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# CRIMINOLOGY

## POLICING HOT PURSUITS: THE DISCOVERY OF ALEATORY ELEMENTS\*

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Roger G. Dunham\*\*\*

### I. INTRODUCTION

The police pursuit technique has only recently come under scrutiny. Recent concern and publicity have forced the law enforcement community to respond with appropriate guidelines for officers to follow.<sup>1</sup> As with any police technique about which little is known, solutions are often suggested without proper analysis or information. Armchair philosophy and conventional wisdom can aid in deciding which of several responses to a problem is the best one, but solving the problem of police pursuit requires decision-making rather than problem-solving skills. Thus, appropriate knowledge must be obtained and processed before proper decisions can be made. Moreover, after the appropriate data are analyzed, any interpretation is subject to judgments that must be balanced before policy makers consider the alternatives.<sup>2</sup> It is therefore important to

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<sup>1</sup> Alpert, *Police Pursuit: Linking Data to Decisions*, 24 CRIM. L. BULL. 453 (1988); Alpert, *Questioning Police Pursuits in Urban Areas*, 15 J. OF POLICE SCI. & ADMIN. 298 (1987) [hereinafter *Questioning Police Pursuits*]; Alpert & Anderson, *The Most Deadly Force: Police Pursuits*, 3 JUST. Q. 1 (1986).

<sup>2</sup> Petersilia, *The Influence of Research on Policing*, in CRITICAL ISSUES IN POLICING 230 (1989).

consider the information necessary to ensure appropriate pursuit driving and the reduction of accident and injury.<sup>3</sup>

This study identifies the salient factors that influence the outcome of pursuit driving. The identification of factors that predict the appropriateness of specific police pursuits requires an interactional analysis due to its complexity. The analysis must include a consideration of the behaviors of at least three actors: the police officer, the law violator, and innocent third parties. Consequently, this complexity creates uncertainties or unpredictable contingencies, both of which affect outcomes.

## II. A STRATEGIC ANALOGY AND THE USE OF SOCIAL RESEARCH

One of the more publicized areas of police work that has only recently become a target of research is response to calls for domestic violence. Until the mid-1980s, police were reluctant to make arrests for domestic violence without the presence of extenuating circumstances.<sup>4</sup> The police most frequently resolved the disputes using alternatives: negotiation and referral, threatening the disputants, leaving, or removing one of the disputants from the premises.<sup>5</sup> Arrests were made only under special circumstances,<sup>6</sup> and, unfortunately, the police used no empirical data to make these decisions.

To inform the decision-makers, Sherman and Berk<sup>7</sup> conducted and reported the results of an experiment in which they concluded that recidivism was lower for those arrested than for any other method of resolution. They concluded further that the police should make an arrest unless there are clear reasons that an arrest would be counterproductive. These conclusions contradict historical wisdom and challenge present police practices in many jurisdictions. Even though Sherman and Berk acknowledge the limitations of their data and findings and welcome replications of their research to test external validity and generalizability,<sup>8</sup> this example suggests that, when possible, empirical research may prove valuable in developing police policies.

Police pursuit lends itself to empirical research and examina-

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<sup>3</sup> *Questioning Police Pursuits*, *supra* note 1, at 300-01.

<sup>4</sup> Sherman & Berk, *The Specific Deterrent Effects of Arrest for Domestic Assaults*, 49 AM. SOC. REV. 261, 270 (1984).

<sup>5</sup> *Id.* at 272.

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

<sup>8</sup> Langan & Innes, *Preventing Domestic Violence Against Women*, in BUREAU OF JUSTICE STATISTICS 4 (Aug. 1986).

tion. The conventional understanding of police pursuit derives from the impressions provided by Hollywood and sensational news reports. Although most pursuits do not resemble these dramatic events, they nevertheless create high anxiety and the potential for destruction and injury. An ideal study of pursuit would include experiments that control the discretionary decisions made by police. The random assignment of officers permitted to pursue and not permitted to pursue, under a variety of conditions, would serve as a valuable research design, by permitting the evaluation of pursuit driving and the differential deterrent effect on those offenders who are pursued and those who are not pursued. Because such experimentation may never be permitted, this study is limited to evaluations that compare police officers and pursuit characteristics with chase outcomes for the purpose of improving police policies and practices. The data presented in this study provide a comprehensive look at police pursuit by analyzing the findings from more than 300 pursuits that took place in Dade County, Florida during 1987. First, however, is a discussion of pursuit as a discretionary police practice and a review of findings from prior research.

