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FACTORS AFFECTING THE INCIDENCE OF BUS CRIME IN LOS ANGELES

VOLUME I

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16. Abstract

A survey of 1088 randomly-selected households was conducted to measure the incidence of bus crime in west central Los Angeles, and to assess sources of reporting error and isolate environmental factors contributing to bus crime. The incidence is 20 to 30 times greater than Southern California Rapid Transit District reports indicate. Major differences between reported incidents and incidents estimated in this study include: Crimes occurring outside buses, but in transit; Victims not reporting crimes; Police not investigating; and Statistical loss from local police reports. Most crimes occur in the afternoon and early evening and there are usually many persons around. Overcrowding was perceived as a contributing factor, especially for crimes on buses. The perceived causes at bus stops are particular to the surrounding environment. A method was illustrated for detecting dangerous bus stop locations and observations at three were conducted. There was strong support among respondents for bus crime prevention, and several suggestions were made. It was recommended that the existing reporting system must be supplemented by police reports using revised crime categories. This will require consultation between the U.S. Department of Transportation and the U.S. Department of Justice. Environmental information should be included in any transit crime data base. Strategies for protecting passengers at bus stops must use the unique elements of locations. Volume II contains appendices: A - Survey Questionnaire; B - Sample Design, Sampling Error and Probable Bias; C - Observations at Three Dangerous Bus Stops; D - Some Transit Crime Reporting Systems in Southern California: Towards An Alternative Method.

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EXECUTIVE SUMMARY

FACTORS AFFECTING THE INCIDENCE OF BUS CRIME IN LOS ANGELES

by

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A survey of 1088 randomly-selected households was conducted to measure the incidence of bus crime in west central Los Angeles, to assess sources of crime reporting error and to isolate environmental factors contributing to bus crime. Crimes on buses and when travelling to or from buses (bus-related) were examined. The major conclusions were:

1. The incidence of bus and bus-related crime in central Los Angeles is much greater than has been documented. About 9% of respondents had been victimized with 3% being victimized in 1983 alone. Constructing a household exposure rate for 1983, 5% of households had at least one member victimized in 1983, which translates into about 23,292 bus-related crimes in 1983 for west central Los Angeles. This estimate is 20 to 30 times greater than official data published by the Southern California Rapid Transit District.

2. There were major sources of reporting error (information 'leakage') for bus and bus-related crimes which account for the discrepancy between SCRTD reports and survey estimates. In 1983, 57% of the crimes occurred outside buses, either at bus stops or on the way to or from bus stops. In addition, in 1983 only about 28% of the crimes were reported by victims and the police investigated reports about 50% of the time. When it was the police who investigated, it was usually the Los Angeles Police Department who investigated. Since the LAPD do not categorize crimes as transit-related, the likelihood of SCRTD receiving information about bus crimes is negligible. Consequently, SCRTD is only aware of a small proportion of all bus-related crimes occurring. Even for crimes on buses, information 'leakage' is high.

3. For the victims, there is considerable financial loss, as well as physical and emotional harm. Elderly persons, women and persons of Hispanic background are particularly vulnerable to bus-related crimes.

4. There is substantial fear of using buses, especially for travel at night and to downtown Los Angeles. Fear of using buses appears to be related to actual vulnerability. Women, Hispanics, persons of lower education, persons who have been victimized and persons who know others who have been victims perceive bus travel as less safe.

5. There are some significant environmental correlates of bus crime. Overcrowding is a major factor which is perceived as contributing to bus crime, especially for crimes on buses. On buses, life threatening crimes are more likely to occur in the back. For crimes at bus stops, overcrowding is important in some locations but not in others. Most crimes occur in the late afternoon and early evening and there are usually many persons around. But the exceptions are important. Crimes that occur at night or when few persons are around are more likely to be life threatening.

6. Bus stop crimes were analyzed by specific intersection. The locations of bus stops which have larger volumes of crimes are distributed all over the area. A method was illustrated for detecting specific locations which are dangerous and observations at three of the most dangerous bus stops were conducted. The factors contributing to crime at each were different, and any solution developed must be tailored to the specific circumstances.

7. There was strong support among the population for a bus crime prevention program. When asked how such a program should be financed, the majority (including bus users) preferred increased fares to other actions with which they were presented. In terms of priorities, increased police protection had the greatest emphasis. Several design options were evaluated which can be incorporated into a preventive strategy.

8. Several suggestions were made for reducing bus and bus-related crimes: re-scheduling to reduce overcrowding; re-designing the back of the bus to allow better passenger flow; improving drivers' roles in protecting passengers; deploying police at dangerous bus stops; moving bus stops from dangerous locations; physical separation at crowded bus stops; community outreach around dangerous bus stops; and special outreach for schools. The effectiveness of any of these would depend on where it is implemented.

9. Three recommendations are made. First, the existing system for collecting information on transit crime has fundamental faults that can only be corrected by revising the categories used in measuring crime. This will require consultation between the U.S. Department of Transportation and the U.S. Department of Justice. Second, environmental information is important for understanding factors contributing to crime and should be included in any transit crime data base. Third, the physical and social causes of bus stop crime are particular to the environment surrounding each stop. Any strategy for protecting passengers at bus stops must be based on an assessment of the unique elements at a location.

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VOLUME I

INTRODUCTION

How much transit crime is there in the United States? Recent interest in transit crime has raised the issue of the scope of the problem. Many newspaper reports and several congressional hearings have brought into focus the problem of security on America's transportation systems. Policymakers and transit authorities are trying to determine whether various measures taken over the last decade to improve security have been effective. There have also been many studies of bus crime, some of which are reviewed in Chapter 1.

Uniqueness of Criminal Incidents

This report also examines bus crime and attempts to document its incidence in central Los Angeles. But it differs from other studies in two respects. First, it uses a survey method to estimate the amount of bus crime occurring in central Los Angeles. This method can overcome many deficiencies found in existing transit crime statistics collected by transit and police agencies. Second, the study tries to obtain information about the conditions under which bus crimes have occurred. Though crime is a widespread problem and though its 'causes' may reflect the existence of inequalities, frustrated opportunities, and family pathology, however it is always specific in that a particular person attacks another individual at a specific location and time. Current methods for analyzing crime tend to ignore the specificity of situations. Starting from statistics of crime, which begin with police reports (if they are reported) to their compilation and aggregation through the reporting system, there has been a tendency to minimize the uniqueness of crime and seek the generalities. Yet in looking for the general patterns, the unique set of factors which led to the crime may be ignored.

For transit, this becomes important. Many 'bus' crimes occur at bus stops or when individuals are walking to or from bus stops. For the victim the crime may have occurred at any point on the transit route, starting from the time the person left home to the time he or she returned. Policymakers have tended to deal with the most accessible parts of the system, the buses and the drivers, and have tended to ignore the least accessible parts, the bus stops or streets.

A Needed Data Base on Transit Crime

Providing solutions to crimes on buses and at bus stops is intrinsically tied up with information systems. To break up the problem into manageable pieces, a data base is needed which has information about which bus lines or bus stops are dangerous, at

what times they are dangerous, what types of land use and other conditions may be contributing to them. Unfortunately, existing statistical sources for bus crimes lack such specificity. Neither transit operators nor local police departments have adequate data bases for monitoring bus crimes, the police because they do not categorize transit crimes and transit agencies because they do not measure the bulk of transit-related crimes. Solutions to bus crimes happening in unique environments must remain an abstract idea because there is little data that can allow for uniqueness to be recognized. This report illustrates how such a data base can be constructed and how environmental information can be used in prevention.

KEY ISSUES GOVERNING STUDY

There are three issues which this report addresses. Though the concern will be with bus crime in the central core of the Los Angeles metropolitan area, the issues are not specific to Los Angeles but have wide generality:

1. To estimate the incidence of bus crime. It is important to have accurate estimates of the amount of transit crime affecting patrons of a transit system.

2. To examine contributing environmental conditions to bus crime. If conditions contributing to crimes at particular bus stops or on specific bus lines can be detected, then preventive actions can be taken.

3. To explore strategies that can be adopted in mitigating crime. A method is developed for focusing prevention on bus stops that are dangerous. The survey also examines respondents' perceptions of bus crime prevention.

Based on the results, recommendations are made for improvements in transit crime reporting systems. The aim is to reduce information loss from current reporting methods as well as obtain information about specific environmental conditions affecting bus crimes.

ORGANIZATION OF THE REPORT

The report is organized around these issues. Chapter 1 will review some literature on bus crime and will discuss methodological problems in measuring it. Chapter 2 will present the methodology for the bus crime victimization survey. Chapter 3 will examine the incidence of bus crime in central Los Angeles. Chapter 4 will look at victims and at public fears about bus crime. Chapter 5 will examine environmental correlates of bus crimes with particular focus on detecting dangerous bus stops. Chapter 6 will discuss public perceptions of crime prevention and Chapter 7 will conclude with some policy recommendations and

suggestions for future research. There are also several appendices that are included in Volume II. Appendix A presents the questionnaire used in the survey. Appendix B discusses survey sampling error and bias. Appendix C shows the results of observations at three dangerous bus stops in Los Angeles. Appendix D is a discussion of the way various southern California transit and police agencies categorize bus crimes.

CHAPTER 1

METHODOLOGICAL ISSUES IN MEASURING BUS CRIME

This chapter will briefly review some methodological concerns affecting the measurement of bus crime. As indicated in the preface, the report is governed by three goals: 1) To estimate the amount of bus crime in central Los Angeles; 2) to examine contributing environmental conditions to bus crime; and 3) to explore strategies that can be adopted in mitigating bus crime.

THE INCIDENCE OF CRIME ON BUSES

The extent of crime on public transit is difficult to estimate, because of many unreported crimes and of inconsistencies in crime reporting. What is currently known is the number of transit crimes reported by transit authorities, which includes both bus and train crimes and which most likely represents only a small proportion of actual crimes committed on the systems and when passengers are in transit (the total 'trip').

There have been several attempts to estimate the number of transit crimes in the U.S. In 1971, Thrasher and Schnell (1974a) obtained information from 37 U.S. transit systems in which 20,899 criminal incidents were recorded on those systems. Based on these data, they estimated that between 33,000 and 39,000 serious crimes occurred on all U.S. transit systems in 1971 (Richards and Hoel, 1980). Following this, the Southeast Michigan Council of Governments conducted three national surveys of transport authorities to document the extent of transit crime in the U.S., Canada and several other countries (SEMCOG, 1979; SEMCOG, 1981). Using reported data from 57 transit authorities in the U.S. in 1980, for example, they found that there were 31,378 reported serious incidents ('Part I' crimes), an additional 95,659 less serious incidents ('Part II' crimes) and 155,589 local ordinance violations. There was no breakdown given of the number occurring on buses as opposed to trains. Richards and Hoel (1980) reorganized the 1977 SEMCOG data to separate crimes on 'bus and rail' systems from crime on 'bus only' systems and concluded that most crimes occur on rail, as opposed to bus systems.

In the 1980 SEMCOG survey, the most common type of serious transit crime was larceny (theft, pickpocketing, purse snatching), which accounted for 58% of all serious crimes. This was followed by robbery (24%), aggravated assault (6%), motor vehicle theft (2%) and burglary (9%) (SEMCOG, 1981). Murder and rape, aside from their horrendous consequences, constituted only a small fraction of all serious crimes (less than .2% each). In addition to crimes against people were crimes against property, the most common being vandalism followed by stolen property; motor vehicle thefts and

burglaries were less frequent. No figures were given on the cost of these crimes to the transit authorities.

Definitional Problems

There are major weaknesses with these data bases which affect estimates of the number of transit crimes in the United States. First, there is the definition of transit crime itself. In 1930, the FBI and the U.S. Department of Justice developed the Uniform Crime Reporting (UCR) system to standardize crime reporting throughout the United States (FBI, 1983). This system divides crimes into two categories, Part I or Serious Crimes and Part II or Misdemeanors and Local Ordinance Violations. The Part I crimes include eight types which are considered serious: Murder and Nonnegligent Manslaughter, Forcible Rape, Arson, Burglary, Robbery, Aggravated Assault, Larceny-Theft, and Motor Vehicle Theft. These are further sub-divided into Property Crimes and Violent Crimes. The Part II crimes are made up of around 20 remaining crimes which are generally enforced by states and local jurisdictions (e.g., simple assault, forgery, fraud, vandalism, drunkenness, drug abuse, disorderly conduct).

Although providing for consistency among police agencies across the country, the categories define crime in terms of what happened to the victim, not the activity or location where the crime occurred. Most police agencies do not categorize crimes by transit use. Jacobson et al. (1979) attempted to redefine crime categories to make them more appropriate for transit systems. Their system has four categories: I - crimes against persons (e.g., assault, battery, rape); II - crimes against personal property (e.g., pickpocket, robbery); III - crimes against the system's property (e.g., burglary, vandalism, fare evasion); and IV - crimes against the public (e.g., drunkenness, disorderly conduct, drug law violations). Such improvements to transit crime reporting are necessary, but must go further. In both the UCR system and the Jacobson et al. system, crimes are categorized by their effects on victims. The categories provide little in the way of environmental or contextual information which could allow for a preventive strategy. For a transit system, this becomes essential as the crimes occur within a well-structured activity and it becomes important to monitor the effectiveness of a security system through all stages of a transit operation.

Incidents may also be classified differently by different agencies, as well as varying between what the agency considers a crime compared to the victim. For example, few agencies have records of sexual harassment, yet one study found that almost 90% of female transit users had experienced some form of sexual harassment on buses (cited by Klein, 1980).

Another issue is the scope of transit crime. Many transit authorities may resist including crimes outside buses or trains as

being transit-related. Part of this relates to liability. For crimes occurring on a bus or train, the operator has some liability. For crimes occurring at a bus stop or at the entry of a train station, liability is more ambiguous. For crimes occurring on route to or from a transit point, clearly the agency is not liable. For passengers, however, a crime at a bus stop or at the entry of a train station or on route to or from the transit point may be seen as part of the transit trip.

It is important to gather information about the entire transit trip irrespective of how much liability the transit operator has. In this report, a distinction is made between transit crimes and transit-related crimes. Transit crimes are those that occur to persons in transit or when entering or exiting a system. Transit-related crimes are those that occur going to or away from a transit system. Although this broadens the problem, it has the advantage of examining the total risk to passengers.

Effectiveness of Transit Crime Reporting Systems

A second major weakness of transit crime statistics concern the effectiveness of reporting systems. There are major sources of information loss or 'leakage': unreported crimes, the police not responding to calls even when a report is made, inconsistent reporting between agencies and faulty categorization. Many incidents go undetected because victims do not report crimes. One study, for example, suggested that the actual number of transit crimes is probably two to three times that of the reported ones (Carnegie-Mellon, 1975). The data that will be presented in Chapter 3 indicates that the degree of underreporting is considerably greater than this.

In addition, incidents go undetected because the police never investigate even if reported. Increasing pressure on police departments combined with restrictive budgets have reduced personnel available to even investigate reported crimes. Also, many police departments have priorities for investigation, with the most serious crimes being investigated first. The types of crimes frequently found on transit systems (pickpocketing, purse snatchings) may be considered a low priority.

Different transit authorities also categorize crimes in different ways. The SEMCOG studies, for example, tried to develop standard reporting categories by subdividing crime into three general categories - Part I, Part II and Local Ordinance Violations (SEMCOG, 1979; SEMCOG, 1981). The UCR Part I index corresponds to SEMCOG's Part I categories but the UCR Part II grouping was sub-divided. There are major differences between cities in the incidence of these events, which undoubtedly reflect different reporting procedures as well as substantive differences. For example, in 1977, the New York City Transit Authority reported

4,864 Part I offenses for Brooklyn, but only 3,984 Part II offenses. Los Angeles, on the other hand, had only 623 Part I offenses for the year but 36,417 Part II offenses. By 1980, however, the patterns had changed. Brooklyn had 13,665 Part I offenses but 37,495 Part II offenses, while Los Angeles had 757 Part I offenses and 3,359 Part II offenses. Although there are real differences between cities in the distribution of transit crimes, variability in the use of categories appears to be significant, making comparisons difficult.

A final source of information loss is statistical. Most police departments use the FBI's UCR system as the basis for their reporting forms and do not categorize crimes by the activities of victims. Any relationship to transit use will be recorded only for legal purposes and will not be coded in statistical reports. Therefore, many transit or transit-related crimes which are investigated by the police are noted without any reference to transit.

As will be shown in Chapter 3, the cumulative effect of unreported crimes, police not responding to calls, inconsistent reporting and statistical loss is large and makes existing transit statistics questionable.

Victimization Surveys as An Alternative Method

Surveys of victims, on the other hand, could get around these difficulties because respondents can report crimes occurring at any point in a transit trip, whether the crime was reported or not. But the few victimization surveys that have been done have not tried to generate estimates of the amount of transit crime. Several studies have studied the risk of being involved in a criminal incident when using transit (Shellow et al., 1974; Thrasher and Schnell, 1974a) but have not estimated the total volume of crime nor victimization rates among the population. In one attempt, Shellow et al. (1974) estimated that the risk of being robbed was about one-third as great on the Chicago transit system as in the rest of the city. But the exact connection between general crime and bus crime would not be expected to follow a systematic pattern and would depend on a myriad of socio-economic and transit factors. In another study (Thrasher and Schnell, 1974a), the researchers found the risk of being involved in a criminal incident was twice as great when using an urban transit system as in a non-transit situation in New York.

Bus drivers may have more chances of being victimized than passengers. One report, upon examining several studies, indicated that 20% of victims were transit employees (Metropolitan, 1974), and for the Los Angeles area Pearlstein and Wachs (1982) have shown that bus drivers have a far higher risk of being victimized than passengers, at least using SCRTD statistics. This

disproportionately higher rate for drivers would be expected, since the bus driver has greater exposure, both in terms of number of trips and time exposure. It is also probable that bus drivers are more likely to report incidents than patrons, thereby exaggerating this differential exposure.

Victimization rates among the population are not clearly known. Richards and Jacobson (1980) found that about 12% of respondents to a survey had been victims and about 27% had witnessed transit crimes sometime during their lifetimes. However, since the survey was not a random sample of the population, the results cannot be generalized. In another study of elderly transit users in Philadelphia, Patterson and Ralston (1983) reported that 4% of the respondents had been victims of a crime on a bus within the previous year and another 2% had been victims at a bus stop, also within the previous year. Again, since the sample was not a random representation of the population, the results cannot be generalized. On the other hand, using a random sample of households in Santa Monica, California, it was found that only 5% of the adult population had been victims of a bus crime, but that 15% had personally witnessed a bus crime (Levine, 1982); small sample sizes yielded large sampling errors so that the results were inconclusive. Though these different survey results are not strictly comparable, varying by geography and by measure of crime, they do suggest a sizeable exposure to crimes on buses.

Bus Crime in Central Los Angeles

The greater Los Angeles area has the largest all-bus transit system in the world with the Southern California Rapid Transit District (SCRTD) operating a fleet of over 2,900 buses and providing transportation to 1.8 million passengers a day, over an area of 2,000 square miles. The district is a public agency, created in 1964, and serves most of the metropolitan region, supplemented with additional service by several smaller municipal districts. Before 1978, the SCRTD security force had limited authority. It was confined to traffic accidents and guarding SCRTD's facilities and equipment. Increasing concern over crime, however, prompted SCRTD to convert its security department to a full transit police department in 1978. Currently they have a force of about 70 sworn officers and 40 security guards, of whom 25 are armed (Budds, 1982; Hargadine, 1983).

The first study of bus crime in Los Angeles was by The Southern California Association of Governments which conducted a study of criminal incidents on the SCRTD system over a three-month period in 1974 (SCAG, 1976). They showed the correspondence of bus crime to other types of crime in the area and the implied correspondence to the density of youths age 16 and under. Another important study has been by that of Pearlstein and Wachs (1982) who have showed that reported bus crime in Los Angeles has increased about in proportion to bus ridership over the period and that it is

concentrated principally on routes which cross areas characterized by high crime rates in general.

Within the SCRTD, systematic collection of bus crime data first began in 1970, but it wasn't until 1978 that some consistency in crime statistics developed. Figure 1.1 shows the number of reported incidents from 1970 through 1983 and, as should be apparent the increase in reported incidents must reflect as much an increasing effectiveness in detection as a real increase in the number of incidents (SCRTD, 1982c; SCRTD, 1983). The pattern of reported crime in SCRTD parallels the SEMCOG studies. In 1983, 41% of all reported Part I crimes were larcenies (thefts and pickpocketings), 32% were aggravated assaults, 13% were robberies, 10% were burglaries and 3% were motor vehicle thefts. There has, however, been a shift over time. Since 1973, larcenies have increased faster than any other type of bus crime.

