important topic for further analysis. Finally, it would be useful to test these conclusions with the most recent homicide data. Although the availability of Canadian data remains a problem, in the United States, these

hypotheses could be investigated using data from 1992 to the end of the century.

Concluding on a more speculative note, future researchers might consider the effect of the erosion of community on the rise in stranger homicide that, in turn, may be implicated in higher levels of uncleared homicide. The two countries would provide an interesting contrast for such an analysis.

NOTES

1. The available data set for Canada included only 1961 through 1983. Statistics Canada has not released microlevel data on homicide beyond 1983.

2. We tested our proposition that patterns would remain consistent over time by running two additional models with the Canadian data. The first used only the years from 1976 to 1983, and the second used only the years from 1961 to 1974. The results showed that the same variables were included in the final models of both additional runs, and the directions of the coefficients were the same as when all 23 years were analyzed. Given the relative rarity of homicide in Canada, we opted to use the whole data set in our analyses to maintain an adequate sample size, an issue that could be problematic particularly when restricting the analyses to a single province.

3. Canada's criminal law is federal (and therefore includes Ontario) and contains much more stringent firearms provisions than those of New York State. Further, there is much less hand gun availability in Ontario and attitudes toward guns may be characterized as more cautious in Ontario.

4. In Canada, once an accused person is identified as the offender, the incident is cleared by charge and an arrest warrant issued if he or she is not already in custody (Orest Fedorowycz, Canadian Center for Justice Statistics, personal communication, October 1998).

5. We recognize that this operational definition is not flawless. In particular, although the offender may be classified as unknown at the time the SHR are submitted, if the case is later cleared, the SHR will not be updated. Alternatively, there is the possibility that the offender will be classified as known but then cannot be located. However, because there is a dramatic reduction in the likelihood of clearing a homicide after a relatively short initial period, the number of homicides that are later cleared and not reported to the UCR program should not have a significant impact on the current analysis (Cardarelli & Cavanagh, 1992).

6. The circumstances surrounding the offense are labeled differently for Canada and the United States as a result of the fact that the term *felony* is not recognized in Canadian law, necessitating the use of the label "another criminal act." In Canada, those offenses that are considered serious are called indictable offenses. The punishment for these offenses is generally more stringent than the maximum of 6 months in prison and/or a \$500 fine assigned to most summary-conviction offenses. The punishment for a felony, on the other hand, is a minimum 1-year term of imprisonment.

7. Although at face value, the killing of a felon by a citizen or police could be considered a felony-related homicide, there are several reasons why these cases are more appropriately classified as nonfelony homicides. The first is that these homicides do not necessarily involve the killing of a felon during the commission of a crime. Second, these kinds of homicides do not pose the same difficulty in terms of offender identification as cases in

which a citizen is killed during, say, a robbery gone wrong. The offender in cases of felons killed by citizens or police is either a member of the public acting in self-defense or an officer of the law, neither of whom will be likely to flee the scene of the crime or otherwise impede the homicide investigation.

8. Although multiple regression appears to be a plausible option in this case, according to Norusis (1993), when using a dependent variable that can have only two values (an event occurring or not occurring), "the assumptions necessary for hypothesis testing in regression analysis are necessarily violated" (p. 1). For instance, it is not reasonable to make the assumption that the errors are normally distributed. Moreover, employing multiple regression analysis does not permit interpretation of the predicted values as probabilities because they are not restricted to values that fall between 0 and 1.

9. 1,725 cases were rejected due to missing data.

10. Odds ratios provide the most straightforward interpretation of logistic regression coefficients in the sense that they can be interpreted as the probability that an event will occur (in this case, the clearance of a case) to the probability that it will not occur.

11. *R* statistics, which can range between -1 and +1, give an indication of each variable's partial contribution to the model, with smaller values signifying smaller unique contributions. *R* is adjusted for the number of parameters estimated.

12. 85,276 cases were rejected due to missing data. To determine whether the extremely large sample size for the U.S. model was resulting in more variables in the final model than would otherwise be the case with a smaller sample, the model was reanalyzed using a random sample of approximately 5% of cases (approximately 17,000). The same variables were included in the final model as was the case when the entire data set was used, suggesting that the original results are not unduly influenced by the size of the sample.

13. Because the Canadian data set stops at 1983, it is not possible to pursue this argument into the 1990s.

14. It is possible that the effect of race might be masked by aggregating the data as we have done. In particular, aggregating over years obfuscates trends indicating that both the proportion of homicides involving unknown offenders and homicides involving unknown offenders in which the victim is Black have increased over time. In earlier years, White victims constituted a greater percentage of victims in uncleared cases, but this trend reverses in later years of the data whereupon Black victims comprise a greater proportion of victims of uncleared homicides. However, at no time during the years examined does this percentage stray far enough from about 50/50 that we would be able to predict the likelihood of homicide clearance based on race. If the trend in later years continues whereby the proportion of cases with unknown offenders involving Black victims continues to increase, sometime down the road, race may have a notable impact on the likelihood a homicide case will be cleared.

15. 559 cases were rejected due to missing data.

16. 17,978 cases were rejected due to missing data.

17. More recent changes in styles of law enforcement in both countries suggest that these distinctions may no longer hold true to the same extent. However, the reference is consonant with the time period under investigation.

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