### III. DISCRETION AND PURSUIT

Police officers are street-level bureaucrats charged with protecting lives by enforcing the law. A topic of significant debate and research is the extent to which police officers enforce the law, against whom, on what occasions, and by what tactics.<sup>9</sup> A trickle-up practice sometimes influences police officers' behavioral choices: officers may act in a variety of ways when only vague guidelines exist without strong policies and supervision. If administrators do not prohibit certain behavior, the officers might perceive the behavior as appropriate. The behavior would thereby become acceptable and customary. As Mark Blumberg reports, "the research suggests not only that a tightened policy which is rigorously enforced will reduce the number of shootings, but that it will change their nature as well."<sup>10</sup> Research has informed us that police discretion, both individual and organizational, *can* be controlled before unwanted patterns of behavior develop.<sup>11</sup> Police policies regarding pursuit

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<sup>9</sup> Weber-Brooks, *Police Discretionary Behavior: A Study of Style*, in CRITICAL ISSUES IN POLICING 121, 126-140 (1989).

<sup>10</sup> Blumberg, *Controlling Police Use of Deadly Force: Assessing Two Decades of Progress*, in CRITICAL ISSUES IN POLICING 450 (1989); see generally Fyfe, *Administrative Interventions on Police Shooting Discretion: An Empirical Examination*, 7 J. OF CRIM. JUST. 309, 315 (1979).

<sup>11</sup> Weber-Brooks, *supra* note 9, at 121-24; M. BROWN, WORKING THE STREET: POLICE DISCRETION AND THE DILEMMAS OF REFORM 276 (1981).

generally fall under one of three models:<sup>12</sup> 1) *Judgmental*—allowing officers to make all major decisions relating to initiation, tactics, and termination; 2) *Restrictive*—placing certain restrictions on officers' judgments and decisions; and 3) *Discouragement*—severely cautioning or discouraging any pursuit, except in the most extreme situations.

Police departments, operating under regulations that emphasize judgmental decision making, provide only guidelines for their officers. Usually, these warnings require officers to weigh various factors before initiating a pursuit, to consider their safety and the safety of others during a pursuit, and to terminate a chase when it becomes too risky. The vagueness of this type of regulation permits officers to make most of the decisions and therefore requires the most supervision, control, and training.<sup>13</sup>

Departments that operate under restrictive regulations or specific rules limit individual officers' discretion. For example, orders may restrict officers from initiating pursuits when the law violators are juveniles, traffic offenders, or property offenders. Similarly, in-pursuit driving behavior may be so limited by ordering specific speed, distance, or time limitations. Additionally, a rule may restrict some types of driving such as going the wrong way on a one-way street, driving over curbs or driving on private property.

Discouragement policies only allow pursuit driving under specific conditions. Examples include chasing a known murder suspect or a suspect whom an officer has observed committing a violent crime. These policies are very specific and leave little room for discretion.

Ultimately, determining the appropriate policies and procedures that balance deterrence and citizen safety is the key element in obtaining the desired police reaction to motorists who refuse to respond to emergency signals.

#### IV. PRIOR RESEARCH ON POLICE PURSUIT

Only recently has empirical research on police pursuit been conducted.<sup>14</sup> Gaining access to police information is a major obstacle to this type of police research and few departments have ever collected and analyzed their own data on pursuit driving. The United States Department of Transportation sponsored the first

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<sup>12</sup> E. FENNESSY, T. HAMILTON, K. JOSCELYN & J. MERRITT, A STUDY OF THE PROBLEM OF HOT PURSUIT BY THE POLICE xv (U.S. Dep't of Transp., Nat'l Highway Safety Bureau 1970).

<sup>13</sup> *Id.*

<sup>14</sup> *Questioning Police Pursuits*, *supra* note 1, at 299; Alpert & Dunham, *Research on Police Pursuits: Applications for Law Enforcement*, 7 AM. J. OF POLICE 124 (1988).

complete study on pursuit driving.<sup>15</sup> This important study summarized previous research on pursuit driving and characterized it as being "distinguished primarily by the absence of any work of quantitative substance."<sup>16</sup>

These researchers acknowledged that pursuit driving was a controversial topic involving the broader issue of effective law enforcement and reported the existence of two opposing schools of thought. First, the law enforcement viewpoint considered pursuit driving as a vital aspect of deterrence for both traffic supervision and crime control. The argument advanced by this school was that chaos would result on the streets if police were either forbidden to engage in pursuit or unduly restricted. This view emphasized crime control and deterrence.<sup>17</sup> Second, a group comprised mainly of physicians reasoned that pursuit driving resulted in an unacceptable number of casualties. This view emphasized citizens' safety, even at the expense of crime control and deterrence. This group further believed that pursuit driving was too dangerous and human life too valuable to place it at such a high level of risk.<sup>18</sup> The primary reason for the difference between the two schools of thought is a nearly complete lack of reliable data on the nature of pursuit driving.