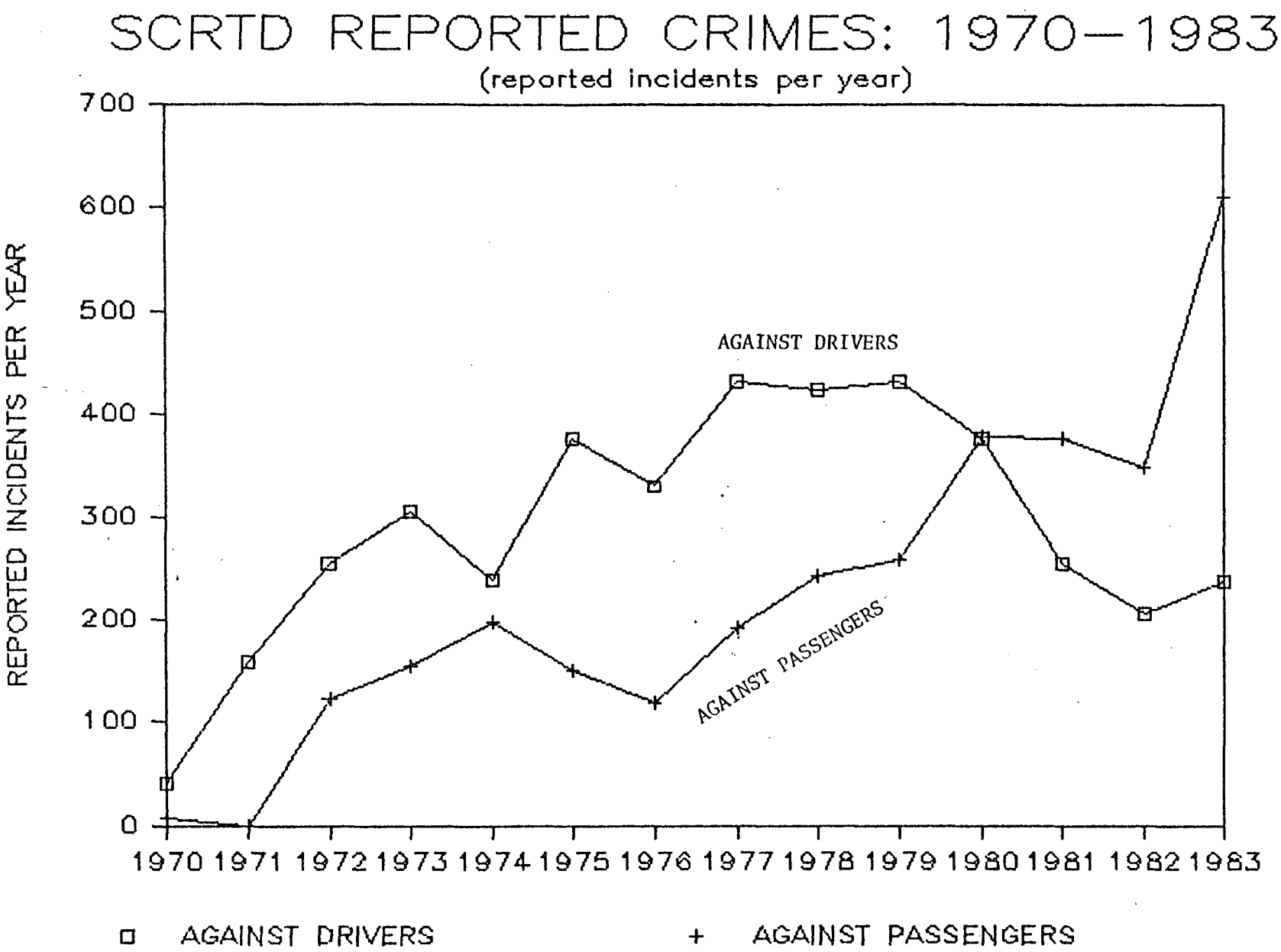
There has also been an apparent shift in the pattern of reported bus crimes. Until 1980, most reported victims were drivers, but since that time an increasing proportion of reported crimes are against patrons. The shift probably reflects increased measurement effectiveness by SCRTD. Since 1978, for example, thefts against drivers have decreased consistently with the introduction of the exact change policy, and since 1980 assaults against drivers have also decreased. Reported crimes against passengers, however, have tended to jump during this latter period, especially thefts and assaults. Whether this is a real increase or one because of better measurement is not clear. As Chapter 3 will show, most incidents occurring on the system are not detected by the SCRTD. Measurement error is so high that one cannot place any confidence on temporal shifts in published statistics about crimes against passengers. Trends in crimes against drivers, on the other hand, may be more reliable because it would be in a driver's interest to report an incident.

This report will show a method for estimating the number of bus and bus-related crimes in a geographical area and will provide estimates for west central Los Angeles in 1983. This report will also examine the degree of reporting error for existing SCRTD transit crime statistics and will evaluate sources of information 'leakage'. It is hoped that the study will provide a basis for improving existing transit crime statistics and linking them more closely with preventive actions.

ENVIRONMENTAL CORRELATES OF BUS CRIME

In addition to measuring the amount of bus crime, this report examines environmental correlates of bus crime. Crime is not an abstract phenomenon but occurs in specific contexts. Surprisingly, little is known about the specific environmental conditions which contribute to crime on buses.

FIGURE 1.1



SOURCE: SCRTD, 1982b, 1982c, 1983

There are some spatial and temporal correlates. The geographic association with general crime has frequently been noted. Bus crime incidents are highest on routes passing through high crime areas (Carnegie-Mellon, 1975; Shellow et al., 1974; Richards and Jacobson, 1980; Andrle et al., 1980; Pearlstein and Wachs, 1982). The association is based upon aggregate data, however, and it is important not to attribute uniform characteristics to people living within geographical areas.

Pearlstein and Wachs (1982) showed that most reported bus crimes in Los Angeles occur during the late afternoon and early evening; violent crimes are more likely to occur at nighttime but the bulk of robberies and thefts occur during the evening rush hours. There is contradictory evidence for seasons. Ferrari and Trentacoste (1974) found that winter was perceived as most dangerous in Chicago; they attributed this to longer hours of darkness in winter and the use of the transit system by 'street people' as shelter. In Chicago, robberies were more likely to occur in the evening and were most frequent on Friday and Saturday nights (Carnegie-Mellon, 1975). On the other hand, Pearlstein and Wachs (1982) found no seasonal differences in Los Angeles.

What is not known is the relative distribution of crimes between the bus and other locations in the transit trip (the bus stop, travel to-and-from the bus stop). Patterson and Ralston (1983) found that 4% of a small sample of elderly persons in Philadelphia had been victims of a crime on a bus and slightly over 2% had been victims at a bus stop. They also found that there was greater fear among the elderly about waiting at bus stops compared to riding on the buses themselves. In a small survey in Santa Monica, California, 60% of all known bus crimes occurred at a bus stop, compared to 40% on a bus (Levine, 1982).

Crime must be understand as an interaction between the victim, the criminal and the situation. Richards and Hoel (1980) argued that crimes require a conducive situation. They hypothesize that some criminals actively seek out situations while others are just tempted. They state that crimes for profit usually involve the perpetrator looking for an opportune situation. Pickpockets and purse snatchings are more likely to occur in crowded environments, whereas muggings and rapes occur more in isolated situations. Aggressive acts are often triggered by crowded situations. These are plausible hypotheses but lack empirical confirmation. There have been several attempts to characterize criminal strategies. Several studies have suggested that the 'typical' transit criminals in New York and Chicago are young, male and black (SRI, 1970; Carnegie-Mellon, 1975). They work alone or in small groups (SRI, 1970; Hawkins et al., 1977) and will usually pick on a lone victim. For robbery, the offender usually commits the crime soon after boarding and exits immediately after. The criminal almost always is able to escape, usually on foot. Drivers usually will not try to stop a robbery and usually are not injured. A Rand study (Chaiken et al., 1974) found that passenger robbers in the

New York subway tend to be teenagers, operating in the hours after school lets out, whereas toll booth robbers tend to be older, more experienced criminals.

Aside from these, however, little is known about the way crimes are committed and the specific micro-environmental factors and uses of physical space which encourage crimes. Chapter 5 will illustrate a method for detecting dangerous bus stops and Appendix C will present detailed observations of social behavior around three specific bus that were shown to be dangerous.

EVALUATIONS OF MEASURES DESIGNED TO MITIGATE TRANSIT CRIMES

This study also explores several strategies for reducing bus and bus-related crime. Ultimately, any crime prevention program should incorporate knowledge about crime in the physical and social design of bus systems. One could conceptualize four levels of an effective bus crime policy: (1) 'Target hardening'; (2) Surveillance; (3) Scheduling; and (4) Community building.

Target Hardening

'Target hardening' is the use of physical devices and design aimed at hindering easy access to a target (Rand, 1983). Much of the literature on bus crime has been concerned with physical design to discourage crime. There have been many studies of design elements for trains and subways to improve protection for patrons and employees. Many of these have been formalized in the APTA design manual (APTA, 1979) and will not be reviewed here. For buses, the use of the exact change policy, silent alarm systems on both the inside and the outside, and protective shields around the driver's seat have been explicitly designed to prevent crimes on buses. In addition, there have been other design elements which have encouraged safety-including interior lighting at night as well as large windows, which both increase visibility from the outside of the bus. Current bus design routinely integrates safety criteria, but some of the newer buses have regressed in safety planning: darkly tinted windows and paneled back ends reduce visibility from the outside during daylight. Also, many of these systems are expensive and may not be effective.

The most visibly helpful measure has been the exact change policy and the use of tokens, tickets or passes which has freed drivers from the need to provide change for passengers. Signs reading "Driver carries no change" further reinforce this policy measure. It should be noted that although robberies of bus drivers have decreased dramatically since the initiation of the policy, assaults are still frequent against bus drivers. SRI (1970) compared the number of injuries from assaults on drivers and found that injury levels were only slightly lower after the initiation of the policy. At SCRTD, assaults against drivers actually

increased after the introduction of exact change policy, though robberies did decrease dramatically (SCRTD, 1982c).

Surveillance Measures

Surveillance and alarm devices have been used to communicate with people outside the bus to either prevent crimes from occurring or allow intervention before the event has developed sufficiently. Automatic vehicle monitoring systems have been used to keep track of buses as they pass through their route. Two-way radios have been used to allow direct communication with transit personnel. Silent alarms have been used to alert a station that a bus has been stopped or hijacked. External, 'flashing electronic messages have been use to alert outside observers of an emergency event on the bus and to ask them to call the police for help. Identification numbers painted on the top of buses easily identify the vehicle in case of a helicopter search. Closed-circuit television systems have been used at the most dangerous bus stops to allow visible protection at all times of the day.

In spite of widespread use, communication measures have been criticized for their lack of effectiveness in combating crime (SRI, 1970; SCAG, 1976). Since most criminal acts take a short amount of time, even if police respond quickly the offender is likely to have finished and escaped from the system. SRI (1970) stated that the best effect of such systems is morale boosting for drivers and passengers, but questioned whether this benefit justified the capital expense required to install the systems. However, communication systems continue to be popular measures.

Further, there is a question about whether such devices even have psychological value. Survey respondents often state the need for more personnel and for communication or alarm systems to deal with bus crime (Ferrari and Trentacoste, 1974; Richards and Hoel, 1980). One study found that few people are aware that many of these measures are already in practice (Feldman and Vellenga, 1977). The result of visible security attempts may also increase patrons' fear, rather than abate it. Richards et al. (1980) examined the effects of installing a closed-circuit television system at one dangerous bus stop. The effect was that women felt more safe, but men felt less safe. The authors proposed that the reason for this was that women, who were already sensitive to crime, were reassured by the presence of the system, whereas men had been less sensitive about crime to begin with. It is not clear that surveillance or alarm systems can mitigate crimes or soothe public fears about crime.

Scheduling Measures

Other measures that have been proposed are scheduling and re-routing buses to minimize bus crime. It has been noted several

times that crime incidents tend to be higher near schools and the presence (or imagined presence) of unruly teenagers shows up in surveys of bus riders (e.g., Patterson and Ralston, 1983). It has been suggested that the scheduling of special buses or the re-routing of lines around schools to minimize contact between the school and non-school population would discourage incidents as well as protect the public at large. In practice, the implementation of such a scheme might meet extensive legal resistance, both from an accusation that the transit authority is not serving the entire community as well as possible charges of racial discrimination because of geographic overlap between high crime areas, high patronage areas and areas with higher percentages of ethnic minorities.

Overcrowding on buses, especially during peak hours may also be contributing to bus and bus-related crime. Petty thieves tend to depend on crowds to conceal their behavior. Given the huge deficits that many transit authorities face, crowded buses may be desired. Yet, by crowding people into buses or having them wait for extended periods at bus stops there is an increased likelihood that they will become victims of a purse snatching or pickpocketing incident.

Community Building: Educational Measures

Some actions have been taken to educate the public towards crime prevention. One such proposal has been a community education program designed to enlist help in preventing crime and vandalism (Thrasher and Schnell, 1974b). The content of such programs is usually left vague, and it is suspected that many are not cost effective. In Los Angeles, two community programs have been started though it is too early to evaluate their effectiveness.

Bus driver training programs have also been suggested to teach drivers how to deal more effectively with the public as well as with emergency situations (SRI, 1970; SCAG, 1976). One would intuitively expect that training would improve the effectiveness of drivers in direct assaults on them, but would be less effective in preventing incidents against patrons. Good public relations is another recommendation which has been made so that public transit would be portrayed in a positive light with no undue fear generated from sensationalist bus crime stories.

This report will attempt to evaluate the feasibility of some of these measures in preventing crime, at least as perceived by the public, and will illustrate a method for designing preventive measures around dangerous bus stops.

CHAPTER 2

BUS CRIME VICTIMIZATION SURVEY METHODOLOGY

A telephone survey of residents of the central core of Los Angeles was conducted during the winter of 1983-84 to measure the incidence of bus crime. It was decided to select a random sample of households in west central Los Angeles, interviewing both bus users and non-users.

WEST CENTRAL LOS ANGELES

The west central area of Los Angeles was selected for the survey. This is an area that extends from downtown Los Angeles in the east to West Hollywood in the west, and from the Hollywood Hills in the north to the Crenshaw district in the south. Figure 2.1 shows a map of west central Los Angeles is relation to the whole of Los Angeles County while figure 2.2 presents a more detailed map showing general boundaries but sub-divided into 17 internal areas.

A limited geographical area was chosen to maximize the information available. The SCRTD service region covers 2,000 square miles. Transit ridership falls off with increasing distance from central Los Angeles and, outside the core, sufficient numbers of persons who had experienced transit crimes would not be found without taking a large sample. The area has the highest transit usage in Los Angeles (Data Sciences, 1981) with more than 30 bus lines passing through the area. Although transit usage in Los Angeles County is low (0.16 average daily boardings per capita in 1981), transit usage in west central Los Angeles is much higher (0.61 average daily boardings per capita in 1981; SCRTD, 1982a). West central Los Angeles also has a sizeable proportion of the Los Angeles area population. The 1980 Census indicated that about 1.1 million persons lived in the area, which represents about 40% of the Los Angeles City population and about one-seventh of the Los Angeles County population (U.S. Census Bureau, 1980).

The area is diverse both ethnically and economically. The 1980 Census indicated that the ethnic/racial breakdown of west central Los Angeles was about 32% non-Hispanic White, 26% Black, 31% Hispanic, 11% Asian and 0.5% American Indian. Economically, the area covers census tracts having median household incomes which vary from very low to very high; however, for most census tracts in the area the median household income is low. The area also has a high transit crime rate. An examination of the distribution of reported transit crimes over a three-month period indicated that a high proportion of incidents occur in west central Los Angeles (Pearlstein and Wachs, 1982).

Although an area was chosen which is a "best case", having a high crime rate and high transit ridership, the purpose was to estimate

FIGURE 2.1

WEST CENTRAL LOS ANGELES
(In Relation to Los Angeles County)

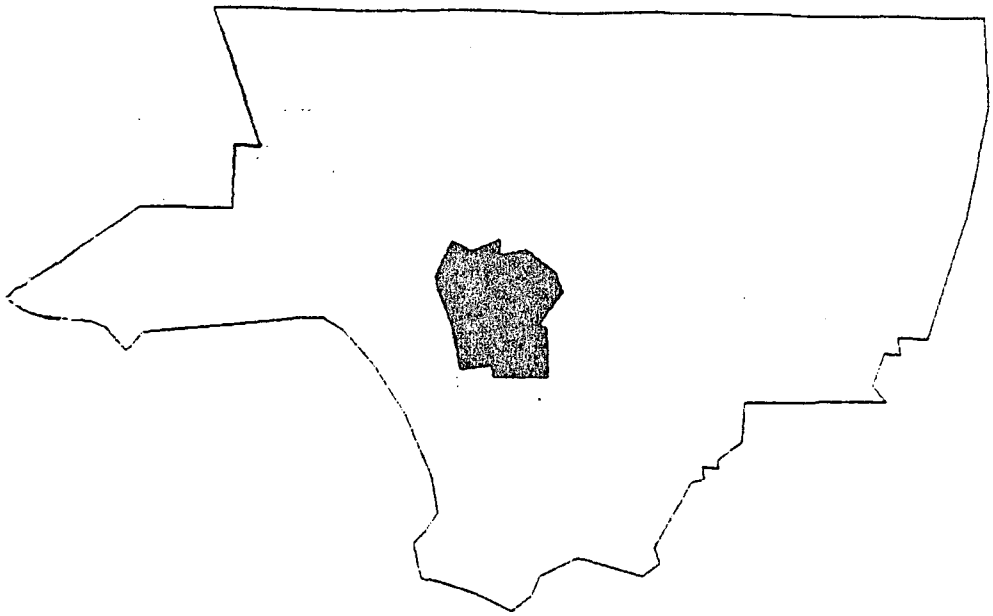
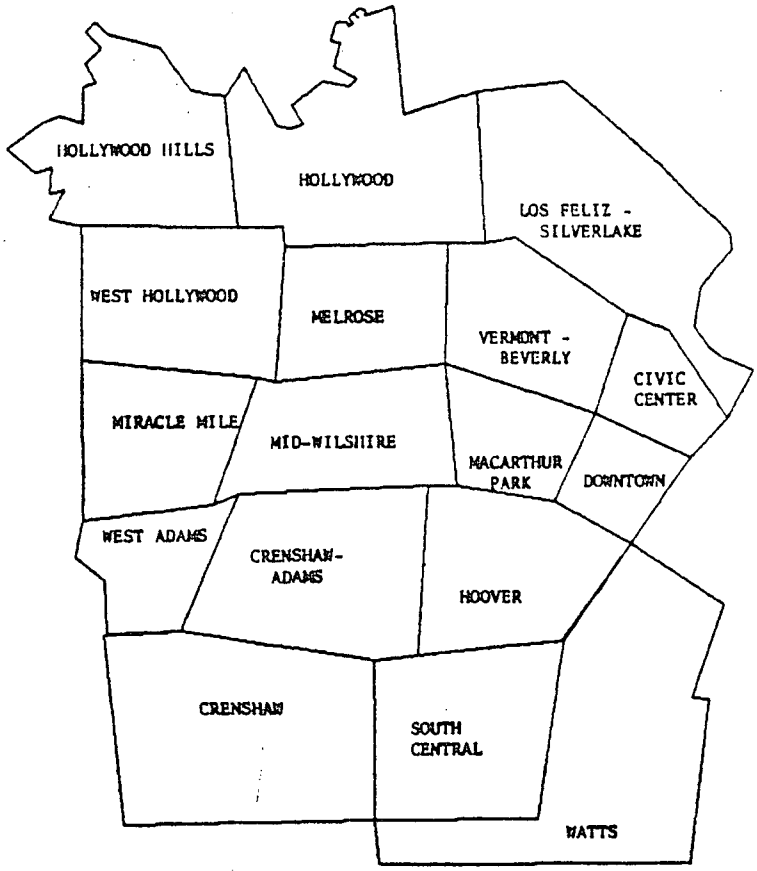


FIGURE 2.2

AREAS WITHIN WEST CENTRAL LOS ANGELES



the total number of crimes occurring, rather than population or ridership rates, to illustrate sources of reporting error.

SURVEY DESIGN

Questionnaire

The questionnaire was developed over a two year period, starting with a pilot study during the spring of 1982 in the City of Santa Monica, California (Levine, 1982). The west central questionnaire explored bus usage, experience with bus crime and attitudes toward bus crime prevention. Both household experience with bus crime and indirect experience were examined. Household experience was defined as either the respondent having been victimized by a bus or bus-related crime in Los Angeles or another member of the respondent's current household having been victimized. Indirect experience was defined as either the respondent having witnessed a bus or bus-related crime in Los Angeles or the respondent knowing another person who had been victimized by a bus or bus-related crime. For each level of experience, detailed questions about the location and circumstance were asked.

