JUSTIFIABLE HOMICIDE BY POLICE AND CRIMINAL HOMICIDE: A RESEARCH NOTE

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ABSTRACT

The connection between police use of deadly force and the criminal homicide rate has long been recognized in the literature. Despite some attempts, this correlation has not been explained well. Recent research efforts suggests that structural characteristics of cities are a key determinant to explaining this phenomenon. However, this study suggests that research has underestimated the importance of the temporal relationship of particular types of criminal homicides with police use of deadly force. Rather, police use of deadly force can best be understood through a "reactive hypothesis" version of the danger perception theory that takes into account the perceived risk of situations police officers encounter. Through a time series analysis of the Supplement Homicide Report (S.H.R) data over an eleven year period, we confirm this hypothesis. The results further confirm, on a national level the temporal connection between predatory crime and police use of deadly force. The implications for policy and future research are discussed.

Public criticism of police use of deadly force is as old as the gun itself. In 1986 William Geller discussed a 1858 New York Times article that publicized a case in which a police officer shot and killed a fleeing suspect. The New York Times article set forth a moral standard which was not accepted by the courts until the 1980s: "If a police officer needs to defend his life, the use of force is permissible. But if he is chasing a suspect he has no right to shoot the man." (Geller, 1986)

Because police use of deadly force includes such serious consequences, it is not surprising that the subject has long been the focus of attention from the public, police and research communities. Early research efforts attempted to find correlations between police use of deadly force and other variables, with the hope that these findings would increase knowledge about when and why police use deadly force (Geller and Scott, 1992).

Research has succeeded in the identification of one significant variable, the number of criminal homicides.[1] Over the past twenty years, researchers using different data sources have found the rate of criminal homicides to be correlated with police use of deadly force (Fyfe, 1980; Sherman and Langworthy, 1979; Sherman and Cohen, 1986; Kania and Mackey, 1977; Jacobs and O'Brien, 1998.

Langworthy (1986), who reviewed the majority of the research on justifiable homicides by police, stated that the most consistent finding in the literature on police killing of civilians is the strong correlation between the incidence of police use of deadly force and criminal homicides. The explanation for this correlation is not clear, and the critical issue of causality remains. In other words, is the correlation between these two phenomena causal or is it explained by other factors? Three theoretical paradigms in the literature are used most often to explain the relationship. First, *Brutalization* theory refers to the use of deadly force by legal authorities (either capital punishment or deadly force by police) as a justifiable method of resolving a crime related incident. This theory has been used to explain how capital punishment increases the homicide rate (Bowers and Pierce, 1980), but the same argument can be used to explain police use of deadly force. In other words, the greater the number of police killings of civilians, the more likely that citizens will become violent in general. A second theoretical paradigm, the *Danger Perception* theory explains how police officers in high crime areas, particularly high-homicide areas, are more likely to use deadly force than police officers in less dangerous places. This explanation is the one favored by criminologists (Sherman and Langworthy, 1979; Fyfe, 1980; Kania and Mackey ,1977). The third perspective consists of *Political Threat* theories, which suggest that the relationship between police use of deadly force and the homicide rate is not a causal association but a result of some other factor(s). For example, Jacobs and O'Brien

(1998) suggest that police may "use deadly force because they protect the interests of the privileged by keeping the redistributive violence of the subordinate racial or economic groups in check" (845). In other words, police use of deadly force is an extreme form of state coercion on the lower class whose violent actions threaten rich White elite.

The first two theories assume implicitly that police officers have a choice not to shoot but prefer to do so, either because they support the use of deadly force (brutality theory), or because they think being in a dangerous area places them at a level of risk that justifies the application of deadly force (perception theory). Unfortunately, no one has argued convincingly or provided data to support either one of these theories at a national level. At the local level, with New York City data provided by Fyfe (1980), Langworthy (1986) found through a time series analysis that no causal relationship existed between homicide rates and police use of deadly force. Langworthy claimed that the correlation between use of deadly force and homicide rate is a result of hidden factors, but he did not offer any specific explanation or alternative theory. The third approach, essentially argues that police killings of civilians are primarily the result of factors not related to the overall homicide rate. Jacobs and O'Brien's (1998), proponents of this perspective, however, acknowledged from their analysis that the murder rate of an area, even after controlling for "political threat" variables, remained a consistent predictor of police use of deadly force. It is evident that additional research is needed to explain the correlation between police use of deadly force and criminal homicides. We suggest that the "reactive hypothesis" aspect of the *Danger Perception* theory (Jacobs and O'Brien, 1998) be specified more succinctly and tested.

Jacobs and O'Brien (1998) suggest that this perspective explains that police "kill because they must protect all groups from violence" (846). Police, therefore, use deadly force in reaction to the level of civilian violence. Jacobs and O'Brien suggest that "law-abiding citizens benefit from the public safety provided by this seemingly necessary use of lethal violence" (846).