In their report, Fennessy, Hamilton, Joscelyn and Merritt presented a discussion balancing the ideas argued by both schools.<sup>19</sup> The report identified appropriate methods by which researchers could conduct a test to determine if support for either position was warranted and suggested that the reduction of crashes, injuries, and deaths is the main goal of any meaningful policy or practice.<sup>20</sup> It was not until the 1980s, however, that any empirical research was conducted on pursuit driving, although many individual police agencies and professional associations recognized the need for investigation and improvements in police pursuit policies and practices.<sup>21</sup>

The early 1980s marked the second generation of research on police pursuits. The California Highway Patrol (CHP), responding to pleas from the decade before, conducted an exploratory study on police pursuit.<sup>22</sup> Although limited to a six month period, and substantially limited to freeways, the study followed many of the sug-

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<sup>15</sup> E. FENNESSY, *supra* note 12, at x.

<sup>16</sup> *Id.* at 151.

<sup>17</sup> *Id.* at 10-11.

<sup>18</sup> *Id.*

<sup>19</sup> *Id.* at 46-50.

<sup>20</sup> *Id.* at 127-30.

<sup>21</sup> California Highway Patrol, *Pursuit Study*, in STATE OF CALIFORNIA 1-3 (1983).

<sup>22</sup> *Id.*

gestions made by the Fennessy group<sup>23</sup> and thereby provides an excellent base of information. The CHP study reports findings from an analysis of almost 700 pursuits. The profile based upon results from this study shows that the typical pursuit: 1) is initiated by a traffic violation; 2) takes place at night; 3) continues for one mile; 4) lasts one to two minutes; 5) involves two police cars; 6) is terminated voluntarily by the offender; and 7) involves a male driver twenty years old.<sup>24</sup> Two of the most important findings reported by the CHP are that: 1) 77% of the suspects were apprehended; and 2) 70% of the pursuits ended without an accident.<sup>25</sup>

Based upon its empirical analysis, the CHP concluded that pursuit is worth the risk:

Attempted apprehension of motorists in violation of what appear to be minor traffic infractions is necessary for the preservation of order on the highways of California. If approximately 700 people will attempt to flee from the officers who participated in this six-month study, knowing full well that the officers would give chase, one can imagine what would happen if the police suddenly banned pursuits. Undoubtedly, innocent people may be injured or killed because an officer chooses to pursue a suspect, but this risk is necessary to avoid the even greater loss that would occur if law enforcement agencies were not allowed to aggressively pursue violators.<sup>26</sup>

Not all police administrators, policy makers, or politicians will agree with the conclusions drawn by the CHP study. Certainly, though, citizens reading about the damage, injuries, and deaths that result from police pursuits will be concerned.

The data reported by the CHP add empirical support to some of the suggestions made by the Fennessy group,<sup>27</sup> which observed in 1970 that pursuits do not typically end in injury or death as both the media and police literature often imply. The 1970 study recommended the *outcome* of the pursuit as the best measure of its risk.<sup>28</sup> Policy and rule-making decisions about pursuits depend, in part, on these risks. While other measures are important, it is the *outcome* of a pursuit that most concerns the parties involved. The research presented here focuses upon pursuits and provides information for police administrators who are concerned about improving policies, directing supervision, and implementing training.

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<sup>23</sup> E. FENNESSY, *supra* note 12, at 149-56.

<sup>24</sup> California Highway Patrol, *supra* note 21, at 20.

<sup>25</sup> *Id.* at 22.

<sup>26</sup> *Id.* at 21.

<sup>27</sup> E. FENNESSY, *supra* note 12, at 149-56.

<sup>28</sup> *Id.* at 9-16.

## V. THE PRESENT RESEARCH

In 1984, the Dade Association of Chiefs of Police initiated a two-phase national study on police pursuits. The first phase included a content analysis of pursuit policies from around the country. All police departments in Dade County adopted a model pursuit policy as a result of this inquiry. The second phase of the study consisted of an empirical analysis of pursuits in Dade County. A form was created to collect specific information on every pursuit. The Director of the Metro-Dade Police Department volunteered his agency as the first to participate in the study and reaffirmed the requirements that the officers complete a form each time they were involved in a pursuit and that the form be reviewed by supervisors.

The interest in pursuit by the Dade Association of Chiefs of Police removed a significant hurdle to research—the availability of data. Based upon the theoretical issues raised in the criminology and legal literature and the form used by the California Highway Patrol, a new instrument was created to collect specific information about the environment, area of the pursuit, the conditions that prompted the chase, the in-chase tactics, and the termination of the pursuit. As the data collection progressed, more information to the reporting form as well as the requirement of a detailed narrative were added. While the most recent data are the most comprehensive, information on all pursuits has been verified and a 10% sample was re-checked. Information was also collected on the officers and the law violators, although data on the law violators were available only for suspects who were apprehended or identified. The data presented below represent information on pursuits from the Metro-Dade Police Department (MDPD) for the calendar year 1987.