Appendix A provides a copy of the questionnaire in English. A Spanish version was also produced because of the high frequency of Spanish usage within the survey area. This can be obtained upon request.

Telephone Sample

The survey was by telephone and the sample was drawn using random digit dialing. Random telephone numbers are generated and interviewers telephone all numbers. When a household is reached, an interview is conducted. Even though most generated numbers are either not working or are businesses, the process is more cost effective than face-to-face surveys. See Tuchfarber and Klecka (1976), and Groves and Kahn (1979) for more detail.

The sample size was 1088 households. One adult, age 16+, randomly selected from within each household, was interviewed. The survey was administered by the Institute for Social Science Research at U.C.L.A. Fifteen interviewers worked on the survey from the end of November 1983 through mid-April 1984, stopping for two weeks at Christmas. Interviews were conducted in either English or Spanish.

Sampling Bias

There are two major biases with telephone samples for estimating household characteristics. First, households without telephones cannot be sampled. From the 1980 Census, 10.2% of households

within the area did not have telephones (U.S. Census Bureau, 1980). Usually, these are persons who are poorer or who are new to the area. Any characteristic which is associated with not owning a telephone is likely to be undersampled.

A second bias with telephone surveys is that households with more than one telephone number have a greater likelihood of being selected. This can be adjusted, however, by weighting results with the reciprocal of the number of telephone numbers (i.e., households with one telephone number are weighted by 1, households with two telephone numbers are weighted by 1/2, households with three telephone numbers are weighted by 1/3, and so forth). All household estimates in the survey were weighted by this index.

For major characteristics of the sample, 95% confidence intervals were calculated with weighted estimates being used. For most proportional estimates, the confidence interval varied between 3% and 5%.

COMPARISON WITH THE 1980 CENSUS

To gauge the effects of bias, several characteristics were compared with those obtained from the 1980 Census. Two hundred and seventy census tracts which overlap the geographical area were selected for comparison.

There were were three apparent biases in the sample. First, males were slightly undersampled, a result commonly found in surveys. Males are less likely to be home at any time during a day and are more likely to be out of town (U.S. Census Bureau, 1972). Second, there was a slight undersampling of Asians which apparently was the result of only interviewing respondents who could speak English or Spanish.

Third, there are slight discrepancies between the survey and the census which are the likely result of not having interviewed households without telephones. Several sub-areas were undersampled which have proportionately more households without telephones. Other discrepancies were slight undersampling of elderly persons, those with low levels of education and those at the lowest income levels. These biases might be expected from a telephone survey as elderly persons are more likely to live in group quarters and people with lower incomes are more likely to not own a telephone. Because lower income individuals are more likely to be victims of bus crimes, it is probable that the number of bus and bus-related crimes have been underestimated. Aside from these differences the sample compares well with the 1980 Census. Appendix B presents a detailed description of sampling procedures, confidence intervals and sample bias.

CHAPTER 3

THE INCIDENCE OF BUS CRIME IN WEST CENTRAL LOS ANGELES

How much bus crime is there in a large city such as Los Angeles? As pointed out in Chapter 1, the answer to this question may be difficult, if not impossible, to find. No existing data source can possibly account for all the crime that exists and, at best, data from several sources have to be integrated.

Problems with Published Crime Statistics

There are several reasons for this. Many crimes go unrecorded because victims do not report them or the police do not investigate. Many other bus and bus-related crimes are misallocated as existing police recording forms usually make no reference to transit. Therefore, the extent of underreporting transit-related crimes is probably large.

The SCRTD records crime incidents made available to them through either their transit police department or through communications from local police departments, such as the Los Angeles Police Department. For example, in 1983 the SCRTD recorded 848 crimes committed against passengers and drivers, up from 555 in 1982, an increase of 53%. How much faith should be put in such statistics? Does the increase of 293 crimes represent a real increase or does it reflect an improvement in measurement capability?

The statistics become important because the emphasis given in public policy may depend on them. If the data have flaws so that the increase is not real or bears little relationship to the scope of the problem, then judgments based on measured rates of growth of the phenomena may themselves be faulty.

The reason for caution is that the results from the survey bear little relationship to the published statistics of SCRTD. The degree of underreporting and miscategorization is so large as to obscure the relationship of crime to bus travel. The differences in estimated crime rates by the survey and those reported by SCRTD vary by a factor of 25 to 30 times. As will be seen, the problem is systemic, relating to flaws in the data collection system and to reticence by the public.

RATES OF EXPOSURE TO BUS CRIME

Most of the crimes reported either directly by the victims themselves or indirectly were serious, 'Part I' crimes. Although respondents defined crimes in their own terms, the crimes were converted into the FBI's Uniform Crime Reporting (UCR) categories. Figure 3.1 shows the relationship between the survey categories

and the appropriate UCR categories. In only a handful of cases were there incidents that were ambiguous (assaults where there was no injury, and 'verbal abuse').

Table 3.1 lists types of crime as described by victims and by respondents for other members of the household who were victims. The totals and percentages are also included. Across all levels of experience, the most common type of crime is purse snatching. The next most common crime is that of being pickpocketed. These are followed by jewelry snatching, assault (without and with robbery), verbal abuse, armed robbery and rape (which was only experienced indirectly).

Respondents were asked whether they had ever been a victim of a crime on a bus, at a bus stop or on the way to or from a bus stop in Los Angeles. Of the 1088 respondents, 108 had been victims, of which 97 (or 9.0% of respondents -weighted) were from serious ('Part I') crimes.

The rates are, of course, much higher for people who frequently use buses. Using current bus usage as a proxy for continual exposure, 16.3% of those who have taken the bus within the last six months have been victims of a bus crime in Los Angeles, compared to only 3.9% who haven't ridden a bus in the last six months. For those who are heavy users (taking the bus five or more days a week on average), the rate rises to 25.4%. Further, there are multiple victimizations. Twenty-four persons had been victimized twice; 8 persons had been victimized three times and there were 2 persons who had been victims 6 times.

The data is heavily weighted toward the present. Of the 108 victims, 36 were victimized in 1983 with 31 being serious ('Part I') crimes. Forty-eight of the respondents stated that other current household members had been victims of bus or bus-related crimes, of which 43 were serious ('Part I') crimes. Of these, 23 other household members had been victimized in 1983 of which 21 were serious ('Part I') crimes. The 21 victims represents a weighted other household member bus crime rate of 2.0% for 1983.

The scope of bus crime is extensive, as shown by indirect indices. Almost a fifth (19.2%) of the respondents had witnessed a crime on a bus, at a bus stop or near a bus stop and 10.2% had done so in 1983 alone. Another 20.9% knew persons who had been victims. (1) Not surprisingly, people who ride the bus are more likely to have witnessed another bus crime, but there are no differences for knowing persons who have been victims.

Taking any experience with bus crime (direct or indirect), it was found that 43.3% of the respondents have had some contact with bus crime in Los Angeles. For bus users (persons who have taken a bus in the last six months), 51.1% have had some experience, and for heavy users it is almost sixty percent (59.8%). For bus riders in central Los Angeles, crime is apparently a common experience.

FIGURE 3.1

SURVEY CRIME CATEGORIES COMPARED TO UCR SYSTEM CATEGORIES

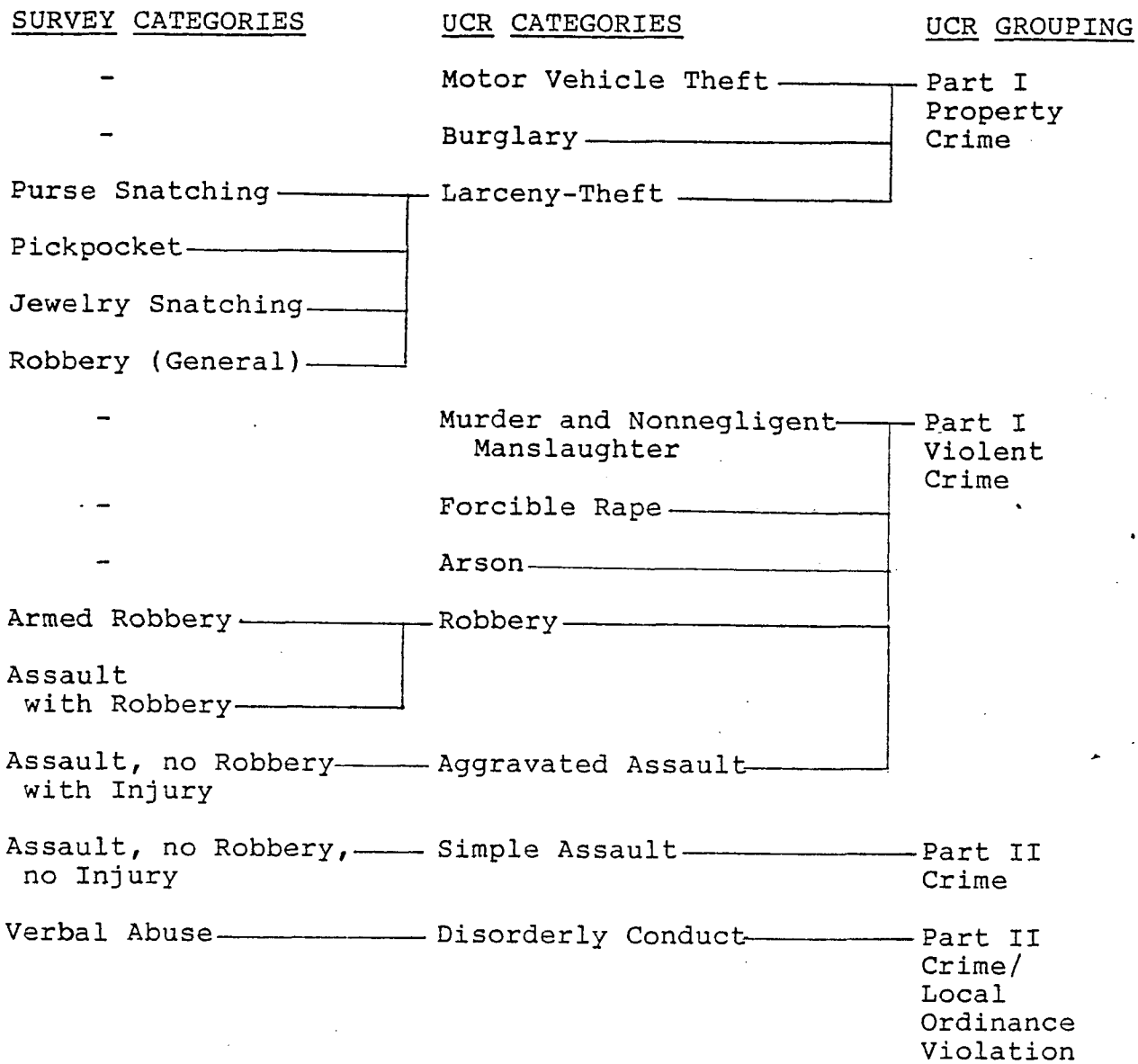


TABLE 3.1

TYPES OF BUS CRIME IN 1983 FOR VICTIMS AND OTHER HOUSEHOLD MEMBERS
(Number of Incidents)

TYPE	VICTIM		OTHER PERSON IN HOUSE WAS VICTIM	
	No.	%	No.	%
PART I PROPERTY CRIMES				
Purse Snatching	8	22.2	6	26.1
Pickpocket	10	27.8	4	17.4
Jewelry Snatching	3	8.3	4	17.4
Robbery (General)	1	2.8	3	13.0
PART I VIOLENT CRIMES				
Rape	-	-	-	-
Armed Robbery	1	2.8	-	-
Assault and Robbery	6	16.7	2	8.7
Assault, No Robbery With Injury	2	5.6	2	8.7
PART II CRIMES				
Assault, No Robbery, No Injury	4	11.1	1	4.4
Verbal Abuse	1	2.8	1	4.4
TOTAL	36	100.1%*	23	100.1%*

* Percentages do not add to 100% because of rounding.

ESTIMATING BUS CRIME FOR 1983 IN WEST CENTRAL LOS ANGELES

Taking 1983 as a standard, it is possible to estimate the number of serious (Part I) bus crimes that occurred. A household crime index was constructed. Table 3.2 summarizes the construction of household rates for 1983 with 95% confidence intervals.

On census day 1980 (April 1), there were 1,113,287 persons living in and around the area of west central Los Angeles, living in 458,976 households. To estimate the number of bus crimes occurring in the area in 1983, the number of households existing on July 1, 1983 (mid-year) had to be determined. Three estimates were constructed. A low estimate assumed that at a minimum there should be the same number of households in the area as in 1980. A medium estimate assumed the same rate of household formation as experienced between 1970 and 1980. Lastly, a high estimate assumed that the rate of household formation was equivalent to the population growth rate. Table 3.3 summarizes these estimates.

Applying the measured household bus crime rate for 1983 to these figures produces an expected estimate of 23,292 bus and bus-related crimes in west central Los Angeles for 1983. If the 95% confidence intervals are taken with the highest and lowest estimates for the number of households in the area, there is a low estimate of 16,982 (a 3.7% household bus crime rate with no change in the number of households between 1980 and July 1, 1983) and a high estimate of 29,835 (a 6.3% household bus crime rate and a rate of household formation equivalent to that of the expected population growth). (2)

Table 3.4 summarizes the results and breaks down the estimates on a proportional basis consistent with the 1983 survey results - 43% for crimes on buses, 34% for crimes at bus stops, and 23% for crimes on the way to or from bus stops.

The numbers are 25-30 times as high as that recorded by SCRTD for their entire service area in 1983 (843 serious crimes) and more than half the estimates published by SEMCOG for the entire United States and Canada in 1980. Of course, most crimes reported by transit agencies such as SCRTD are crimes occurring on the system, whereas the survey estimates include transit-related crimes too. However, the survey estimates for crimes only on buses still is many times higher than SCRTD statistics. Crime as indicated by transit company statistics represents only a small fraction of the total amount of transit-related crime. (3)

TABLE 3.2

ESTIMATING SERIOUS BUS CRIMES IN 1983 FOR WEST CENTRAL LOS ANGELES
(n=1088)

	Weighted Rate*
36 Respondents were Victims in 1983 of which 31 were Serious Crimes	3.0%
23 Household Members were Victims in 1983 of which 21 were Serious Crimes	2.0%
Household Rate	5.0%
95% Confidence Intervals	(3.7% - 6.3%)

* Weighted by the reciprocal of distinct telephone numbers

TABLE 3.3

ESTIMATED NUMBER OF HOUSEHOLDS IN WEST CENTRAL LOS ANGELES

MID-YEAR 1983

	CENSUS YEARS		ESTIMATED	
	APRIL 1, 1970	APRIL 1, 1980	JULY 1, 1983	
			458,976	LOW
Number of Households	439,938	458,976	465,833	MEDIUM
			473,566	HIGH

TABLE 3.4

ESTIMATED BUS CRIMES IN 1983 FOR WEST CENTRAL LOS ANGELES

		Occurring:		
	TOTAL	ON BUS	AT BUS STOP	TO/FROM BUS STOP
Low Estimate	16,982	7,302	5,774	3,905
Medium Estimate	23,292	10,016	7,919	5,357
High Estimate	29,835	12,830	10,144	6,861

EFFECT OF BIAS ON THE ESTIMATE

The effect of bias on these estimates was examined. Table 3.5 summarizes factors that could overestimate or underestimate the number of bus-related crimes. The key component is the survey estimate for the household bus-related crime rate, which is the number of bus-related crimes enumerated relative to the number of households interviewed (n=1088). If any factor increases the numerator of the index relative to the denominator, then the number of bus-related crimes will be overestimated. Alternatively, if any factor decreases the numerator of the index relative to the denominator, then the number will be underestimated.

Factors which could have led to overestimation were victims' or researcher's miscategorization, undersampling of males and Asians, and not including elderly persons living in convalescent homes. Care was taken to count only those crimes which clearly fit into the UCR Part I crime index. The main ambiguity concerned assaults in which no robbery occurred. The UCR system distinguishes between 'aggravated' assaults (Part I) if a serious injury occurs or if there is a threat of injury' and 'simple' assaults (Part II) if there is no injury nor threat of injury. If anything, the categorization used here has been cautious compared to usual police categorization practices; two-thirds of the reported assaults without robbery were coded as 'simple'. Other possible exaggerating biases were undersampling of males (who are less likely to be victimized than females) and Asians (who are less likely to be victimized than other racial/ethnic groups); the percent of underestimation, however, was less than 4%.

On the other hand, factors which could have led to underestimation are 130 respondents being interviewed before the end of 1983 was completed (December was the highest crime month in 1983; LAPD, 1984), multiple incidents in 1983 not being counted (only the last crime was queried), loss of information on victims through

TABLE 3.5

SOURCES OF BIAS IN ESTIMATING THE NUMBER OF BUS-RELATED CRIMES

$$\text{HOUSEHOLD BUS-RELATED CRIME RATE IN 1983} = \frac{\text{NUMBER OF BUS-RELATED CRIME INCIDENTS IN 1983}}{\text{NUMBER OF HOUSEHOLDS IN SURVEY AREA ON JULY 1, 1983}}$$

FACTORS LEADING TO OVERESTIMATION

Victims Exaggerate Seriousness of Crime

Researchers Miscategorize Less-Serious Crime as Serious

In-Migration of Victims After July 1, 1983

Out-Migration of Non-Victims Before July 1, 1983

Undersampling of Males

Undersampling of Asians

Not Including Elderly Persons Living in Convalescent Homes

FACTORS LEADING TO UNDERESTIMATION

130 Respondents were Interviewed Before End of 1983

Multiple Incidents in 1983 were Not Counted

Mortality of Victims Before Household Selected

Out-Migration of Victims Before Household Selected

In-Migration of Non-Victims After July 1, 1983

Not Including Households Without Telephones

- Undersampling of Low-Income Households
- Undersampling of Households Without a Car
- Undersampling of Households which Rent
- Undersampling of Individuals with Low Education

Not Including Persons Living in Residential Hotels

mortality or out-migration (the area has net out-migration), not including households without telephones (typically these are persons of lower income who have higher victimization rates), and not including persons living in residential hotels (the 'skid row' area of Los Angeles is within the survey area and appears to have extraordinarily high victimization rates for all types of crime).

Without going into detail, it is our opinion that the effects of underestimation are probably greater than the effects of overestimation. In short, the sample has most likely underestimated the number of bus and bus-related crimes.

COMPARISON WITH OTHER TYPES OF CRIME

How realistic are these estimates? Published transit authority data give figures much lower. Unless the survey is completely aberrant about crime, although other measured characteristics were generally consistent with census parameters, the data suggests that there is a high amount of bus and bus-related crime.

Respondents were asked whether they or any other member of their household had ever been a victim of a serious crime in Los Angeles aside from bus or bus-related crimes. Three-hundred ninety-one respondents indicated that they or other members of their household had been victimized by 'other' crimes in Los Angeles of which 370 were serious ('Part I') offenses. This represents a weighted household rate of 35.8%. For 1983, the figures were 137 other crimes committed against households of which 129 are serious ('Part I') offenses. The weighted household rate for 1983 was 11.9%. As with bus-related crimes, the rate is probably an underestimate.

Using the above method, estimates for the number of 'other' household crimes were made. Household bus crimes were added to household 'other' crimes to give an estimate for the total number of crimes in 1983 of 78,726 with a low estimate of 63,339 and a high estimate of 95,187. (3) Table 3.6 summarizes the calculations.

COMPARISON WITH LOS ANGELES POLICE DEPARTMENT STATISTICS

The results were compared with Los Angeles Police Department published statistics (LAPD, 1984). Taking the whole or part of 7 police areas which approximately match the survey area, their records indicated about 105,000 reported Part I incidents for 1983, a figure slightly higher than the survey estimate.

Of course, the two data sets are not exactly comparable. The police records include incidents reported within the geographical area, whether the victims happened to live there or not. It is

TABLE 3.6

COMPARISON WITH LAPD STATISTICS

Other Crimes to Household

1983 — Weighted Rate

137 Other Crimes Occurred to Household in 1983, of which 124 were Serious and 11 were ambiguous (assault, no robbery but no injury information). On the assumption of same injury proportions, then 5 of the ambiguous are Serious Crimes

Household Rate 11.9%

95% Confidence Intervals (10.1% - 13.8%)

Other Crimes in 1983

Low Estimate	46,357
Medium Estimate	55,434
High Estimate	65,352

Total Crimes in 1983
(Bus Crimes + Other Crimes)

Low Estimate	63,339
Medium Estimate	78,726
High Estimate	95,187

Los Angeles Police Department Records for 1983

LAPD records for a somewhat similar area show about 105,000 reported Serious (Part I) crimes for 1983

suspected that many crimes happen to persons not living within the area since the area includes downtown Los Angeles. Similarly, some of the crimes occurring to residents of the survey area may have happened outside the area.