We propose a more refined version of the "reactive hypothesis" and suggest that police use of deadly force can be explained temporally by the level of risk or perceived threat that officers encounter in a given time period. According to this "reactive hypothesis," the frequency of police use of deadly force incidents depends on the perceived level of danger police officers encounter. If the number of dangerous situations increase so will the number of cases in which officers use their weapons, and as a result the number of police killings of civilians will increase.

This hypothesis explains the correlation between police use of deadly force and criminal homicides. Criminal homicides provide a proxy

measure for the number of (perceived and real) dangerous situations police officers experience (see Jacobs and O'Brien, 1998). When police officers view a particular time period as dangerous they are more likely to use deadly force. In a given month, for example, when the level of violent crime has increased police officers are more likely to view their occupation as dangerous. Therefore, one would expect that as the number of dangerous events increases (i.e. carjackings, drive-by shootings, etc.) so do the incidence of police shooting civilians.

HYPOTHESES

To test this "reactive hypothesis" we predict a strong temporal relationship between criminal homicides which involve the greatest perceived risk to public safety, such as robbery and stranger-related events, and police use of deadly force. These types of criminal homicides will have a stronger correlation with police use of deadly force than other types of homicides that are less likely to affect police perceptions of the dangerousness of their job. We can test the hypothesis by checking the correlation between police killings of civilians and different criminal homicide types (see Tennebaum and Fink, 1994 for a discussion of the distinction between types of homicides). Over time, if the hypothesis is correct, homicides that are the result of risky situations with the most perceived public threat (where the police are the most likely to become involved) will be more temporally correlated with police killing of civilians than other types of homicides. In other words, if police use of deadly force is associated with the level of perceived or real risk of situations they are likely to encounter, one would expect that the frequency of these incidents would closely mirror specific high risk criminal homicides.

Homicides that are the result of a love triangle are often random, spontaneous, and are not situations that typically involve the police. In a typical love triangle homicide, prior to the incident people are less likely to want police involvement. The number of these events, therefore, are not likely to affect either the police or the public's perception of the dangers of police work. Our hypothesis, therefore, predicts that the number of love triangle homicides will not be correlated (temporally) as strongly with the number of police killings of civilians as other types of criminal homicides. Accordingly, the number of criminal homicides that have been committed while attempting robbery will be more strongly correlated with the number of police uses of deadly force. Justifiable homicides by citizens will also be correlated with police killings of civilians because they represent situations

with increased risk to the public as well as the police and, thus, are more likely to be related to police use of deadly force. In the next section we test this hypothesis using the homicide types previously discussed.

DATA AND MEASURES

Data

Law enforcement agencies that report criminal homicides on the basic U.C.R. (Uniform Crime Report) form are requested (but not required) to submit a Supplementary Homicide Report (S.H.R) for each month.[ii] The S.H.R's are not submitted by agencies for months in which no homicides are reported to police. Every record includes one event with many details on the victims and offenders (if known) including age, race, weapon, etc.[iii]

One of the variables in the form is the circumstances of the event. It includes many values that can explain the background of the incident. Values such as "love triangle", "killed by baby sitter", "brawl under alcohol", "argument over money", "killed while robbery", "killed while rape", etc. are included. In the year 1976 two values were added to the list of circumstance values, "justifiable homicide -civilian" and "justifiable homicide - police".

Data used in the present analysis are from S.H.R files for the years 1976-1986 (eleven years) and were processed by the ICPSR from the original S.H.R master tapes provided by the F.B.I.[iv] We used a copy of those files provided by the Inter-University Consortium for Social Research (ICPSR). We wrote a program in SPSSX that used those files and produced the monthly data for this eleven year period (132 months). For each monthly point we have nine variables.[v]

casenumber - the first through last month in the data set (rank. 1-132).
month - the month in the year.
year - two last digits of the year.
homicide - the number of homicides in the given month not including negligence.
police - the number of justifiable homicides by police.
civil - the number of justifiable homicide by civilians.
robbery - the number of homicides occurring in conjunction with a robbery.
lovetriangle - the number of homicides occurring as a result of a love triangle.

hompol - the number of homicides minus the number of police homicides.[vi]

All the variables were calculated from the S.H.R. Table 1 contains descriptive statistics on all the variables we have in the data set.