## A. FINDINGS

This study first examines some statistics describing the population of pursuits and then progresses to a multivariable analysis of the pursuits to decipher relationships between the outcome of the pursuits and various officer and situational characteristics.

As indicated by the figures in Table 1, 323 pursuits were initiated in 1987 by MDPD, which comprise the population analyzed in the present study. The vast majority of the pursuits (73%) lasted five minutes or less. Fifty-four percent (176) of the pursuits were initiated for traffic violations, while another 28% (92) were felony stops or initiated because there was suspicion that the offender was a felon. All but two of the remaining pursuits (16%) were initiated



**TABLE 1**  
**OVERVIEW OF POLICE PURSUITS**

Number of Pursuits				323
Duration of Pursuits (minutes):	$\frac{<3}{84}$	$\frac{3-5}{152}$	$\frac{6-9}{49}$	$\frac{10+}{38}$
Reason for Pursuit:				
<u>Traffic</u>	<u>BOLO</u>	<u>Felony Stops/Suspected Felons</u>	<u>Reckless/DUI</u>	
176	53	92	2	
Pursuits Ending in Arrests				236
Pursuits Resulting in Defendant's Death				3
Pursuits Ending in Escape				84
Total Accidents				110
Personal Injuries				75
Property Damage				144
Voluntarily Terminated By Officer or Supervisor				11*
* This figure does not include when the police are out-run.				

because of memoranda and calls instructing the officers to "be on the lookout for" (BOLO) a specific offender.

Two hundred and thirty-six pursuits (73%) ended in arrests and three ended in the defendant's death. The remaining 84 (26%) ended with the defendant escaping from the officer. One hundred and ten (34%) of the pursuits resulted in an accident, 75 (23%) included injuries, and 144 (45%) involved property damage. Seventy-seven percent of the chases resulted in *no* personal injury. An analysis of these few personal injuries indicates that in twenty-three chases a police officer was injured, and in five chases a bystander was injured.<sup>29</sup> These numbers are fewer than anticipated, but they represent serious concerns for law enforcement which must be addressed and resolved. The remaining forty-seven injuries were to the defendants or their passengers. Nearly one-third of these injuries occurred *after* the chase terminated and while the officer was attempting to make an arrest. The severity of the injury in the vast majority of cases (87%) was not serious, involving only minor scratches, cuts, and bruises. Seven percent of the injuries were serious, an additional 1.4% were life-threatening, and less than 1% resulted in death. The three deaths included a shooting and two drownings. In one pursuit, the offender used his vehicle as a

<sup>29</sup> Thirty-four pursuit incidents included property damage that resulted from the apprehension of the suspect after the termination of the chase.

weapon and attempted to run over a police officer, but was shot by another officer from a neighboring jurisdiction. One of the drownings involved a suspect who exited his vehicle and jumped into a canal. The other drowning involved a suspect who ran off the road into a canal.

#### B. MEASURING THE OUTCOME OF PURSUITS

The next step in the analysis is to determine which characteristics of pursuits, and of the officers, predict specific types of outcome. For purposes of this analysis, several measures of negative outcome have been created. These measures include whether there was an accident, whether there was an injury to the suspect, the officer, or bystanders, and whether the suspect escaped. Since nearly all of the property damage resulted from accidents, the results of the analyses on property damage are not reported separately. As the measures of pursuit driving were all derived from the theoretical issues which have been discussed in the literature, this study looks at which officer and pursuit characteristics predict each type of negative outcome using discriminant analysis and then explains how the characteristics are related to the outcome.

#### C. ACCIDENTS

The findings from the first discriminant analysis, on the accident/no accident measure, are summarized in Table 2. In this analysis, seven variables contributed significantly to the prediction of accidents: officer's age, reason for pursuit, road conditions, officer's gender, the officer's ethnicity, time of day, and type of road. This discriminant analysis is significant at the .08 level and has a canonical correlation of .21. While the predictive strength of the factors is not great, it resulted in the correct classification of 59% of the cases. Because the discriminant analysis has helped identify the significant predictors, a closer look at the effect of each of these variables on the outcome is necessary.

A comparison of the means and breakdowns of group percentages indicates that it is the pursuits initiated by officers forty years of age and over that are the least likely to end in accidents (23%), compared to 36% for the pursuits initiated by officers in their twenties, and 35% initiated by officers in their thirties. There was a slightly greater likelihood of an accident if the pursuit was initiated for traffic reasons (36%) compared to pursuits initiated for other reasons (32%). Pursuits conducted on wet roadways had a greater probability of accidents (43%) than those conducted on dry road-