However, Table 3.7 shows that the distribution of crimes as reported by the survey parallels the distribution of crimes as reported by the police statistics. In other words, the survey data matches official police statistics in the distribution of crimes but significantly underestimates the volume of crimes. For this reason, the estimated 23,292 bus-related crimes for 1983 should be seen as a minimum estimate.

TABLE 3.7

DISTRIBUTION OF CRIMES IN 1983 FOR WEST CENTRAL LOS ANGELES

	LAPD Records	Survey Estimates
Larceny-Theft	39.4%	44.2%
Burglary	22.4%	24.3%
Motor Vehicle Theft	18.0%	10.5% *
Robbery	12.2%	14.4%
Aggravated Assault	6.9%	6.6%
Forcible Rape	0.9%	-
Murder	0.3%	-

* - 95% Confidence Interval around estimate does not include LAPD result

Bus crime is a problem for bus users in central Los Angeles and the scope of it hasn't been recognized because of distortions in the crime reporting system. This situation most likely holds in other large cities in the United States. Further, it is a problem that even the local police don't completely recognize. When questioned, police officials told us that bus crime is "only a small proportion of the crimes that occur in Los Angeles". The survey data suggests that this is not correct for the central city population. About 20%-30% of the total crimes experienced by the survey population are bus-related (Table 3.8).

TABLE 3.8

BUS CRIMES AND ALL CRIMES OVER TIME
(Bus Crimes to Respondent or to Member of Household as a Percentage of Total Crimes to Household for a Given Period)

	Before 1980	1980-81	1982	1983	1984
Bus Crimes	27	22	24	52	15
All Crimes	115	89	84	189	48
Bus Crimes as Percentage of All Crimes	23.5%	24.7%	28.6%	27.5%	31.3%

SOURCES OF INFORMATION 'LEAKAGE' FOR BUS-RELATED CRIMES

There are several sources of information 'leakage' which can account for underestimation of transit crimes. First, many bus-related crimes occur outside the bus. If the crime occurs on a bus, then it is possible that the driver will be made aware of and report it. For bus-related crimes that occur outside the bus, however, the transit-authority is unlikely to record the incident in that almost always it will be the local police who investigate.

Taking victim reports only, of 97 'Part I' bus crimes reported by respondents, 45.8% occurred on a bus, 31.8% at a bus stop, and the rest on the way to or from a bus stop (Table 3.9). In the last two years, however, bus crimes are increasingly occurring outside buses. For those bus crimes reported in 1983, 42.9% occurred on a bus, 34.3% occurred at a bus stop with the rest being when walking to or from a bus stop, and for those 12 crimes measured during the first few months of 1984, only 3 occurred on a bus. In other words, close to 60% of the 'bus' crimes that occurred since 1983 happened outside buses and would, therefore, be unlikely to come to the attention of the transit authority.

Second, many crimes are never reported to the police. Of the 108 bus crimes where the respondent was the victim, the police were called in 45 of them or 41.7%. In 1983, however, this percentage lessened to 27.8%, and of the 12 reported crimes in early 1984 the police were called in 5 of them. Crimes occurring on the bus are also likely to miss detection. Of the 15 crimes occurring on the bus in 1983 the police were called in only 2 cases, and in only 1 out of 3 cases for 1984.

TABLE 3.9

SOURCES OF INFORMATION "LEAKAGE" FOR VICTIMS

LOCUS OF BUS CRIMES	ALL YEARS	1983
On a Bus	46%	43%
At a Bus Stop	32%	34%
To/From a Bus Stop	22%	23%
WHETHER CRIMES WERE REPORTED	42%	28% (on bus - 13%)
WHETHER POLICE CAME WHEN CRIME REPORTED	62%	50%
TYPE OF POLICE WHO CAME		
LAPD	92% (24)	80% (4)
SCRTD	4% (1)	20% (1)
OTHER POLICE	4% (1)	-

Third, the police may not investigate a bus crime even when it is reported. With increasing crime rates over the last decade and decreases in public funding for police departments, serious deployment problems have confronted local police departments, struggling to match an increasing social problem with constant or declining manpower. Therefore, the extent to which the police may not show up to investigate a crime even though it has been reported is a significant variable in the underestimation of transit crime. Over all years, the police came only about two-thirds of the time when they were called (62%) but in 1983 this dropped to 50%. Further, in almost every case where the police were called, it was the Los Angeles Police Department (LAPD) which investigated. Of the 5 cases in 1983 when the police came, it was the LAPD which came 4 times. The SCRTD transit police came in only 1 case in 1983, as reported by the respondents, giving a "detection rate" of about 1 out of 31; the numbers are so low that it is impossible to generalize. For the first part of 1984, the corresponding figures are out of 12 crimes, the police were called in 5 cases with the police coming in 3 of these (of which all were LAPD). Most bus crimes are not being picked up by SCRTD, though

the Los Angeles Police Department do send a handful of "courtesy" reports to the SCRTD; we were told that they send 4 or 5 a month.

Fourth, there is statistical underestimation in that standard police reporting forms do not identify transit-related behavior. The Los Angeles Police Department does not use this as a category in police forms. For crimes that occur on buses, the police forms will usually include mention of the bus as the place where the crime occurred, though this will not be a category for aggregating the statistics. For crimes occurring outside buses in most cases there is no mention of the victim standing at a bus stop or walking to or from a bus stop.

BUS CRIME AS A SERIOUS PROBLEM FOR TRANSIT

There is a considerable amount of bus crime in Los Angeles, and much of it has not been recognized because of underreporting of incidents by the public and systematic errors in the measurement system. It is not clear whether bus crimes have been increasing or not. A large proportion of recorded incidents in the survey happened in the last few years, which may be a product of mortality, out-migration and, possibly, forgetting as well as a real increase. The statistics of the main local transit-authority (SCRTD) indicate an increase in bus crimes since 1982, a fact that they attribute to increased ridership after the decrease in fares to $0.50 in 1982. But SCRTD only accounts for a small percentage of bus crimes so that the increase in their statistics should be viewed with caution. The Los Angeles Police Department records show a decrease in crimes in the central core of Los Angeles since 1982, the result possibly of shifts in the age structure of the population. However, underreporting of crime is a general problem as well so that their statistics may have flaws.

Whether bus crime has been increasing or not, it is a serious problem which accounts for a sizeable proportion of the crime to which the central city population is exposed (around 30%). This fact has not been recognized by the Los Angeles Police Department and other local police departments primarily because of the nature of their statistical reporting system which does not categorize bus-related behavior. It is a common experience among bus users, and the heavier the use the greater the likelihood of victimization or witnessing events. It involves financial loss and emotional upset and for many physical injury. For the society as a whole, bus crime is a financial problem, represents a social disturbance and, like all crime, poses a moral dilemma.

FOOTNOTES

(1) There is surprisingly little overlap between the different levels of bus crime exposure. Of the 108 victims, 35 had also witnessed a bus crime, 5 had another member of the household be a bus crime victim, and 34 knew someone who was a victim. Similar overlap percentages hold for the other indices.

(2) An alternative per capita measure can be constructed. In 1983, there were 57 bus crimes experienced by the respondents or members of their households. The 1088 respondents lived in households which had 2,655 persons. This represents a per capita bus crime rate of 2.15% which translates into 25,024 bus crimes using the middle population project (1,165,581). The two estimates are close. The household measure is a better estimate, however, because it is weighted and also is more precise. The per capita measure is defined as

$$\text{Bus Crimes in 1983} = \frac{\text{Total Sample Crimes-1983}}{\text{\# of Persons represented by Sample (1088 X 2.44 ppu)}} \times \text{\# of Persons in Area}$$

where ppu is the average number of persons per household.

The household measure is defined as

$$\text{Bus Crimes in 1983} = \frac{\text{Total Sample Crimes-1983}}{\text{\# of Sample Households (n = 1088)}} \times \text{\# of Households in Area}$$

The per capita measure includes a variable in the denominator of the index, thereby increasing sampling error, whereas the household measure includes a constant.

(3) A cohort estimate is based on the number of crimes that households were exposed to within the last year, irrespective of the calendar year. Respondents were asked for the month if the crime occurred in 1983 or 1982. Using this index, there are slightly more crimes reported for the last year than taking recorded 1983 incidents. Within the last year, forty-five persons had been victims of bus crimes, 22 respondents indicated that members of their household had been bus crime victims and 161 households had been victimized by another type of crime. These produce weighted household rates of 6.2% for bus crimes and 14.8% for other household crimes. The corresponding population estimates using the middle-range household multiplier are 28,656 bus crimes and 68,860 other types of crime, giving a combined total of 97,516.

CHAPTER 4

THE VICTIMS AND PUBLIC IMPACT

This chapter will examine differences in victimization rates. In addition, an assessment will be made of the effect of bus crime on perceived safety and ridership.

COST TO THE VICTIMS OF BUS CRIME

To victims of bus crimes, there are monetary, physical and emotional costs. Of the 97 victims of serious crimes, 92 experienced a theft of some sort. Eighty-one of these persons estimated the value of the loss; these estimates were not evaluated for accuracy. The average loss was $168 although the median loss was $60, varying from a low of $1 to a high of $2500. For crimes occurring in 1983 and 1984 (up to the time of the interview), the average value of the loss was $199 though the median loss was $45.

About one-fifth of the victims were injured, many seriously. The average number of days required to recover from injuries was about 24 with a range varying from 1 day to a high of 90 days. Over half of the injured victims took longer than a week to recover. Twelve of the 23 injured victims lost work days from the injury. There was probably financial loss from this to victims or employers. For most victims, there was emotional disturbance from having been victimized. Of the 108 victims (either a serious or less serious crime), 83 stated that they were emotionally upset. Ten of these persons lost work days through emotional upset.

There were also legal costs, though these were minimal because only a minority of bus crimes were reported and in an even smaller minority of cases was the criminal caught. Only 4 victims knew whether the criminal was caught. In 3 of these, the victim had to go to court. For these persons, there was a 'cost' in time and, possibly, income loss which had to be borne.

WHO ARE THE VICTIMS?

Bus users are more likely to be victimized than non-users, obviously, and the heavier the use the higher the likelihood of victimization. Whether the risk is for a 'lifetime' or for the current year, people who ride the bus bear the burden of the problem. To measure bus usage, respondents were asked how frequently they had taken a bus within the last six months. Five levels of ridership were distinguished: 1) Did not take the bus

within the last six months; 2) Took the bus less than once a month; 3) Took the bus once or twice a month; 4) Took the bus one to four days a week; and 5) Took the bus five or more days a week. Taking this index as a proxy for continual usage, there was a definite relationship between use and exposure to bus crime (Figure 4.1). Frequency of bus use was the most important factor predicting direct exposure to bus crime. For all respondents, 9% had been victims of a bus crime in Los Angeles and 19% had witnessed a bus crime. For heavy bus users (defined as persons who took the bus five or more days a week), 25% had been victims in Los Angeles and 35% had witnessed a bus crime.

Because bus crime exposure is directly related to bus use, it is essential to separate out different levels of bus ridership to assess the effects of other variables on victimization. Heavy bus users would be those persons closest to the "true" probability of being victimized by a bus crime in that they ride the buses frequently and are exposed more often. The results are not completely conclusive but they strongly suggest that the elderly, women, persons of Hispanic background and persons with lower incomes are more likely to be victimized.

The Elderly as Victims

The elderly appear to be more vulnerable to bus crime in Los Angeles than other age groups. There are two statistical problems that affect the interpretation. First, although the elderly are more dependent on buses than younger persons, they are also less likely to travel. An earlier study of the elderly in Los Angeles showed that most of today's transit-dependent elderly never drove, whereas those who drove in their youth continue to drive (Wachs, 1979). However, as people age they travel less in all modes and environment because work-related travel is around 40% of all travel. To assess the relative vulnerability of the elderly, therefore, the extent of bus use must be statistically controlled. Second, age is a proxy for having lived and the greater the time spent in a city, the greater the likelihood of being victimized by a crime (bus or otherwise). For those under 30 in the sample, 8% have been victims of a bus crime but for those 65 or older, 17% have been victims.

To distinguish these factors, only those bus crimes that have occurred in 1982, 1983 and the first part of 1984 have been used, and these have been further broken down by the five levels of bus use (Figure 4.2). For non-users and light users, there is little selectivity by age, whereas for moderate and heavy users (one or more days a week on average), those age 65 and older are more likely to have been victimized since 1982. For those elderly (age 65+) taking the bus daily, more than one out of four (29%) have been victimized since 1982. It should be noted that sample sizes are small, but the consistency of the change across the four age categories strongly suggest that vulnerability increases with age.

FIGURE 4.1

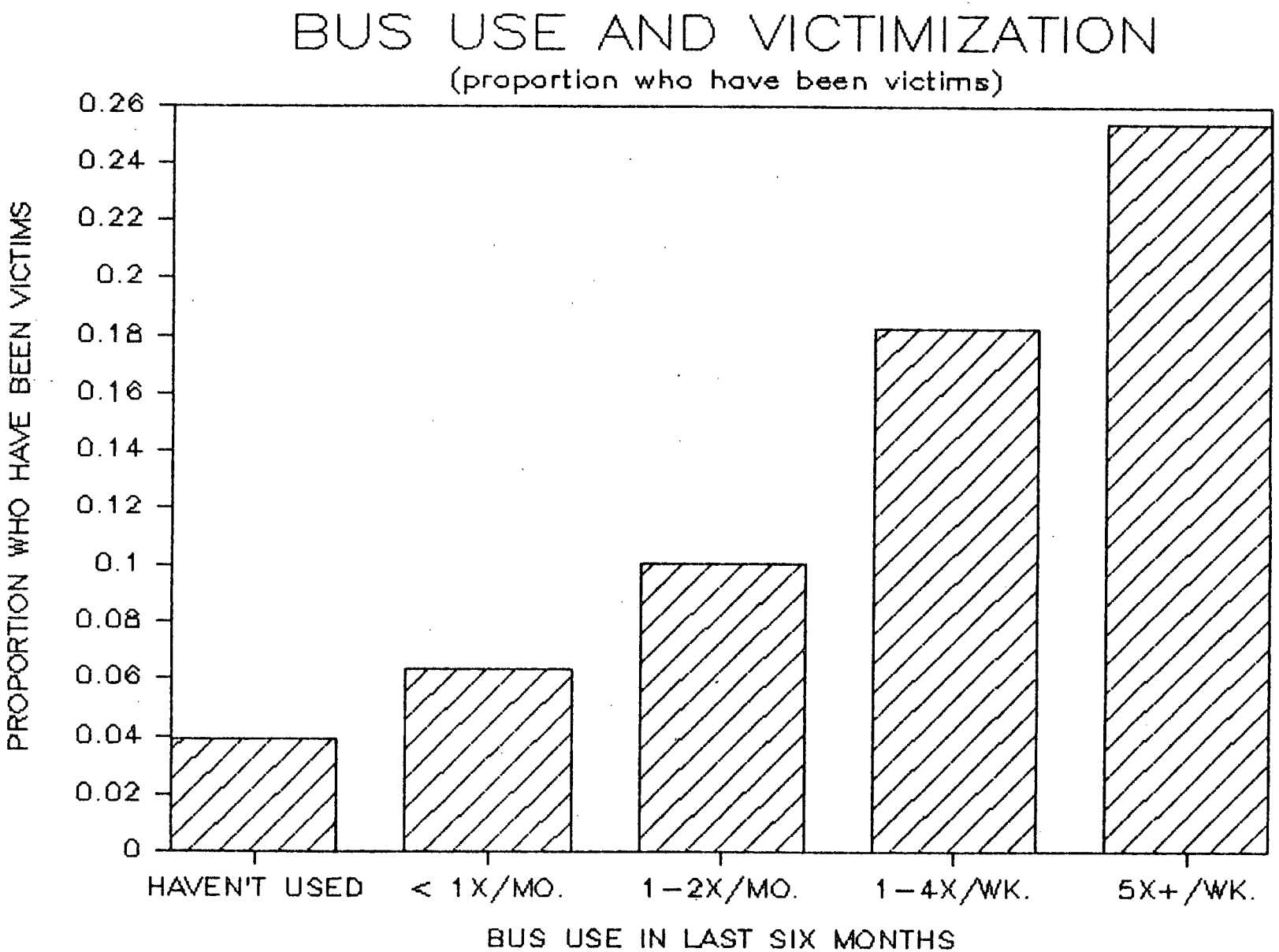
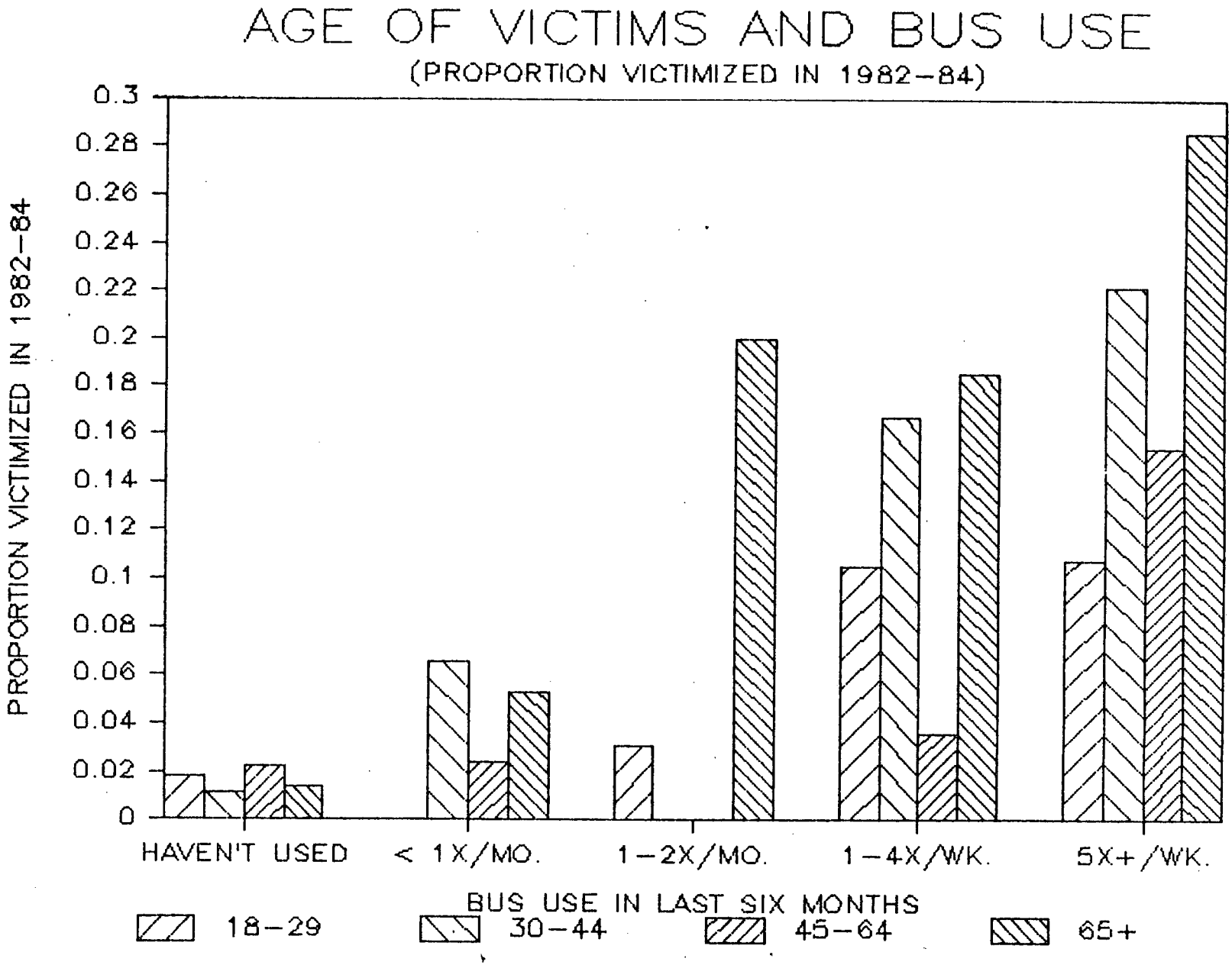

BUS USE AND VICTIMIZATION
(proportion who have been victims)
PROPORTION WHO HAVE BEEN VICTIMS
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
HAVEN'T USED
< 1X/MO.
1-2X/MO.
1-4X/WK.
5X+/WK.
BUS USE IN LAST SIX MONTHS

FIGURE 4.2


AGE OF VICTIMS AND BUS USE
(PROPORTION VICTIMIZED IN 1982–84)
PROPORTION VICTIMIZED IN 1982–84
0.3
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
HAVEN'T USED
< 1X/MO.
1–2X/MO.
1–4X/WK.
5X+/WK.
BUS USE IN LAST SIX MONTHS
18–29
30–44
45–64
65+

Gender and Vulnerability

From the sample as a whole, women are more likely to be victimized than men. Of the 108 victims in the sample, 75 were women (or 69%). However, women are also more likely than men to use buses. Of the women in the sample, 56% have taken the bus within the last six months compared to 50% of the men. Controlling for bus use, however, women are still more likely to be victimized for each level of use (Figure 4.3), though the differences are small for heavy bus users.