Table 1
DESCRIPTIVE STATISTICS OF VARIABLES USED IN ANALYSIS (PER MONTH)

Variable	Mean	S.D.	Min	Max
Month	6.5	3.5	1	12
Year	81	3.2	76	86
Homicide	1582.3	165	1308	2279
Police	30.6	7.3	14	53
Civil	28.4	9.5	12	64
Robbery	153.2	27.9	97	234
Love triangle	37.1	7.3	20	56
Hompol	1551.7	162.5	1275	2246

METHODS

Theoretically, a majority of police use of deadly force incidents are caused by the level of criminal homicides. There is also the possibility that a hidden third variable influences both of these factors (see Jacobs and O'Brien, 1998). In either case, using a regression based model and measuring the R^2 should give us a good indication of the relationship between the two variables over time. The dependent variable of interest is police use of deadly force (*police*) and the independent variable is homicides excluding those committed by the police (*hompol*). All the statistical analysis were done using Limdep version 5.1.

Before we employ any statistical model, however, it would be useful to describe how the data appear graphically. Graph plots (not shown)

of the number of justifiable homicides by police (*police*) against criminal homicides (*hompol*) and the standard residuals against the expected values indicated a nice linear fit that would satisfy the conditions for multiple regression. The problem with multiple regression with these data, however, is that they are plotted over a period of time (time-series). As a result, auto-correlation between the residuals may occur over time which would not be appear in a regular plot and would bias the estimates.

Therefore, to test for autocorrelation we employed the use of the Durbin-Watson test. Using the Durbin-Watson test on a model of ordinary least squares regression (OLS) we obtained a value of 1.3, which is less than the minimum Durbin-Watson value of 1.75 (see Table 2). This indicates the presence of autocorrelation in the data. The degree of autocorrelation, however, does appear to be small. Regardless, the results using OLS regression will be biased due to the problems associated with autocorrelation. Therefore, we employed a first order autoregressive error model (ARIMA) that reduces the autocorrelation between the residuals. The ARIMA model also provides a test of the bias in the classic OLS model. The basic ARIMA model is:

$$Y_t = B_0 + B_1 X_t + U_t, \text{ where } U_t = ROH * U_{t-1} + Z_t$$

Z_t is distributed as expected from an honest residual in the classic regression model and $|ROH| < 1$. It can be shown that if we calculate ROH (the degree of correlation between the residuals) then we can calculate unbiased coefficients B_0, B_1 (Neter, Wasserman and Kutmer, 1989). Calculating ROH, therefore, removes the problem of autocorrelation in these data. This is evident from a Durbin-Watson before and after the calculation of ROH which allows one to interpret the improvement using an ARIMA model over standard OLS.

Limdep provides three different algorithms to calculate ROH: (1) the Parais and Winster algorithm; (2) the Cochrane and Orcutt algorithm; and (3) the maximum likelihood estimator of Beach and Mackinnom. Our analysis indicates that the difference in calculating ROH between these algorithms is minimal, so we employed the Cochrane-Orchutt method (see Appendix A).

FINDINGS

Table 2 summarizes the results of the standard OLS and Cochrane-Orchutt models. The equation tested was: *police* = intercept + B_1**hompol*. The results are similar in both models; there is a correlation between police

use of deadly force and criminal homicides. The R^2 is approximately 0.106 (r=0.326) and the probability of chance is less than 0.001.[vii] The results verify, on a national level, the temporal relationship between police homicides and general criminal homicides.

To provide a more complete test of the "reactive hypothesis" we also compared different types of homicides as independent predictors of justifiable homicides by police. The results displayed in Table 3 indicate, as predicted, that more potentially dangerous homicides are the most correlated with police use of deadly force. For instance, examination of the

Table 2.
Predictive Model of Homicides on Incidence of Police Use of Deadly Force

Variable	(β Regression)	T-Ratio	(β Cochrane-Orchutt)	T-Ratio
Hompol	0.014**	3.93	0.014**	3.35
Intercept	7.87	1.35	7.82	1.14
R^2	.106		.106	
Rho	--	--	0.348	--
Durbin-Watson	1.3		2.1	

**<.01

R^2 values indicates that justifiable citizen homicides (R^2 = 0.239) and robbery related homicides (R^2 = 0.121) are the best predictors of police killings. In addition, despite the fact that OLS is not the most applicable to our data, it does provide a close enough fit that we can compare the log likelihood function between predictive models. The log likelihood (improvement) statistic, for example, indicates that there is a statistically significant improvement in fit to the data when one compares robbery homicides to lovers triangle (*lovetriangle*) homicides.[viii] From both the R^2 values and the log likelihood test one can see clear hierarchy between the predictive models. The best predictor of police use of deadly force (*police*) is justifiable citizen homicides (*civil*), followed by robbery related homicides (*robbery*), and homicides overall (*hompol*). Lovers triangle (*lovetriangle*) homicides is the worst predictor.