**TABLE 2**  
**DISCRIMINANT ANALYSIS OF ACCIDENT/NO ACCIDENT**

Discriminating Variable Summary				
<u>Measures</u>	<u>Standardized</u> <u>Coefficients</u>	<u>Means</u>		<u>F*</u>
		<u>No Accident</u>	<u>Accident</u>	
Officer's Age	.608	31.52	30.02	.989
Reason for Pursuit	.528	0.49	0.41	.974
Road Conditions	.420	0.93	0.87	.981
Officer's Gender	-.364	0.91	0.93	.961
Anglo Officer	-.357	0.60	0.64	.966
Daytime	-.345	0.26	0.30	.970
Pursuit on Expressway	.301	0.15	0.11	.957
<u>Results From Function Test</u>				
U = .96	$X^2 = 12.47$	d.f. = 7	P < .08	$R_{can} = .21$
<u>Classification Results</u>				
	<u>N</u>	<u>Centroids</u>	<u>Predicted Group Memberships</u>	
			<u>No Accident/Accident</u>	
No Accident	213	0.153	126 (59%)	87 (41%)
Accident	110	-0.289	46 (42%)	64 (58%)
Percentage of Cases Correctly Classified: 59%				
* All F values represent transformations of Wilke's lambdas				
** P = .08 or less				

ways (33%). Female officers in pursuit were less likely to get into an accident (28%) than male officers (34%). This relationship is based on only twenty-five chases by females and should be interpreted with caution. There is very little difference between the chances of accidents when Anglo officers engage in pursuits (35%) compared to the pursuits of non-Anglo officers (33%). Chases conducted during daylight hours result in more accidents (38%) than other chases (33%). Chases on freeways are less likely than other pursuits to end in an accident (29% compared to 35%).

#### D. PERSONAL INJURY

The next category of negative outcome is personal injury. The discriminant analysis (see Table 3) identified six variables which contribute significantly to the prediction of personal injury: officer's age, the involvement of other police departments in the chase, elapsed time, number of police units, the officer's gender, and the location of the chase in a rural area. The discriminant anal-

**TABLE 3**  
**DISCRIMINANT ANALYSIS OF PERSONAL INJURY/NO INJURY**

Discriminating Variable Summary				
<u>Measures</u>	<u>Standardized</u> <u>Coefficients</u>	<u>Means</u>		<u>F*</u>
		<u>No Injury</u>	<u>Injury</u>	
Officer's Age	.447	31.38	29.72	.989
Other Police	-.607	0.15	0.24	.977
Elapsed Time	.570	5.17	4.37	.970
Number of Police Cars	.456	0.63	0.55	.961
Officer's Gender	-.331	0.90	0.96	.956
Rural Area	.283	0.06	0.03	.952
<u>Results From Function Test</u>				
U = .95	X <sup>2</sup> = 14.06	d.f. = 6	P < .03	R <sub>an</sub> = .22
<u>Classification Results</u>				
		<u>Predicted Group Memberships</u>		
	<u>N</u>	<u>Centroids</u>	<u>No Injury/Injury</u>	
No Injury	248	0.122	145 (59%)	103 (42%)
Injury	75	-0.409	31 (41%)	44 (59%)
<u>Percentage of Cases Correctly Classified: 59%</u>				
* All F values represent transformations of Wilke's lambdas				
** P = .07 or less				

ysis is significant at the .03 level and the canonical correlation is .22. This discriminant analysis classified 59% of the cases correctly into the injury/no injury categories.

An in-depth analysis of each of these predictors reveals several details. The younger the officer, the greater the likelihood that there will be personal injury as a result of the chase. Twenty-six percent of the chases with officers in their twenties result in personal injury. Compare this to the 20% of chases with officers in their thirties that result in injuries and the 18% of the chases initiated by officers in their forties that result in injuries. Chases in which other police agencies are involved result in a greater percentage of injuries than chases that do not have help from other police departments. Twenty-one percent of the chases conducted by MDPD officers involved injuries, while 33% of the chases involving other police led to injuries.

Surprisingly, there is no clear relationship between time elapsed and injury. However, the chases that lasted between one and three minutes and those lasting between four and five minutes

all have slightly more than a 20% chance of concluding with injuries. In comparison, 37% of the chases lasting six to nine minutes had personal injuries. However, the extended chases, lasting ten minutes or more, have a very low rate of personal injury (11%). Many of the suspects involved in such long chases will likely escape injury. It is important to remember that only 13% of the injuries were serious or life-threatening, and one-third occurred after the pursuit ended.

The chases with only one police car involved have a smaller likelihood of personal injuries (20%) than chases involving two or more police cars (28%). Chases initiated by female officers have only half the chance of personal injury as those initiated by men. Twelve percent of the chases by women involve personal injury compared to 24% of the chases by men. Chases taking place in rural areas are much less likely to result in personal injuries than pursuits in other areas: 24% of the chases in urban or suburban areas result in personal injuries while only 11% of chases in rural areas involve personal injuries.