What makes the comparison complex is the relationship to age where both the elderly are more likely to be victimized and women constitute a higher proportion of the elderly population. It was found that women are more likely to be victimized for all age groups, but particularly so for ages under 65. For the elderly, however, men are almost as likely to be victimized as women.

Race and Victimization

There are also some racial/ethnic differences in vulnerability to bus crimes. What the causes of these are is not clear, but they should be noted. Controlling for bus use, Hispanics (Latinos) are in general more likely to be victims than other ethnic groups. For persons of Hispanic background, 17% have been victimized by a bus crime, compared to 8% for Whites, 9% for Blacks, and 4% for Asians; there are too few American Indians to yield legitimate rates. This pattern also holds for recent crimes.

However, the relationship changes both with bus use (Figure 4.4) and with age. For heavy bus users, both Whites and Hispanics have high victimization rates (37% and 27% respectively) compared to lesser rates for Blacks (19%) and Asians (11%), with a high proportion of these crimes occurring since 1982. Also, White and Hispanic elderly are very vulnerable. For younger persons, Blacks are more vulnerable than other ethnic groups, but their vulnerability decreases with age. Asians appear to show a similar decrease with age, though the numbers in each age group are small.

Socio-Economic Status and Victimization

People of lower socio-economic status are more vulnerable to bus crimes primarily because they are more likely to use public transit. For most indices of socio-economic status, vulnerability is highest for those who are poorer. For example Figure 4.5 compares bus crime victimization with victimization from other crimes and, as can be seen, there is an inverse pattern. Vulnerability to other crimes increases with income whereas vulnerability to bus crime decreases. Persons of lower income are less likely to own cars (and, therefore, less likely to experience car theft or car break-in, both common crimes in Los Angeles) and

FIGURE 4.3

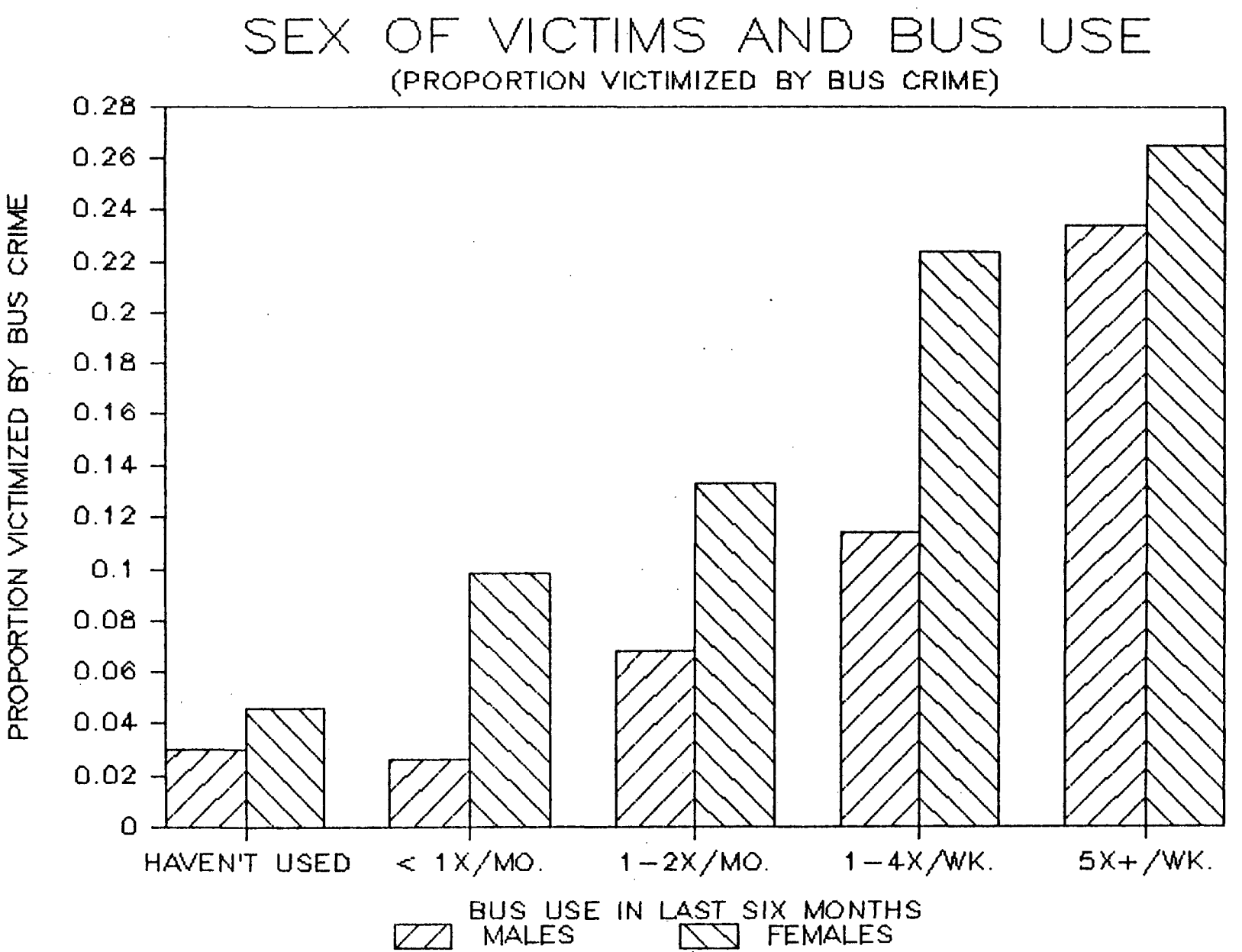

SEX OF VICTIMS AND BUS USE
(PROPORTION VICTIMIZED BY BUS CRIME)
PROPORTION VICTIMIZED BY BUS CRIME
0.28
0.26
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
HAVEN'T USED
< 1X/MO.
1-2X/MO.
1-4X/WK.
5X+/WK.
BUS USE IN LAST SIX MONTHS
MALES
FEMALES

FIGURE 4.4

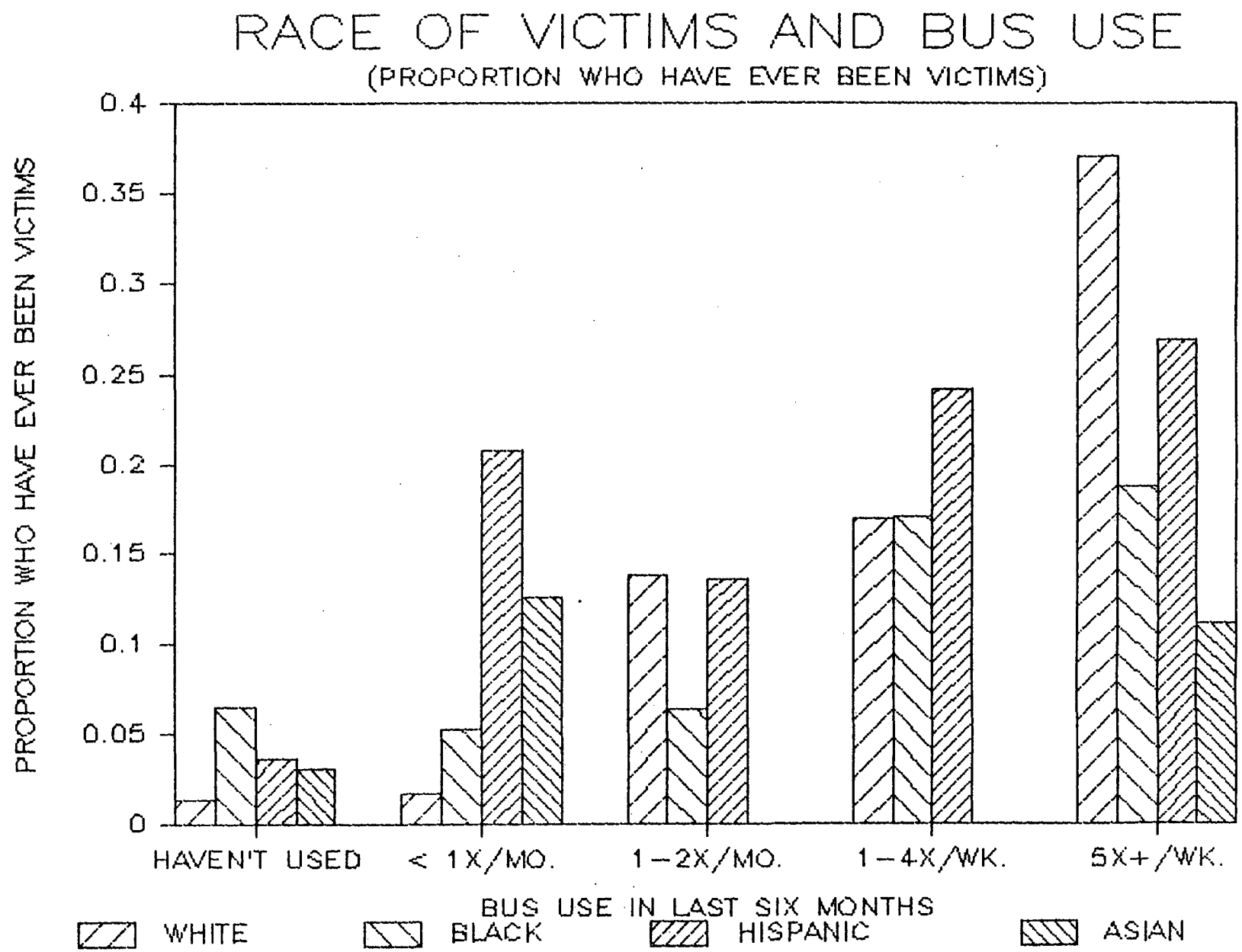
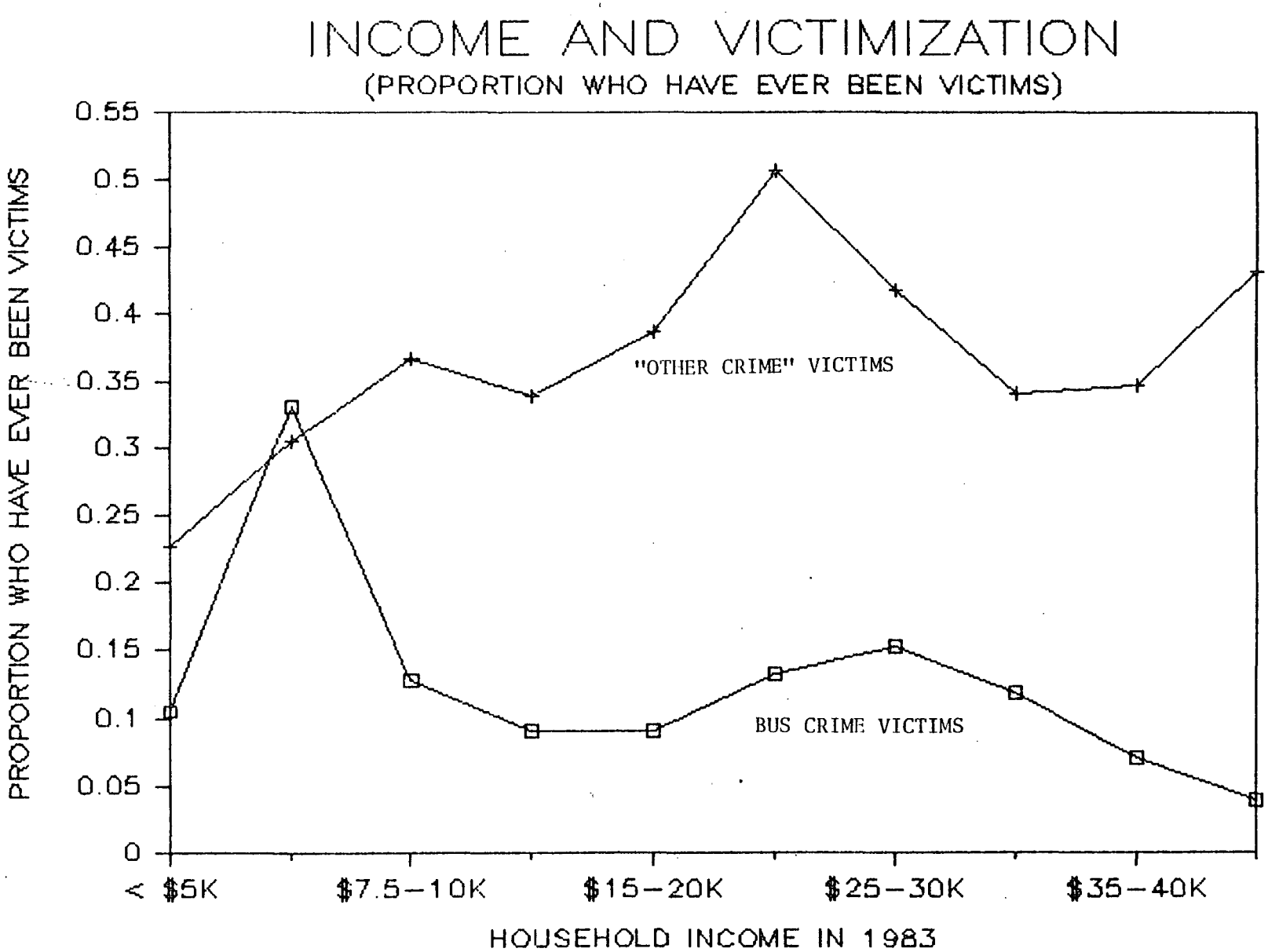

RACE OF VICTIMS AND BUS USE
(PROPORTION WHO HAVE EVER BEEN VICTIMS)
PROPORTION WHO HAVE EVER BEEN VICTIMS
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
HAVEN'T USED
< 1X/MO.
1-2X/MO.
1-4X/WK.
5X+/WK.
BUS USE IN LAST SIX MONTHS
WHITE
BLACK
HISPANIC
ASIAN

FIGURE 4.5


INCOME AND VICTIMIZATION
(PROPORTION WHO HAVE EVER BEEN VICTIMS)
PROPORTION WHO HAVE EVER BEEN VICTIMS
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
"OTHER CRIME" VICTIMS
BUS CRIME VICTIMS
< $5K
$7.5-10K
$15-20K
$25-30K
$35-40K
HOUSEHOLD INCOME IN 1983

are less likely to be burglarized than those with higher incomes. Housing tenure is also a particularly sensitive index, showing greater vulnerability of renters compared to owners, especially with increasing bus use. This may reflect both housing location and income. In Los Angeles, rental units are more likely to be located on busy, congested streets, exposing their inhabitants to ecological hazards as well.

A Model of Bus Crime Vulnerability

Using the SAS (1980) Proc Logist program and building a series of dummy interaction terms, a series of descriptive models for bus crime victimization was developed. Table 4.1 presents the regression model for 'lifetime' bus crime victimization in Los Angeles. The most important variable predicting bus crime victimization is frequency of bus use. The next two variables are interaction terms associated with aging; elderly women and elderly Hispanics (of both sexes) are more likely to have been victimized. Lastly, renters are more likely to have been victims.

TABLE 4.1

PREDICTORS OF LIFETIME VICTIMIZATION IN LOS ANGELES
(Logistic Regression Coefficients)

Dependent Variable: Los Angeles Bus Crime Victim

D^2 (pseudo R-square) = 0.16

Independent Variable	Logistic Regression Coefficient	Standard Error	Chi-Square	p
Intercept	-3.75	0.27	188.38	-
Frequency of Bus Use	0.55	0.07	56.57	****
Elderly Hispanics (age 65+)	0.02	0.01	10.67	**
Elderly Females (age 65+)	0.01	0.004	10.51	**
Renters	0.67	0.31	4.90	*

**** p < .0001 ** p < .01
*** p < .001 * p < .05

BUS CRIME AND THE PUBLIC

People who have not been victimized are also affected by bus crime. All respondents (whether they had taken the bus within the last six months or not) were asked how safe from crime they perceived bus travel in Los Angeles under four conditions. Table 4.2 presents the proportion of the sample who perceived bus travel as safe or very safe. Not surprisingly, bus travel in the neighborhood is perceived as more safe than bus travel to or from downtown Los Angeles, and night travel is perceived as more unsafe than during the daytime.

The four items tend to correlate highly with each other and have been added to form a scale (called 'Perceived Safety of Bus Travel'). For example, if a respondent stated that it was very safe to take a bus in the neighborhood during daytime (scored as '4'), safe to travel to downtown during daytime (scored as '3') but unsafe to travel in the neighborhood in the evening (scored as '2') and very unsafe to travel to downtown in the evening (scored as '1'), then this person's scale score would be '10' (4+3+2+1).

TABLE 4.2

THE PERCEPTION OF BUS TRAVEL SAFETY
(Percentage indicating 'Safe' or 'Very Safe')

	%
Neighborhood Travel During the Daytime	79%
Neighborhood Travel During the Evening/Night	29%
Travel To/From Downtown L.A. During the Daytime	61%
Travel To/From Downtown L.A. During the Evening/Night	10%

Several multiple regression models were constructed to examine the relationship of background and crime exposure to perceptions of safety. Table 4.3 presents the standardized model which fit the data best. Women, Hispanics and persons with less education perceived bus travel as less safe from crime than males, other ethnic groups and persons of higher education. As seen in the

TABLE 4.3

PREDICTORS OF PERCEIVED SAFETY OF BUS TRAVEL IN LOS ANGELES
(Standardized Multiple Regression Coefficients)

Dependent Variable: Perceived Safety of Bus Travel

$R^2 = 0.13$

Independent Variable	Standardized Regression Coefficient	t-Value	p
Females	-.19	-6.34	***
Hispanics	-.15	-4.33	***
Education	0.11	3.20	**
Know Victim of Bus Crime in L.A.	-.11	-3.64	***
Other Household Member Victim of Bus Crime in L.A.	-.07	-2.50	*
Victim of Bus Crime in L.A.	-.06	-2.01	*

**** p < .0001 ** p < .01
*** p < .001 * p < .05

last section, these three groups are among those who are more vulnerable to bus crime. The results for women has been demonstrated elsewhere (Olsen, 1973; Ferrari and Trentacoste, 1974; Thrasher and Schnell, 1974a; Richards et al., 1980; Austin and Buzawa, 1984), though no one to our knowledge has demonstrated the perceived vulnerability of Hispanics. Age does not show a simple effect, though there is a weak interaction effect; elderly who use buses frequently perceive that they are less safe.

In addition to demographic selectivity, exposure to bus crime affects the perception of safety on buses. People who have been victimized by a bus crime or who had another member of their household victimized by a bus crime perceive that bus travel is less safe. Slightly more important is knowing other persons who have been victims of bus crimes. All these variables are statistically significant.

It should be mentioned that these are exploratory hypotheses which fit the data. By using a stepwise regression model, those variables which show the strongest relationships have been selected; the R-squares will be artificially high (though in these cases, not particularly so). In other words, the data suggests that the perception of safety on buses is partly a function of crime experience with those who have been exposed to crime perceiving bus travel as less safe. In addition, persons who have characteristics associated with greater risk of exposure also appear to perceive bus travel as less safe.

Safety and Bus Use

To what extent does the perception of safety on buses affect ridership? There is a sizeable literature on the determinants of bus use and 'mode choice', much of which shows the economic constraint that limits some persons to public transit. There are many people who use public transportation out of choice, but there are many more who use it because of limited income, lack of car ownership or inability to drive.

However, safety on the system may play an additional role in affecting ridership, especially for those who can afford to choose between automobiles and buses. In an earlier study of Santa Monica (Levine, 1980), the perception of safety in riding buses was a significant 'fourth-order' factor in predicting ridership following car ownership, ethnic background (non-Whites were greater bus users), and educational background (persons of higher education in Santa Monica used buses more). With these data, similar results are found (Table 4.4).

People who don't have a driver's license, who live in households without a car, and who are younger are more likely to use buses. Hispanics and Blacks are also more likely to use buses. In addition, persons who perceive that bus travel is more safe are more likely to use buses. As with the Santa Monica study, the perception of safety does predict usage, though the effect is small.