Table 3
PREDICTIVE MODEL OF HOMICIDES TYPES ON INCIDENCE OF POLICE USE OF DEADLY FORCE

Variable	$\beta 1_{OLS}$	$\beta 1$ Cohrane-Orchutt T-Ratio	$\beta 2_{OLS}$	$\beta 2$ Cochrane-Orchutt T-Ratio	$\beta 3_{OLS}$	$\beta 3$ Cochrane-Orchutt T-Ratio	$\beta 4_{OLS}$	$\beta 4$ Cochrane-Orchutt T-Ratio
Intercept	--	8.0**	--	1.14	--	4.99**	--	10.67**
Coefficient	--	1.67	--	3.35**	--	2.97**	--	5.24**
R^2	--	0.024	--	0.106	--	0.121	--	0.239
Log-likelihood	-447.57	--	-441.85	--	-440.30	--	-431.12	--
Improvement of Fit	1.7		5.72		1.55		9.18	

**<.01
$\beta 1$= lovetriangle
$\beta 2$= hompol
$\beta 3$= robbery
$\beta 4$= civil

DISCUSSION

These findings, overall, support our "reactive hypothesis" version of the danger perception theory. Robbery related and justifiable citizen homicides represent clear patterns of violence which affect the police and publics perception of the dangers of police work. Therefore, police are more likely to use deadly force during time periods when the frequency of these incidents are at their highest level, and the perceived threat to themselves and the general public is particularly high. In other words, our findings in accordance with the "reactive hypothesis" suggest that police use of deadly force varies with the level violence and risk of the time period that police officers are working.

These results are important because, for the first time and on a national level, there is evidence of a temporal connection between criminal homicides and police use of deadly force, supporting the "reactive hypothesis". Whether or not an individual shooting is justified must be determined on the facts of each incident. There are clear cases where police abuse their legal authority and kill civilians unjustifiably. The results of the present study, however, indicate that the incidence of police use of deadly force closely follow the dangerousness of particular time periods.

The implications from this research provide an unpleasant caveat. According to the analysis, in order to reduce the number of police killing of civilians, police have to reduce the risk level of their occupation. This is, indeed, a difficult challenge as a primary goal of policing is to be involved directly in incidents of high risk. Also, the number of robbery related homicides and other risk related incidents are often the result of social problems (i.e. income inequality, divorce rates, social disorganization, etc.) that are beyond the control of the police and may have little connection to police performance.

The present research was only an attempt to clarify a more refined version of the danger perception theory. More work is necessary to understand the relationship between rates of homicide and police use of deadly force on an incident and aggregate level. A more informative analysis would be one that combined the importance of social problems along with particular types criminal homicides (over time) to predict police use of deadly force. Such an analysis could help disentangle the relationship among these factors.

ENDNOTES

[1]Criminal homicide is defined in this research as murder and non-negligent manslaughter.

[2]The form is incident oriented; i.e. if more than one murder occurred during the same incident only one form will be filled out for all of them.

[3]The validity of the U.C.R. is a question beyond the scope of this paper. See Maxfield (1988) for a good summary of research on the specific question of circumstances in the S.H.R. Maxfield points out that the S.H.R. has some of the same flaws as the U. C. R. with regard to inappropriate filling out of forms. However, these flaws appear to be much less common than with the U. C. R. in general, and are less serious than the problems associated with using other data sources to examine the issue of police use of deadly force (see Sherman and Langworthy, 1979).

[4]The S.H.R. data from the Uniform Crime Reports (1976-1986) were originally collected by the Federal Bureau of Investigation. Neither the ICPSR nor the F.B.I. bear any responsibility for the interpretations presented in this paper.

[5]The variables *lovetriangle*, *robbery*, *civil*, were chosen according to two criteria: (1) their ability to express the hypothesis, and (2) their values (number of cases each month) were large enough for statistical purposes.

[6]This variable was calculated because including *police* in the analysis would have artificially increased the correlation.

[7]Other studies have found higher levels of r-square. The differences may be explained by the fact that earlier studies used smaller data sets and different statistical methods. Regardless, previous studies also report significant correlations between the two variables.

[8]This conclusion was reached using the following equation -2 (Likelihood $_{\text{robbery}}$ - Likelihood $_{\text{lovetriangle}}$) which is distributed as a Chi-Square statistic.

Appendix A

Comparison of Three Algorithms for Calculating ROH: Hompol on Police Use of Deadly Force

	Classical Regression Model	Paris-Winsten	Cochrane-Orcutt	Maximum Likelihood
Intercept	7.87	8.29	7.82	8.28
T-ratio (of intercept)	1.35	1.21	1.14	1.21
T-prob (of intercept)	0.178	0.224	0.251	0.223
Coefficient	0.014	0.014	0.014	0.014
T-ratio (of coefficient)	3.93	3.29	3.35	3.30
T-prob (of coefficient)	0.000	0.000	0.000	0.000
R-square	0.106	0.106	0.106	0.106
Rho		0.348	0.348	0.341
Durbin-Watson	1.30	2.10	2.10	2.0

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