**TABLE 4**  
**DISCRIMINANT ANALYSIS OF ESCAPE/NO ESCAPE**

Discriminating Variable Summary				
Measures	Standardized Coefficients	Means		F*
		Escape	No Escape	
Number of Units	.592	0.71	0.58	.987
Vehicle Type	.543	0.11	0.06	.979
Chase at Night	.565	0.63	0.56	.969
Top Speed	-.477	59.06	61.97	.965
Results From Function Test				
U = .97	X <sup>2</sup> = 9.47	d.f. = 4	P < .05	R <sub>can</sub> = .18
Classification Results				
	N	Centroids	Predicted Group Memberships	
			Escape	No Escape
Escape	84	0.318	50 (60%)	34 (41%)
No Escape	239	-0.104	87 (36%)	152 (64%)
Percentage of Cases Correctly Classified: 63%				

\* All F values represent transformations of Wilke's lambdas

\*\* P = .06 or less

#### E. APPREHENSION V. ESCAPE

The data in Table 4 summarize the results of the discriminant analysis on suspects escaping from the pursuing officer. There are four variables that contribute significantly to the prediction of apprehension: number of police units involved in the chase, type of vehicle being chased (which is categorized into motorcycles and other vehicles), time of day, and top speed reached during the chase. This analysis is significant at the .05 level and has a canonical correlation of .18. While the strength of the factors is weak, it results in 63% percent of the chases being classified correctly into the two groups (escape and no escape).

A closer examination of these relationships reveals that chases employing more than one police vehicle have significantly fewer escapes (18%) than chases involving only one police vehicle (31%). Nearly twice the percentage of escapes occur when the pursued vehicle is a motorcycle rather than when it is an automobile or truck. Twenty-four percent of the automobiles escape, while 44% of the motorcycles escape. There is only a slight difference in the percentage of escapes between chases conducted at night and those conducted at other times. Twenty-eight percent of the chases result in escapes when conducted at night, compared to 24% of the chases at other times. Surprisingly, chases with top speeds of forty miles per hour and under have the greatest likelihood of escape (33%) when compared with chases reaching top speeds of more than forty miles per hour. The chases at lower speeds are likely to take place in residential and business areas where it is easier to escape apprehension.

### VI. DISCUSSION AND CONCLUSIONS

#### A. PURSUITS IN PERSPECTIVE

An analysis of possible solutions to problems involving police strategies and tactics, in the absence of adequate research data, often leads to faulty conclusions. This certainly has been the case with previous attempts to respond to the problems of police pursuit. For example, Stone and DeLuca accurately summarized the conventional wisdom concerning police pursuits:

One of the major areas of controversy in traffic law enforcement, and in patrol administration generally, is the practice of pursuing fugitives at high speed. . . . High-speed pursuit is an exceedingly dangerous kind of police operation. It is dangerous not only for the police officer and the fugitive, but equally so for innocent citizens who happen to be in their path. . . . More often than not, a high-speed pursuit ends only when either the fugitive or the officer is involved in a collision, often a

fatal one.<sup>30</sup>

This description of pursuit and its inherent dangers suggests that such activities are exceedingly dangerous for the police officer, offender, and innocent bystander. Further, it emphasizes that a collision resulting in serious injury or death is the likely result of a high-speed pursuit. Many of these previously held beliefs about police pursuits are inconsistent with the data reported herein concerning pursuits in urban areas or on freeways as reported by the California Highway Patrol,<sup>31</sup> thus providing an example of the unreliability of conventional wisdom.

The data from this study reveal that MDPD police officers are involved in fewer than one pursuit per day. The MDPD mobilizes approximately 1,000 police cars, that travel approximately 19.5 million miles per year. A greater frequency of pursuits was expected relative to the expectations derived from the social concern over police pursuits and the media attention given the subject.

In no way, however, can these findings be interpreted to mean that pursuit driving is safe or should be left uncontrolled. Even in a department that emphasizes adherence to strong policy, and that includes active control and supervision, pursuits result in some damage and injury. For example, pursuit driving accounted for approximately .08% (323 x 5) of the 19.5 million miles driven by police during 1987. Further, there were 110 accidents, a figure which was less than 5% of all accidents involving police cars. Thus, the pursuit accident rate per 1,000 miles equals 68.11 (110 accidents per 1,615 miles) while the non-pursuit driving, (which included approximately 2,000 accidents for 19,500,000 miles) equals 1.03. These figures indicate that pursuit driving is sixty-five times more likely to result in an accident than other police driving, and that a pursuit-related accident occurred almost every three days.<sup>32</sup> However, if these same figures were computed for the seven serious injuries, the differences would be drastically reduced.<sup>33</sup> Determining how much is too much requires a subjective judgment not easily established.<sup>34</sup>

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<sup>30</sup> A. STONE & S. DELUCA, *POLICE ADMINISTRATION* 414-16 (1985).