TABLE 4.4

PREDICTORS OF BUS USE IN LOS ANGELES
(Standardized Multiple Regression Coefficients)

Dependent Variable: Frequency of Bus Use in Last 6 Months

$R^2 = 0.29$

Independent Variable	Standardized Regression Coefficient	t-Value	p
Respondent has Driver's License	-.37	-11.77	***
Number of Cars in Household	-.25	-8.19	***
Age	-.16	-5.52	***
Hispanics	0.09	2.84	**
Blacks	0.08	2.82	**
Perceived Safety of Bus Travel	0.08	2.80	**

**** p < .0001 ** p < .01
*** p < .001 * p < .05

CHAPTER 5

ENVIRONMENTAL CORRELATES OF BUS CRIMES

This chapter explores some environmental correlates of bus crime. The data in the last two chapters showed the widespread scope of bus crime and the vulnerability of many persons, especially elderly. It is important, however, to go beyond describing the facts of bus crime and to outline factors that can be incorporated into a preventive strategy. Some general environmental correlates of bus crimes will be examined followed by a focus on dangerous bus stops. Because the aim is exploratory, information from all levels of experience with bus crime has been combined.

CONTEXTUAL CORRELATES

Where do Bus Crimes Occur?

Many crimes occur at bus stops or on the way to or from bus stops. For victims, 54% of the bus-related crimes occurred outside buses, whereas when victim experiences were combined with other experiences (witnesses, having another member of the household be a victim or knowing another person who was a victim), the proportion of crimes outside buses was only 42%. Whether the difference between direct exposure and indirect exposure represents 'sampling error' or a systematic distortion in indirect perception cannot be gauged. Still, a sizeable proportion of bus crimes occur outside buses.

Using information from all levels of exposure, differences were found between the type of crime and where they occur. Bus crimes have been grouped into three categories. First, there is larceny. This category includes purse snatchings, jewelry snatchings, being pickpocketed, a general reference to robbery, and is similar to the UCR Part I 'Property Crime' Index (see Figure 3.1). The second category is life threatening. This includes aggravated assault, robbery with assault, armed robbery and rape and is similar to the UCR 'Violent Crime' Index. The third category is other crime, which involves simple assault, verbal abuse and harassment (Part II crimes). Table 5.1 presents the type of bus crime broken down by where it occurred. For all stages of a bus trip, most crimes are larcenies. However, for crimes occurring outside a bus, a greater proportion are life threatening.

Perceived Contributing Factors

Respondents who had been victimized or who had witnessed a bus crime were asked whether there were any factors in the situation that contributed to the crime. Those respondents who had other

TABLE 5.1

TYPE OF CRIME BY LOCUS OF OCCURRENCE
(Percentage of Crimes for Each Locus)

Type of Crime	Locus of Occurrence: All Crimes	On Bus	At Bus Stop	To/From Bus Stop
Larceny	73.3%	76.1%	70.2%	66.2%
Life Threatening	23.0%	20.1%	25.8%	30.9%
Other	3.8%	3.8%	3.9%	2.9%

members of their household be victimized or knew someone who had been victimized were asked whether the individual had said anything about contributing factors. Table 5.2 presents the distribution of the ten most mentioned factors.

The most commonly perceived factor was that the bus was overcrowded. This is mentioned more than twice as often as the next most important factor, that the victim was vulnerable. The attribution of overcrowding is consistent with the many thefts that occur in that overcrowded conditions would be expected to contribute to purse and jewelry snatchings, and being pickpocketed.

After overcrowding, most of the other factors mentioned are attributed to a handful of crimes. The vulnerability of victims is consistent with high rates for elderly who use buses and with the heavy use of buses by women. Many locations are perceived as dangerous and some crimes occur at night, when it is dark. The exposure of valuables by victims is also mentioned several times. As far as general contributing factors, there is not a consensus other than for overcrowding.

The factors attributed are specific to the crime locations. For crimes occurring on a bus, of all factors mentioned 71% were for overcrowding, but for crimes occurring at bus stops only 19% were for overcrowding. On the other hand, in 19% of the factors given for bus stop crimes the location was perceived as dangerous and the victim was seen as vulnerable. For crimes occurring on the way to or from a bus stop, the location was seen as dangerous in 28% of the mentioned factors. In other words, crimes on buses appear to be related to overcrowding, whereas for crimes outside buses general environmental factors are more critical.

TABLE 5.2

PERCEIVED CONTRIBUTING FACTORS
(number of mentions by respondents)

Perceived Factor	Number of Mentions
Overcrowding on Bus	137
Victim was Vulnerable	54
Dangerous Location	33
Dark/Late at Night	25
Valuables were Exposed	25
Few People at Bus Stop	18
Ease of Escape for Criminal	16
Victim Provoked Situation	13
Overcrowded Bus Stop	9
Non-Involvement by Others	5

Time of Occurrence

Other research has shown that most bus crimes occur in the late afternoon and early evening (Pearlstein and Wachs, 1982) and these data are supportive of this (Figure 5.1). Dividing the day into six periods, 69% of all incidents experienced by the respondents occurred in the afternoon and evening rush hours. Types of crime do vary, however, over the course of the day (Figure 5.2). Life threatening crimes increase dramatically after evening rush hours. People's fears about bus travel at night appear to be real. Even though there are fewer incidents at night than in the daytime, because of lower passenger loads, the danger to victims is higher. Crimes occurring on a bus are heavily concentrated in the afternoon and evening rush hours (76%), whereas crimes outside buses are extended more evenly through the day: 58% of the crimes at bus stops and 63% of the crimes on the way to or from the bus stop occur during the afternoon and evening rush hours.

FIGURE 5.1

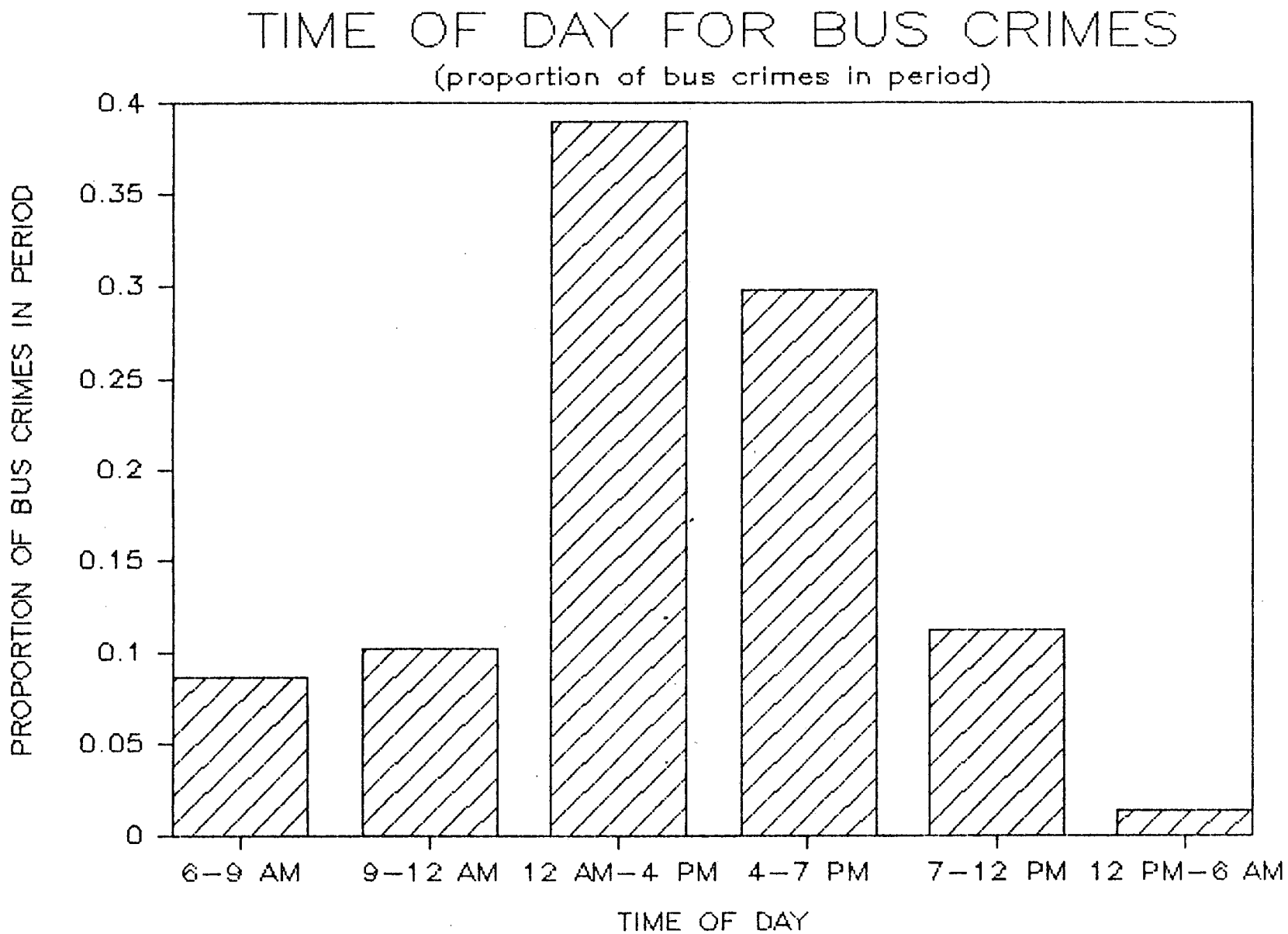
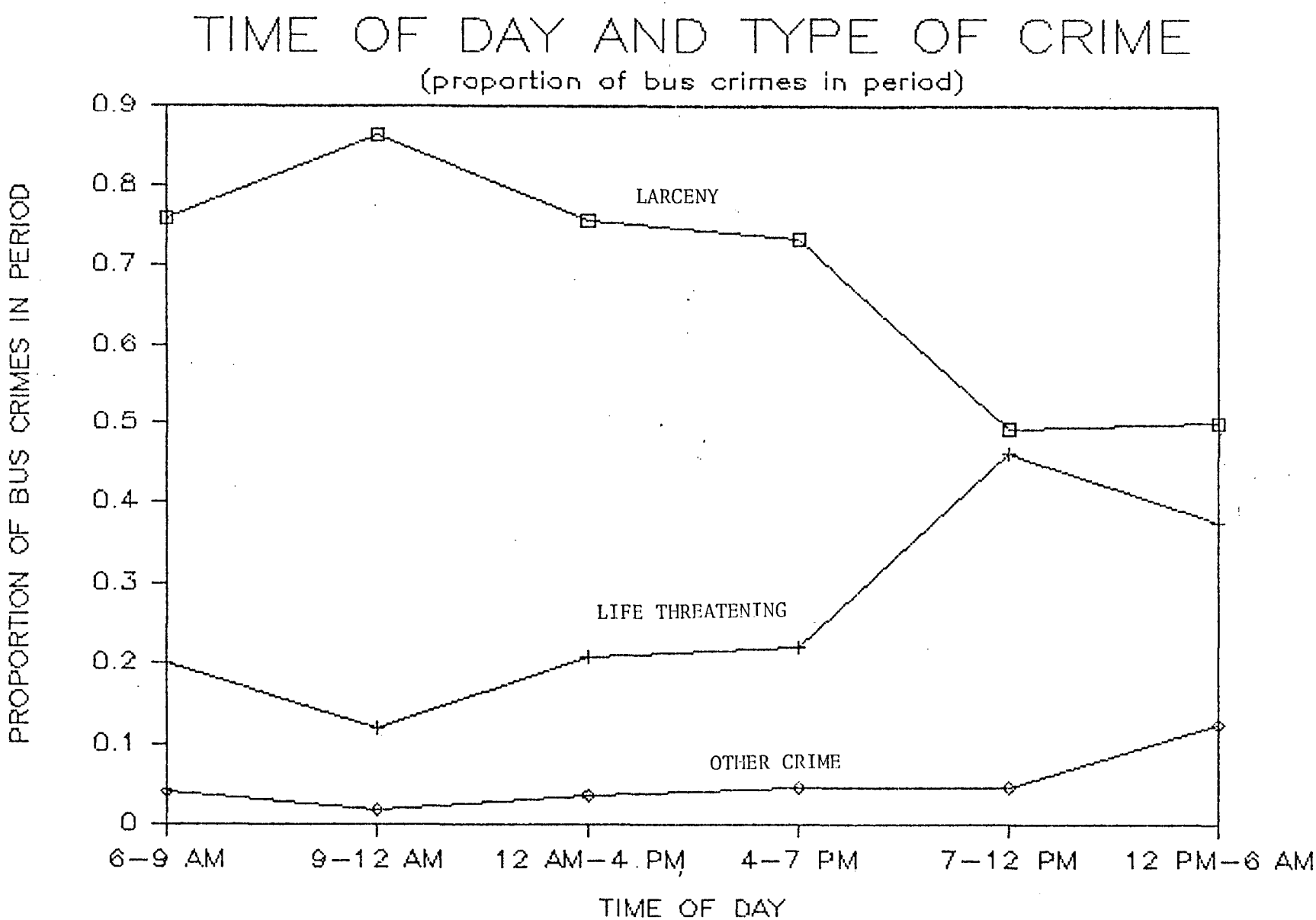

TIME OF DAY FOR BUS CRIMES
(proportion of bus crimes in period)
PROPORTION OF BUS CRIMES IN PERIOD
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
6–9 AM
9–12 AM
12 AM–4 PM
4–7 PM
7–12 PM
12 PM–6 AM
TIME OF DAY

FIGURE 5.2


TIME OF DAY AND TYPE OF CRIME
(proportion of bus crimes in period)
PROPORTION OF BUS CRIMES IN PERIOD
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
LARCENY
LIFE THREATENING
OTHER CRIME
6–9 AM
9–12 AM
12 AM–4 PM
4–7 PM
7–12 PM
12 PM–6 AM
TIME OF DAY

Number of Persons Around

Most crimes occur in crowded conditions. Respondents were asked how many persons were around at the time of the crime. In 65% of the cases, there were 20 or more persons around (Figure 5.3). However, for crimes on a bus, in 90% of the cases there were 20 or more persons around whereas for crimes at bus stops in only 20% of the cases were there 20 or more persons around. In other words, crimes on buses have different contributing conditions than crimes outside the bus.

Location of Crimes on the Bus

Those who were victims of or witnessed a crime on a bus were asked whether the crime occurred in the front, middle or back of the bus. There is some inconsistency in responses. Victims said that most crimes occurred in the front of the bus (47%), followed by the middle (37%) and finally the back (16%). Witnesses observed more crimes in the back (42%), followed by the front (31%) and the middle (27%). There is agreement that a sizeable proportion of crimes occur in the front, but disagreement about the back.

Crimes committed in the back of the bus are more likely to be life threatening than crimes committed in the middle, even though most of these are still larcenies (Table 5.3). However, more physical assaults are likely to occur in the back. Further, crimes at the back of the bus are more frequent in the evening and at night. Of all crimes committed during the afternoon and evening rush hour, about a third are committed in the back of the bus. However, for crimes committed after 7:00 P.M., around half are committed in the back of the bus.

Observations of buses show a higher proportion of males sitting in the back of buses than toward the front. Also, teenagers and younger persons are more likely to sit in the back. Whether crimes occur in the back because of the absence of a bus driver to intervene or because of drifting toward the back of disruptive, disturbed or socially unacceptable persons is not clear. However, the danger existing in the back of buses is real and represents a problem for bus users and transit authorities.

THE GEOGRAPHY OF BUS CRIME

In this section, the geography of bus and bus-related crimes will be explored. Though the details are specific to Los Angeles, the logic and method are applicable elsewhere. Crime is spatial in that it occurs at certain parts of a city. However, crime is not uniform within a district but is focused specifically at particular locations. Especially for bus stop crimes, there are a limited number of stops that have greater numbers of crimes

FIGURE 5.3

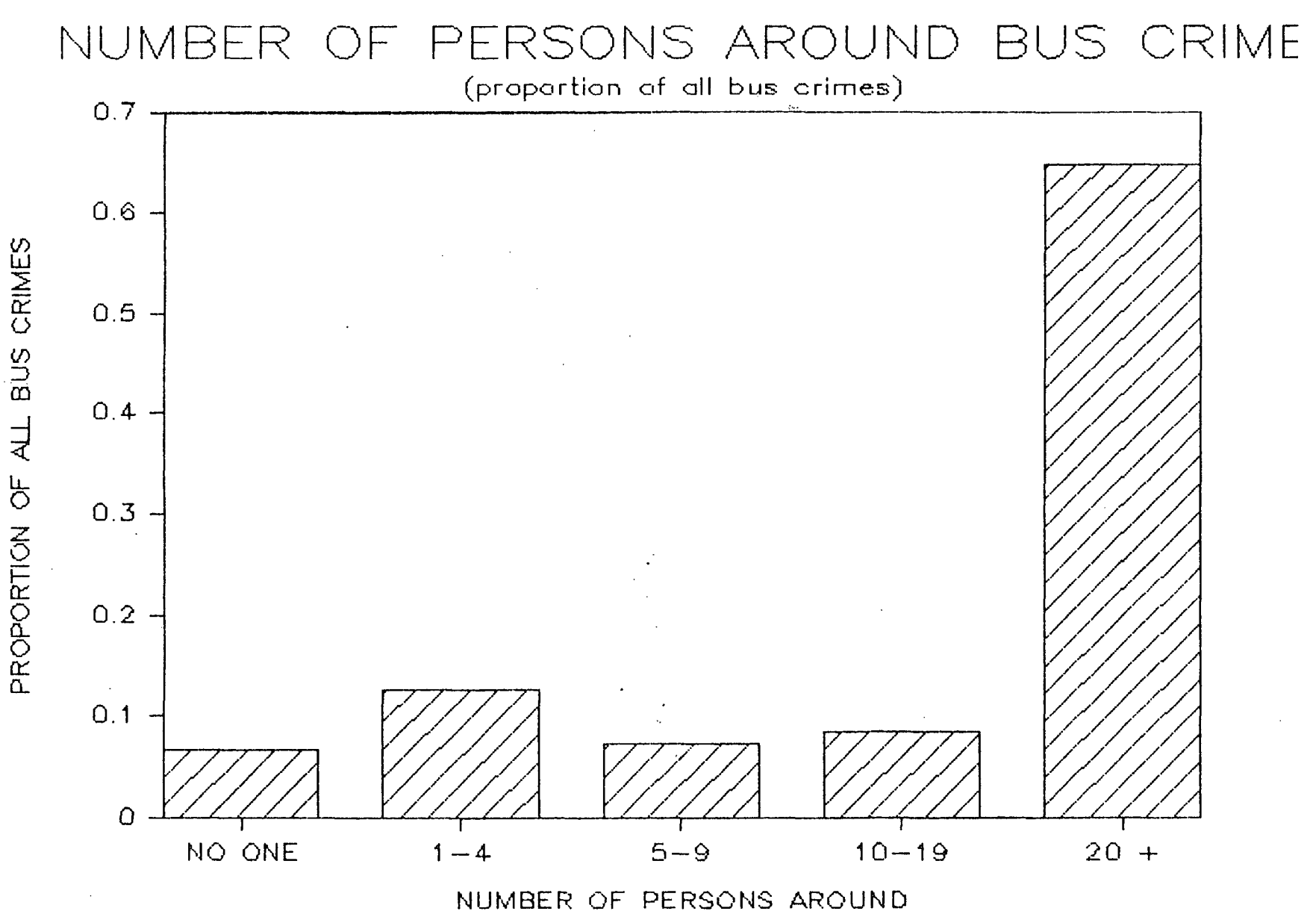

NUMBER OF PERSONS AROUND BUS CRIME
(proportion of all bus crimes)
PROPORTION OF ALL BUS CRIMES
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
NO ONE
1–4
5–9
10–19
20 +
NUMBER OF PERSONS AROUND

TABLE 5.3

LOCATION OF CRIME ON BUS AND TYPE OF CRIME
(Percentage of Crimes Occurring in Location)

Location of Crime on Bus

Type of Crime	Front	Middle	Back
Larceny	84.3%	78.7%	64.0%
Life Threatening	10.8%	16.9%	30.2%
Other	4.9%	4.4%	5.8%
	100.0%	100.0%	100.0%

occurring there than elsewhere. The factors encouraging crime are specific to the location so that any actions which are developed should be tailored to these.

Location of Crimes

Figure 5.5 maps the distribution of crimes on buses within the survey area. More bus crimes occur in downtown Los Angeles than any other district (20% of all crimes occurring on buses). This is expected in that large numbers of commuters come into downtown each day. MacArthur Park and Hollywood are areas which also have a higher proportion of bus crimes occurring there. These are both areas with high turnover in population. MacArthur Park is an area of high immigration from Mexico and Latin America, and Hollywood receives people from all over.

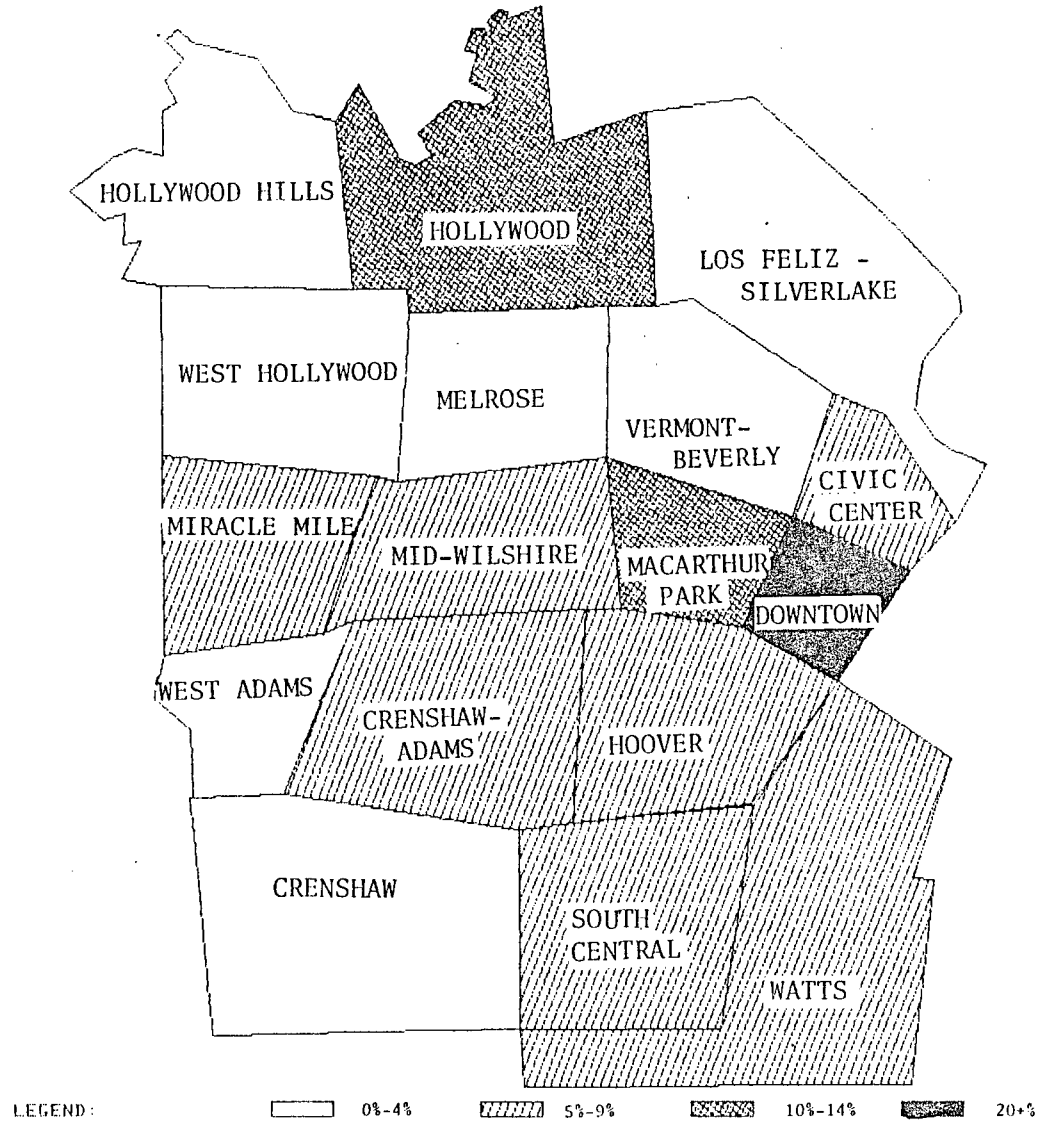
When are Buses Dangerous?

For those victims having knowledge of crimes on buses, the time pattern was compared for different areas. Generally, downtown Los Angeles had high rates during the daytime, but rates dropped off in the evening. The reason is most likely the decrease in the number of buses servicing the area at night. At the same time, crimes on buses at night are more frequent in Watts and South Central. The MacArthur Park and Miracle Mile areas have higher crime rates in the daytime, but much lower ones after the end of the work day; crimes occurring in the mid-Wilshire area are particularly high during the evening rush hours. These differences probably reflect work patterns and the scheduling of buses. When asked which factors in the situation may have

FIGURE 5.5

CRIMES ON BUSES BY AREA

(% OF CRIMES ON BUSES OCCURRING WITHIN AREA)



contributed to the crime, most responses were for overcrowding on the bus. For downtown Los Angeles and MacArthur Park, this was particularly true for the evening rush hours.

There have been shifts in crimes occurring on buses (Table 5.4). The most dramatic increase has been in Hollywood. Respondents made no references to crimes on buses occurring there before 1982, but 20 references to crimes occurring afterward. Crimes committed on buses in the MacArthur Park area have also increased, and there has been a slight increase in crimes committed on buses in the mid-Wilshire area. Relative decreases in crimes committed on buses have occurred in downtown Los Angeles, South Central, Crenshaw, Hoover, Watts and Los Feliz-Silverlake. In other words, there is a shift in the pattern of crimes on buses away from the southeastern part of the survey area towards the northern and central parts.

TABLE 5.4

AREAS SHOWING MAJOR CHANGES IN CRIMES ON BUSES SINCE 1982
(Percentage of crimes in period for each area)

Area	Percentage of Crimes on Buses Before 1982	Percentage of Crimes on Buses Since 1982
Relative Increase		
Hollywood	0.0%	12.6%
MacArthur Park	4.4%	11.3%
Mid-Wilshire	2.9%	4.4%
Relative Decrease		
Downtown	23.2%	13.8%
South Central	8.7%	4.1%
Crenshaw	7.3%	5.0%
Hoover	7.3%	5.0%
Los Feliz-Silverlake	4.4%	0.0%
Watts	5.8%	5.0%

Why are Bus Stops Dangerous?

Though crimes at bus stops display patterns similar to that for crimes on buses, bus stop crimes are more affected by the social and physical environment. As with crimes on buses, the geographical distribution of crimes at bus stops has been changing. Areas to the south of downtown have shown a relative decrease whereas several other areas have shown a relative increase. The biggest change, however, is the relative increase in bus stop crimes in downtown Los Angeles, a pattern completely

opposite to that for crimes on buses. There has been a relative shift in downtown bus crimes from the bus to the bus stop.

Respondent perceptions of contributing factors for bus stop crimes are more diverse than for crimes on buses. Overcrowding at a bus stop was a reason given predominately for downtown bus stop crimes, almost all during the evening rush hours. For other areas, however, other factors appear to be important. Fifteen persons mentioned that the stop was at a dangerous location. Eleven persons, on the other hand, stated that there were too few persons at the stop. Lastly, eight persons mentioned that it was late and dark. In short, there are several dangerous bus stops throughout the area which appear to be affected by different kinds of variables.

SOME DANGEROUS BUS STOPS IN WEST CENTRAL LOS ANGELES

The following presents a method for analyzing specific bus stops which are dangerous and building an environmental data base for transit crime. The method is not complete and needs further work. But it does represent a start to understanding the unique micro-environments which support crime. Ideally, information would be collected routinely as part of crime reporting and incorporated in an information base.

Defining the Most Dangerous Bus Stops

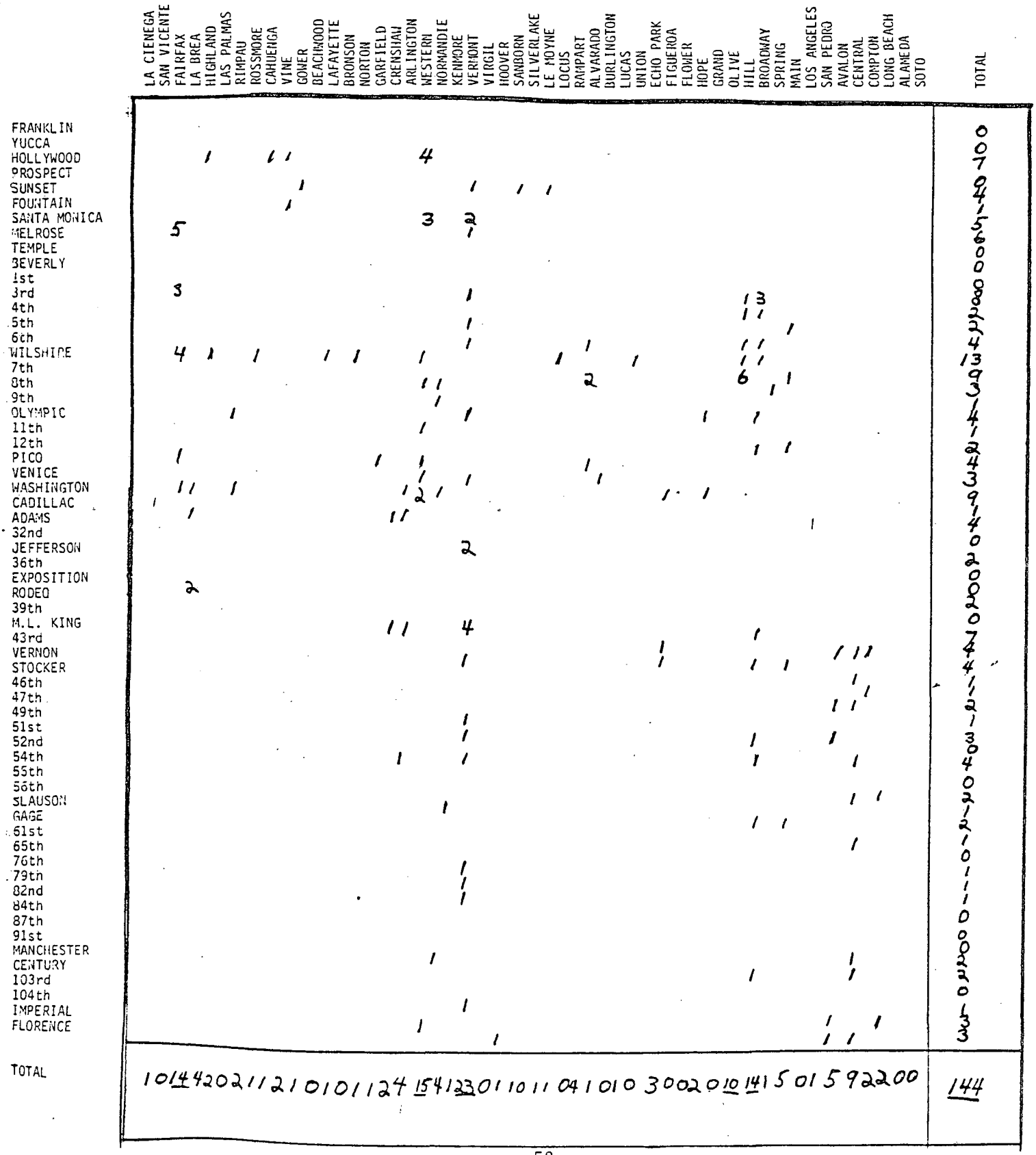
A survey is a good place to begin an analysis of dangerous bus stops, but there are limits to its usefulness. There are large sampling errors for small numbers of cases. For example, six respondents either were victimized, witnessed a crime or knew about crimes occurring at the intersection receiving the highest number of mentions: 7th. St. and Hill St. in downtown Los Angeles. Sampling error is large for six mentions. Only a systematic data base could correct the deficiencies of using survey data to collect information on dangerous locations.

All respondents who experienced a bus stop crime - either as victims, witnesses, having other members of their household be victims, or knowing persons who were victims, were asked where the stop was located. Bus stops were coded by the nearest intersection and organized in matrix form (Figure 5.7). The matrix approximates the geographical location of main streets within the survey area. On the horizontal axis, streets are organized from west (left) to east (right) and on the vertical axis streets are organized from north (top) to south (bottom).

The numbers inside the cells represent the total incidents enumerated by the survey, not rates. There are 144 bus crimes listed within the matrix. Many stops which have a high number of

FIGURE 5.7

INTERSECTIONS WHERE BUS STOP CRIMES OCCURRED



incidents do so because of high patronage. The analysis of the matrix, however, will use the total number of incidents because the purpose is to detect those locations which are in need of preventive actions. Such a matrix could be mapped on a computer using the intersections as coordinates. When used with a current data base on bus stop crimes, dangerous locations could be continually monitored, producing monthly or even weekly maps. The effectiveness of preventive actions could be more easily assessed.

Directional Patterns

By adding the columns and rows, the geographical pattern of bus stop crimes can be seen. First, the pattern is not concentrated but is 'linear'. Since bus stops are arranged in lines, this pattern is logical. Second, there is a heavier concentration along several of the north-south streets than there is along east-west streets. For north-south streets (the totals on the horizontal axis), the most mentioned streets are Vermont Ave. (23 mentions), Western Ave. (15), Broadway (14), Fairfax Ave. (14) and Hill St. (10). For east-west streets, the distribution is more even. The most mentioned are Wilshire Blvd. (13), 7th. St. (9), Washington Blvd. (9), Third St. (8), Hollywood Blvd. (7) and Martin Luther King Blvd. (7).

The north-south pattern cuts across income groups to some extent, which tend to fall in an east-west continuum. The distribution of bus crimes along Vermont Ave. is consistent throughout the survey area. The distribution along Western Ave., however, is more concentrated toward the northern part of the survey area, in Hollywood. Both of these streets have been seen as dangerous for a long time. Western Ave., in particular, is known as a 'seedy' street, with much drug traffic, and many sex book shops, pawn shops and adult cinemas. It is a street which has a high proportion of warehouses and distributors and has few commercial shopping areas. Vermont Ave., on the other hand, is a commercial and residential street for much of its length through the survey area. Many bus lines run on both streets especially Vermont Ave. In downtown Los Angeles, Broadway and Hill St. are heavily used commercial streets. Broadway is the center of an Hispanic commercial development while Hill St. is characterized by large office buildings and a jewelry district. Both streets have heavy automobile traffic and the sidewalks are crowded. They also border on areas that are 'run-down'. That crime is high on these streets is not surprising.

The most surprising result, however, is for Fairfax Ave. For over 50 years, Fairfax Ave. has had a high concentration of elderly persons, and has been a port of in-migration for people from eastern Europe. It is known for its sense of community, especially toward the elderly, and has extensive social networks and many service organizations. There have been some demographic changes over the last 10 years, but the neighborhood has

maintained much of its character. These data, however, show that it is also dangerous, a conclusion echoed by local citizen groups who have complained to the police that they need protection. The higher risk for elderly who use buses is apparently associated with a high crime rate along Fairfax Ave. In the east-west direction, only Wilshire Blvd. stands out. This street has many large office buildings extending from downtown to the ocean. It is a commuter and shopping area and becomes congested particularly at rush hours. The Wilshire Blvd. bus routes carry many times the patronage of other routes.

Third, eight bus stops account for 22% of the total number of bus stop crimes recorded. The intersection with the most bus stop crimes is 7th. St. and Hill St. in downtown Los Angeles (6 crimes reported). The intersection with the second most bus stop crimes is Melrose Ave. and Fairfax Ave. with 5 crimes reported. Next comes three intersections with 4 crimes reported each: Hollywood Blvd. and Western Ave., Wilshire Blvd. and Fairfax Ave., and Martin Luthor King Blvd. and Vermont Ave. After these come three intersections with 3 crimes reported each: Third St. and Fairfax Ave., Santa Monica Blvd. and Western Ave., and Third St. and Broadway. These eight bus stops are spread throughout the area.

In other words, bus stop crimes tend to fall along particular streets and are concentrated at a limited number of intersections. The importance of this to SCRTD (and by implication to other transit agencies) is that crime prevention efforts can be targeted to these limited locations.

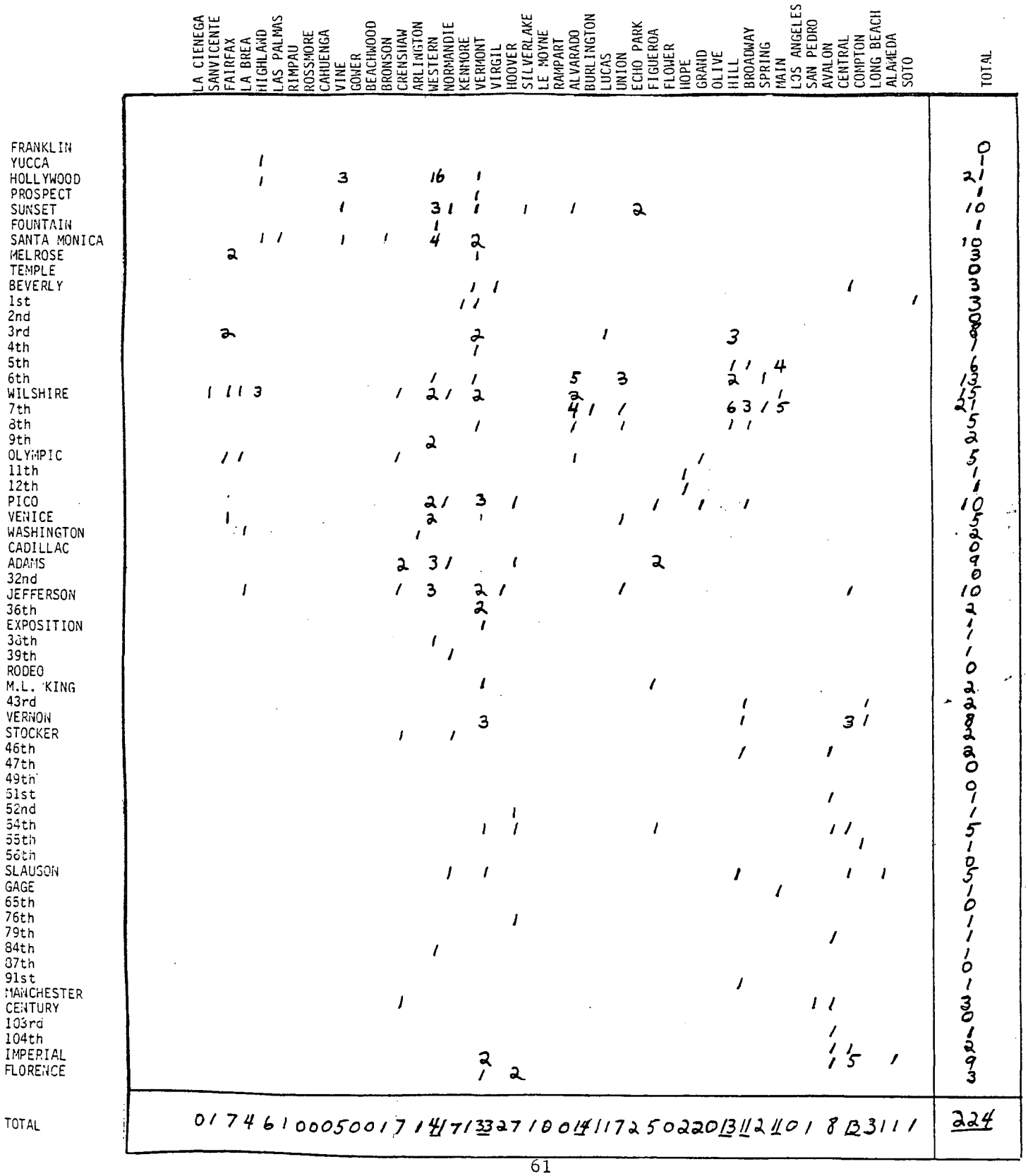
Bus Stop Locations which are Perceived as Dangerous

All respondents were asked if they knew of any dangerous bus stops, whether they had experienced a bus crime or not. There were 224 bus stops mentioned by respondents and they have been coded by the nearest intersection, presented in matrix form (Figure 5.8n. As with the distribution of actual incidents, bus stops along north-south routes are perceived as most dangerous. Western Ave. is mentioned most often followed by Vermont Ave. Other north-south streets which are mentioned several times are Central Ave., Hill St., Broadway, and Main St. In the east-west direction, Hollywood Blvd. and 7th. St. are mentioned most often followed by Wilshire Blvd. and 6th. St.

There is a tendency for the streets which had the largest number of reported incidents to be seen as more dangerous, though the match is not perfect. The most obvious omission is Fairfax Ave, which had many actual incidents but is not perceived by many as having dangerous bus stops. One reason may be that Fairfax Ave. has become dangerous in recent years, but is still not perceived as being dangerous. It is also a middle-class community and may reflect stereotypes about the "safety" of middle-class areas. On the other hand, Main St. is mentioned as being dangerous to a

FIGURE 5.8

INTERSECTIONS WITH BUS STOPS WHICH PEOPLE THINK ARE DANGEROUS



greater extent than it showed up in actual incidents. Main St. includes the so-called 'skid row' and is seen as a dangerous place by many people. The difference might be because of undersampling of persons who live around Main St., most of whom do not own telephones and many of whom are homeless.