<sup>31</sup> California Highway Patrol, *supra* note 20, at 22-81.

<sup>32</sup> Critics of pursuit driving often use this type of comparison to justify policies that restrict officers from chasing law violators. Perhaps a more appropriate comparison is the pursuit related injury to injuries suffered as a result of other arrests.

<sup>33</sup> Unfortunately, the figure for serious injuries is not available department wide. However, 12% of all non-pursuit related accidents (602) resulted in an injury and Dade County Office of Risk Management estimates that there were 11 non-pursuit accidents that resulted in serious injuries.

<sup>34</sup> This quantity must be established by policy-makers not researchers.

Not only are there fewer pursuits than expected, but the vast majority of the pursuits under study were of short duration and involved relatively slow speeds. Certainly, most did not conform to the frightening image portrayed by textbooks, Hollywood, and other media. More than two-thirds of the pursuits lasted five minutes or less, and 27% ran for less than three minutes. Top speed for nearly half of the pursuits never reached fifty-five miles per hour.

#### B. THE OUTCOMES: ACCIDENT, INJURY, AND APPREHENSION

Fifty-five percent of the pursuits had outcomes which did not result in serious injury, property damage, or even a traffic accident. The risk of pursuit driving is best understood when evaluated in a broader perspective. For example, less than 1% of the total traffic accidents that occurred in the county for the time period studied involved pursuit driving. In fact, pursuit driving, the most dangerous type of driving in which a police officer engages, accounts for less than 5% of all the accidents involving police cars. Moreover, a serious injury as a result of pursuit is a rare event. This is especially true for the police officer or innocent bystander. The majority of the chases in the studied population resulted in no property damage. It is obvious that while these findings do not support the commonly held view that most chases in Dade County result in accidents, serious injury, or property damage, they reflect a serious concern for law enforcement.

Finally, the level of risk involved in these pursuits must be balanced against the deterrent effect of criminal apprehension. On the one hand, it has been demonstrated that the cost component of the cost/benefit ratio is serious, but much less than commonly thought. On the other hand, the benefit of initiating pursuits is that, contrary to conventional thought, nearly three-fourths result in an arrest. While a majority of the pursuits were initiated for relatively minor traffic infractions, many of those apprehended were charged with serious felony offenses unrelated to the pursuit (nearly 50%). This indicates that many offenders flee from the officer because of concern over more than the traffic offense that initiated the pursuit.

These findings might not be generalized to all or even most police departments. As stated earlier, the Dade Association of Chiefs of Police conducted a content analysis of pursuit policies from around the country. This analysis resulted in a model policy adopted by the MDPD from which these data were collected. A reasonable explanation for the findings in this study is the strong policy of the MDPD—its requirement for strict supervision and officer ac-



countability through mandatory reporting and review of pursuits. One important implication of this explanation is that pursuit-related problems can be minimized with the adoption of a strong pursuit policy, which includes distinct controls and accountability, coupled with effective police officer training.

### C. CONTROLLABLE FACTORS

It is imperative to remember that the outcome of a pursuit is determined by a combination of factors. The preceding discussion of these factors is incomplete without the recognition of at least three actors in the pursuit scenario. These actors include the police officer, the law violator, and any third party who happens to become involved by being in the wrong place at the wrong time. Little or no control can be had over the offender and any bystanders. As a result, the explained variance is weak. However, there are some factors that can be controlled. Patterns emerged that can both direct policy and training and provide a foundation for future research. The summary of findings presented in Table 5 indicates the significant predictors of pursuit outcome.

**TABLE 5**  
**SIGNIFICANT PREDICTORS OF PURSUIT OUTCOME**

PREDICTORS	ACCIDENT	INJURY	APPREHENSION
<u>Officer Characteristics:</u>			
Age	X	X	
Gender	X	X	
Ethnicity	X		
Months Employed			
<u>Pursuit Characteristics:</u>			
Location	X	X	
Road Conditions	X		
Time of Day	X		X
Vehicle Type			X
Reason for Pursuit	X		
Number of Police Vehicles		X	X
Other Jurisdictions		X	
Top Speed			X
Elapsed Time		X	

The officer's age was a significant predictor of negative outcome for accident and injury. In each case, the younger officers had the greatest likelihood of negative outcome as a result of their

chases. In spite of their greater propensity for negative outcomes, younger officers were not more likely to apprehend their suspects. The younger officers conducted less efficient chases with respect to the cost/benefit ratio than older officers. Older officers tend to be less willing to take the same risks that they took when they were younger. The following quotes illustrate these differences:

When I was younger I would have been more concerned about busting my ass to catch some creep who was trying to escape. Now, I figure this creep will get himself in enough trouble and someone will bust his head. I wasn't going to put my ass on-the-line for that creep. He was smart he just quit.<sup>35</sup>

It was a game, man he was trying to get away and I wasn't going to let him. Thinking about it now, I probably shouldn't have been so concerned with getting the guy, who cares, you know? But at the time it was all that mattered. And I got the son-of-a-bitch.<sup>36</sup>

The officers' gender was another significant factor in predicting accident and injury. The male officers had the highest probability of a chase resulting in a negative outcome. Similar to the age factor, the increase in the intensity of the pursuits conducted by males did not yield a greater benefit in terms of apprehension. The gender of the officer was not a significant factor in the probability of the suspect escaping. Thus, pursuits conducted by females were more efficient with respect to the cost/benefit ratio. Female officers apparently were more concerned about the risks involved in pursuit driving, and the following quote illustrates their ability to balance the costs and benefits:

I have to concentrate enough while stopping someone who is cooperating. I'm not going to take crazy chances driving crazy in a crowded area with the radio blasting, driving to beat all hell after some character who doesn't want to stop for whatever reason. I'll do my job, but there is a limit.<sup>37</sup>

It appears that the aggressiveness of the younger male officers is a characteristic not conducive to efficient and safe pursuits. While it is difficult to determine from our data the exact reasons for these findings, this is an area that future research should examine more comprehensively.

In addition to several characteristics emerging as important predictors across most categories of outcome, several types of out-

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<sup>35</sup> Quotation from a 48 year-old male patrol officer who had been in a pursuit the day before (May 13, 1988).

<sup>36</sup> Quotation from a 24 year-old male patrol officer who had been in a pursuit earlier that day (April 5, 1988).

<sup>37</sup> Quotation from a 35 year-old female officer who had been in a pursuit the day before (April 19, 1988).

come had unique variables that help explain the probability of that outcome. For example, a unique set of variables explains the probability of an accident. Accidents are more likely when the roads are wet, when the pursuit takes place during heavy traffic in the day than during light traffic at night, and when the pursuit takes place on roads other than expressways. These factors indicate that road conditions and the extent of traffic influence the likelihood of accidents, but not the likelihood of escape or injury which are influenced by another set of variables. Injuries are most likely when chases take place in urban areas, involve more than one police unit or police from another jurisdiction, and are of fairly long duration (six to nine minutes). Since most injuries occur after the chase when the officer arrests the suspect, it appears that chases which come to involve complicating circumstances, such as more than one officer or long duration, allow the situation to become more heated and result in more injuries. Escapes are more likely when the pursuits are conducted at night and when the suspect is riding a motorcycle. They are less likely when more than one police unit gets involved and, surprisingly, they are more likely for the slower chases. Apparently, the higher-speed chases take place on freeways where it is more difficult to out-run the police. This unique set of factors is important in that it influences the escape of the suspect, but it does not have much effect on accidents or injury.

#### D. ALEATORY FACTORS

While there is limited influence on one of the actors involved in the pursuit interaction, the actions of the other two actors—the offender and bystander—depend upon aleatory factors that involve uncertain contingencies. One implication of this study is to shift the focus from the officers' characteristics and policy directives to the mechanisms that explain the interaction between the officer, the law violator's behavior, and the bystander's actions. These interactions give the pursuit outcome much of its ad hoc character. An important result of this conclusion should be an increased consciousness of the role that uncertain contingencies play in the final outcome of pursuit driving.

These processes are similar to those found by Short and Strodtbeck<sup>38</sup> which contribute to illegitimate paternity, violent behavior, and gang delinquency. Their analysis acknowledged the weaknesses of studying the differences among the actors or in-

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<sup>38</sup> J. SHORT & F. STRODTBECK, *GROUP PROCESS AND GANG DELINQUENCY* 265-71 (1965).

dependent macro-level factors and focused on the *process*.<sup>39</sup> Their aleatory notion stressed the independence of factors involved in a situation and focused on the probability of these events occurring together. Analogously, it is insufficient merely to be a good police officer and take normal precautions. Pursuits are not undertaken with the expectation that an accident will occur, but increasing the exposure to risk will increase that likelihood.

Even though an officer may conduct the "perfect" chase by following all policy directives and by making all the right decisions, the chase may result in the worst possible outcome due to some unforeseen contingency. For example, a pedestrian may not hear the police siren and step in front of a law violator or speeding police car. As a result, a well conducted chase ends in the worst possible outcome—the death of an innocent bystander. Unforeseen contingencies make any chase a risk, although significantly less than that suggested by conventional wisdom.

Pursuit is one tactic available to police in their war against crime. Because it is potentially dangerous, pursuit driving must be careful and consistent with the police mission—to protect lives. As we move into the 1990s, many police strategies are being modified with strong guidance from empirical research. No longer can decisions be made without appropriate research, analysis, and planning. Perhaps findings from empirical research will influence police pursuit policy, training, supervision and accountability.

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<sup>39</sup> *Id.* at 248.