Most Dangerous Perceived Bus Stops

Of all the bus stop locations which are perceived as dangerous, Hollywood Blvd. and Western Ave. is mentioned more often than other stops. Several other stop locations are perceived as being dangerous: 7th. St. and Hill St., which had the most reported incidents; and 7th. St. and Main St.; 6th. St. and Alvarado; and Imperial Highway and Central Ave., which had few incidents.

The Importance of a Locational and Environmental Data Base

This analysis illustrates what a locational data base could produce. If local police reports could be coded by geographical location and then cross-classified by transit usage, a pattern of dangerous locations could quickly be detected. It would then be possible to take preventive actions. Without such a base, however, one has to rely on survey data, which although revealing general patterns cannot produce the precision required to detect all dangerous locations.

Observations at Three Dangerous Bus Stops

Observations were conducted of bus stops at three of the most dangerous intersections to isolate variables contributing to crimes and also to illustrate the type of environmental information that could be added to a locational data base. Hollywood Blvd. and Western Ave., 7th. St. and Hill St., and Melrose Ave. and Fairfax Ave. were selected because more bus stop crimes had occurred at these intersections and because their physical and social environments are different.

Because of the length of the observational material, details are presented in Appendix C. It seems that bus-related crimes happen at Hollywood Blvd. and Western Ave. in association with marginal social activity, including drug trading. At 7th. St. and Hill St., on the other hand, pedestrian crowding appears to be critical in encouraging bus stop crimes, particularly larcenies. Lastly, at Melrose Ave. and Fairfax Ave., there is a high school which is adjacent to a neighborhood having a high proportion of elderly persons. At the close of school each day, there is intense crowding at the bus stops next to the school, and it appears that during this time period crimes occur.

The observations suggested strategies for reducing crimes occurring at the intersections. But the strategies have to be tailored to the unique elements associated with each micro-environment. For example, at Hollywood Blvd. and Western Ave., because of drug trading around the location of two bus stops, it was proposed to move the bus stops a block or two to the east of the intersection in order not to subject passengers to the activities. At 7th. St. and Hill St., on the other hand, a bus shelter was proposed to separate persons waiting at bus stops from passerbys to make it more difficult for pickpockets to operate. Finally, at Melrose Ave. and Fairfax Ave., three suggestions were made: limited police presence at the close of school; improved scheduling of buses; and an education program geared towards making the students aware of the needs of elderly persons.

The Uniqueness of Bus Stop Environments

Only three bus stops were observed in depth, but the differences between them are so significant as to lead to the conclusion that any program that is adopted to reduce bus crime must be fitted to the unique aspects of the environment. If other bus stops were observed, unique factors probably would emerge as contributing to bus stop crimes. In other words, solutions to crime problems must be tailored to individual circumstances. Whether each bus stop is totally unique or whether there are types of stops is not clear from the data. But even if there are general types of stops, there is sufficient uniqueness as to be a dominant consideration for any mitigation strategy. The problem is not unmanageable, however. As seen, there are probably only 8 really dangerous bus stops in the area plus a handful of other stops where bus stop crimes frequently occur.

CHAPTER 6

PERCEPTIONS OF BUS CRIME PREVENTION

The environment around bus stops is different from one area of a city to another. The observations conducted at three bus stops, and which are discussed in Appendix C, illustrate the diversity of factors affecting crime. Design elements which are introduced at any stop must be unique and related to the specific conditions. In the final two chapters, a strategy for combating bus crimes will be discussed. In this chapter, respondents' views of bus crime prevention will be explored and in the next chapter some recommendations will be made.

As part of the survey, respondents were asked for their perceptions and opinions about the prevention of bus crimes. Three issues were examined. First, is there a need for a bus crime prevention strategy? Second, what should be the priorities of a bus crime strategy? Third, what design elements should be incorporated into a crime prevention program?

THE NEED FOR A BUS CRIME PREVENTION PROGRAM

Adequate Protection on Buses

Respondents were asked whether they thought that there was adequate protection for passengers and bus drivers in Los Angeles. Not surprisingly, 73% said that there was not adequate protection. This perception cuts across most social groups and is widespread. Bus users are a little less strong in this perception than non-users. For example, 76% of those who have not taken the bus within the last six months stated that there was not adequate protection, whereas 70% of heavy bus users stated that there was not adequate protection. Similarly, older persons perceive slightly more protection than younger persons. Seventy-five percent of those under age 65 perceive that there is inadequate protection compared to 67% of those over 65. Much of this difference relates to frequency of bus travel. For those persons who are moderate or heavy users of buses, there are no differences between those under and over age 65.

Also important is actual experience. Eighty-two percent of those who directly experienced a bus crime (either as victim or witness) perceived inadequate protection compared to 70% of those with no directly experience. Similarly, persons who indirectly experienced a bus crime perceived less protection. Eighty-five percent of those who had another member of their household be a victim or who know someone who was a victim felt there was not adequate protection compared to 69% of those with no indirect experience.

Respondents who stated there was not adequate protection were asked what parts of bus travel were not adequately protected. Up to three characteristics were coded. Table 6.1 presents the ten most frequently mentioned. Not surprisingly, travel on the bus and waiting at the bus stop were mentioned far more than other choices. After this came night travel, followed by the boarding of the bus, the existence of vulnerable passengers, a general reference to 'everything', being alone at night, the back of the bus, going to and from the bus stop, and South Central Los Angeles (the only geographical reference). Several of these characteristics have been shown to be dangerous in Chapter 5.

TABLE 6.1

PARTS OF BUS TRAVEL WHICH ARE NOT ADEQUATELY PROTECTED
(Number of mentions)

Parts of Bus Travel	Number of Mentions *
Travel on the bus	390
Waiting at the bus stop	336
Night travel	104
Boarding the bus	37
Vulnerable passengers	34
Everything/all parts	28
Being alone at night	27
Back of the bus	21
Going to and from the bus stop	21
South Central Los Angeles	20

Willingness to Pay for a Bus Crime Prevention Program

Respondents were asked whether they would be willing to pay in taxes, fares or reduced service for some type of crime prevention. For the sample as a whole, 63% stated that they would be willing to pay. Support for such a program cuts across most social groups. Bus users were naturally more supportive than non-users but non-

users supported a program as well. For those persons who had taken a bus within the last six months, 70% were willing to pay for a bus crime prevention program compared to 55% of those who had not taken a bus in the last six months.

The largest differences in this opinion are for the various ethnic/racial groups. Seventy-one percent of Hispanic respondents and 68% of Black respondents were willing to pay for such a program, compared to 62% for Asians and 56% for Whites. Most of these differences are related to bus use. For non-users, most Whites would not be willing to pay for a bus crime prevention program (53% said 'no') although 69% of Whites who were heavy users would be willing to pay. Persons who have directly experienced bus crimes were also more willing to pay for such a program. Among those who had either been victimized or had witnessed a bus crime, 75% were willing to pay compared to 59% of those who had not directly experienced a bus crime. Indirect experience, however, does not differentiate.

How a Bus Crime Program should be Financed

Respondents were asked how such a program should be financed, if there was one. They were given a choice of increased fares, increased local taxes or something else. Table 6.2 presents the results. A larger proportion (36%) supported fare increases than increased local taxes (19%). About 10% supported both fare increases and local taxes, but 19% did not support any financing. Around 10% gave other financing suggestions, the most common being financing from the bus company (SCRTD) or from general revenues.

Support for fare increases was strong in the sample compared to limited support for local tax increases. Surprisingly, there was no difference between bus users and non-users in this and, in fact, a slightly higher percentage of bus users (40%) favored fare increases to subsidize a crime prevention program than non-users (37%).

Support for financing crime prevention through fare increases cuts across all social groups. For example, the elderly were less in favor of fare increases than younger persons but more favored fare increases over taxes. Among those age 65 and over, 32% favored a fare increase, 15% local tax increases and 7% both compared to those under age 65, where 40% favored fare increases, 21% local tax increases and 12% both. Among ethnic/racial groups, there was consensus. Hispanics were more in favor of fare increases (49% with 6% supporting both fare and tax increases) than Blacks (36% with 15% supporting both), Whites (36% with 10% supporting both) and Asians (34% with 6% supporting both).

TABLE 6.2

THE FINANCING OF A BUS CRIME PREVENTION PROGRAM
(Percent of respondents supporting measure)

	%
Fare Increase	35.8%
Local Tax Increase	19.1%
No Financing	18.6%
Both Fare and Tax Increase	10.1%
Other	9.7%
of which:	
Bus Company	3.9%
General Revenues	2.3%
Cigarette-Alcohol Tax	0.8%
Federal Tax Increase	0.8%

Other variables which distinguished support for different financing mechanisms were education, where fare increase support decreased with more education, and direct experience (as a victim or a witness), where those with experience supported local tax increases slightly more than those who with no experience. But, more still supported fare increases than tax increases.

In short, there was a consensus about financing a bus crime prevention program through increasing fares. It has been argued that subsidized bus fares is an equitable subsidy because most patrons have lower incomes. Although this may be true, the data shows that most lower income persons were willing to support fare increases to finance a bus crime prevention program (and the strongest support came from those with less than median household incomes). This is surprising because in California single-purpose tax measures that have come up before the electorate have generally been defeated. The one exception was the passage of Proposition A in Los Angeles County which assessed a one-half percent sales tax and ear-marked the funds for mass transit. From the results, support was shown for fare increases to finance a bus crime program. An important caveat, however, is that the revenues be used for crime prevention.

PRIORITIES FOR A BUS CRIME PREVENTION PROGRAM

Respondents were asked to think of themselves as policy-makers having to make decisions about the most important needs for a crime prevention program. Choices were presented to them and they were asked which policy alternative they would favor.

Protect People on the Bus or at the Bus Stop

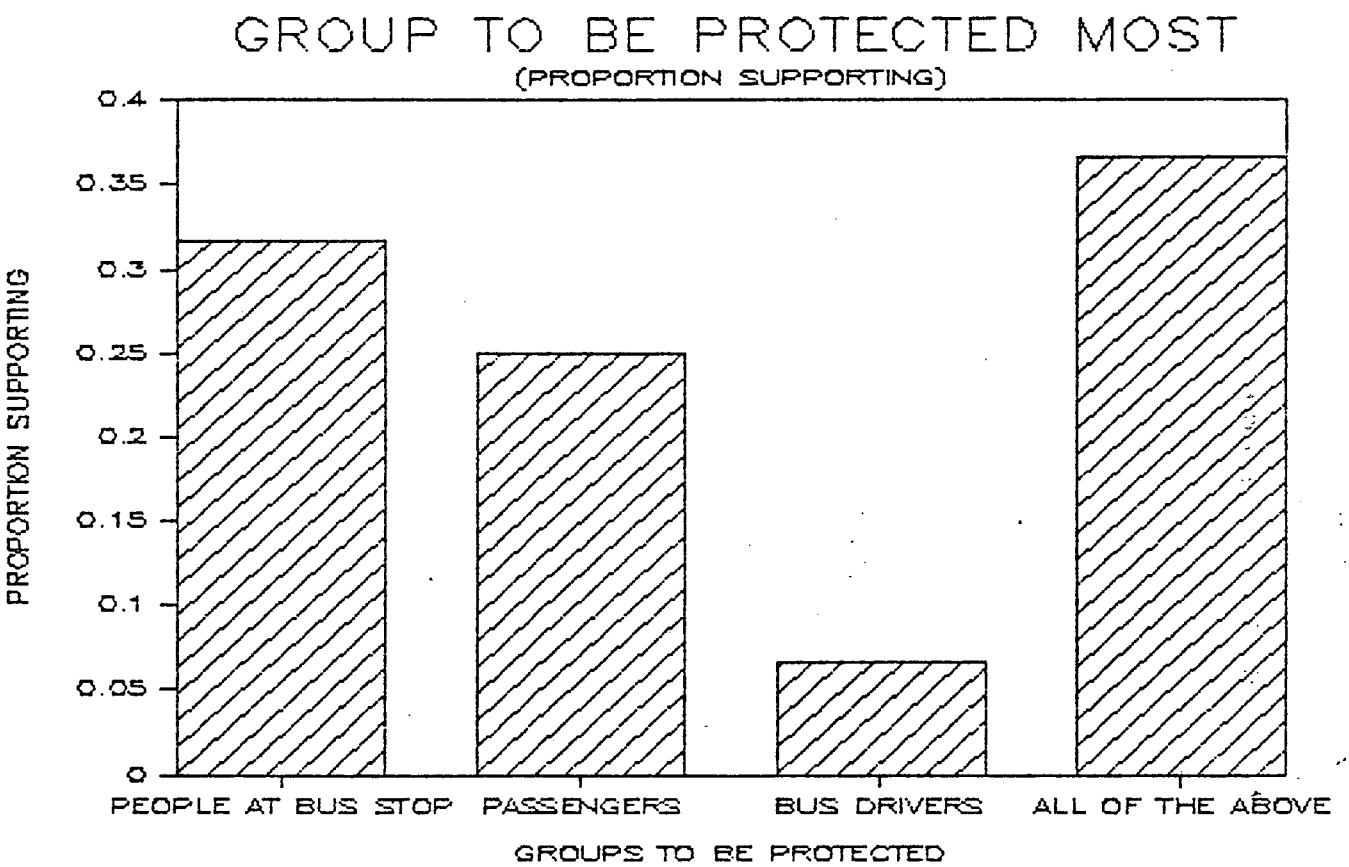
First, they were asked which was most important at this moment, to protect people on buses or at bus stops. Of the 948 respondents who gave opinions, 57% favored protecting people at bus stops. There were some variations. Bus users were less emphatic about protecting bus stops than non-users (54% compared to 61% respectively), though the majority emphasized bus stops more than buses. There were also ethnic differences. Asians gave stronger support to protecting bus stops (75%) than Hispanics (63%), Whites (60%) and Blacks (47%). Most significantly, persons who had experienced a bus crime were evenly divided between protecting buses and bus stops (50% each), and support for protecting buses increased with frequency of bus use. Sixty percent of heavy users who experienced a bus crime supported protecting buses. Persons who use the bus frequently are possibly more sensitive to the conditions on the bus compared to non-users, who have more fears about the 'street'. But both parts of the trip are important.

Protecting Passengers or Drivers

Respondents were asked whether there is a greater need to protect bus drivers, passengers or people waiting at a bus stop, realizing that such a choice is difficult, if not slightly unfair, because the drivers are integral to a bus trip. Figure 6.1 presents the results.

More people refused to distinguish between supporting passengers, people at a bus stop and bus drivers, stating that all were important (this was not a response that was read to the respondents). After this, there was more support for protecting people at bus stops, followed by protecting people on buses and lastly protecting bus drivers. Again, there were social differences. Among bus users, there was more support for protecting passengers on the bus than among non-users. Further, this support increased with bus usage. For heavy users, 35% placed top priority on protecting passengers on the bus compared to 22% for non-users. Possibly the most interesting was that people who had directly experienced a bus crime (victim or witness) placed greater emphasis on protecting both drivers and passengers. Nine percent of those who had directly experienced a bus crime placed a top priority on protecting the driver compared to 6% for those who had not experienced a bus crime; the corresponding figures for protecting passengers on the bus were 33% and 22% respectively.

FIGURE 6.1


GROUP TO BE PROTECTED MOST
(PROPORTION SUPPORTING)
PROPORTION SUPPORTING
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
PEOPLE AT BUS STOP
PASSENGERS
BUS DRIVERS
ALL OF THE ABOVE
GROUPS TO BE PROTECTED

These differences are small but they do suggest public ambivalence toward bus drivers. If respondents can identify with drivers more, then possibly more support will be shown. It might be a useful research topic to explore further.

Design Emphasis of a Bus Crime Prevention Program

To explore the direction that a bus crime prevention should take, respondents were asked whether the major thrust of a program should be on improving the design of buses to reduce crimes, on improving the use of the transit police to capture criminals more quickly as well as to discourage would-be attackers, or on improving the design of bus stops to protect people who are waiting for the bus. The overwhelming majority supported improving the use of transit police (Table 6.3).

TABLE 6.3

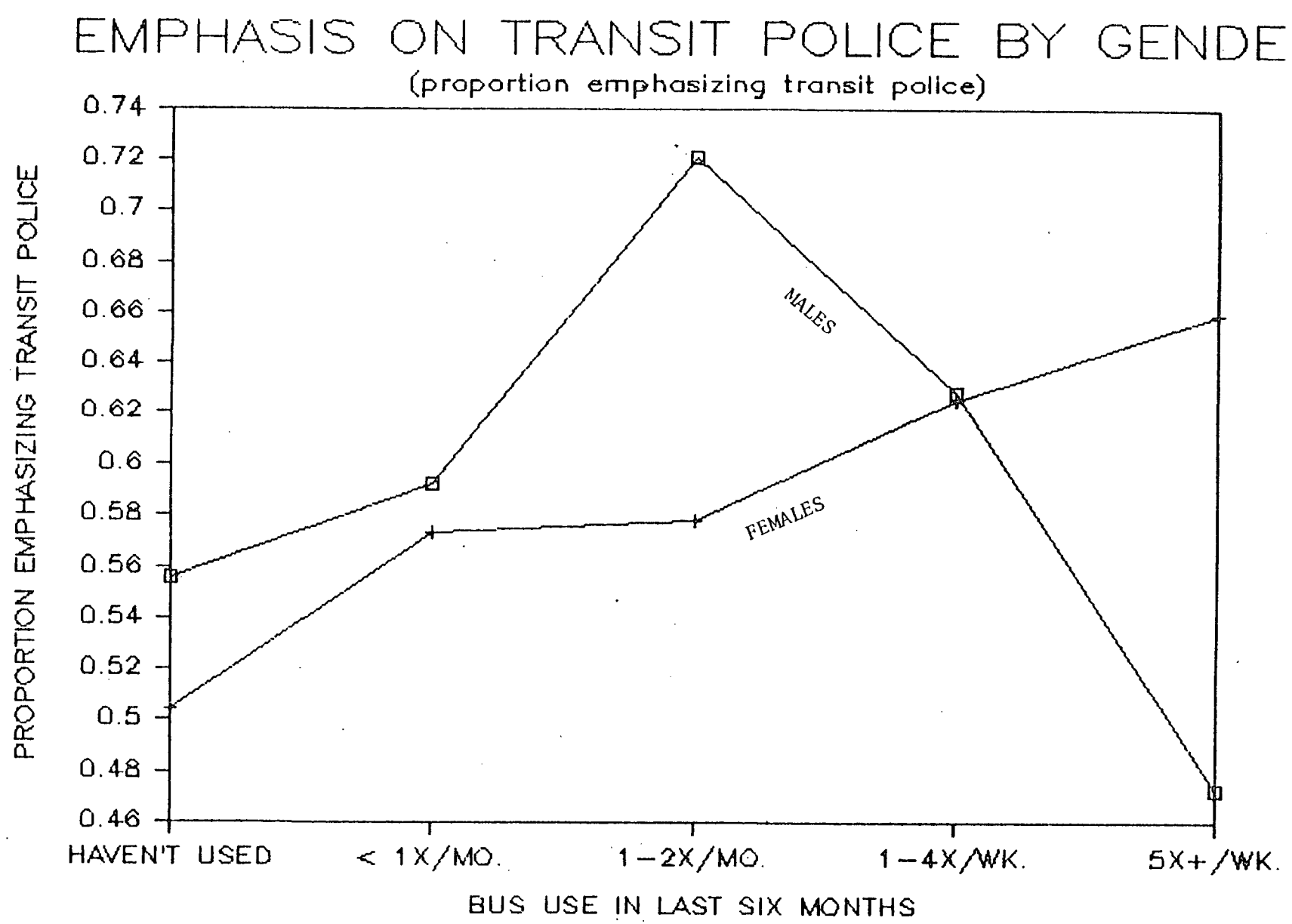
DESIGN EMPHASIS OF A BUS CRIME PREVENTION PROGRAM
(Percent supporting)

Priority for:	%
Improve transit police use	57.0%
Improve bus stop design	10.6%
Improving bus design	5.2%
All of the above	27.2%

More than half placed emphasis on improving the deployment of transit police and an additional 27% said all choices were equally important. There was less support for improving design, either on buses or at bus stops. Whether people really do not understand the importance of design or whether they have considered and rejected the possibilities cannot be clarified with these data. The police are seen as important and critical to a bus crime prevention program.

Bus users placed even greater emphasis on the use of transit police (61%) than non-users (53%). There were also social differences. Figure 6.2 shows the relationship between sex and emphasis on transit police. For non-users and light users of buses, men placed greater emphasis on the transit police than women. But for heavy bus users, women placed greater emphasis on the transit police than men. Older people, on the other hand, place less emphasis on the use of transit police. Similarly, emphasis on transit police decreased with educational level.

FIGURE 6.2


EMPHASIS ON TRANSIT POLICE BY GENDER
(proportion emphasizing transit police)
PROPORTION EMPHASIZING TRANSIT POLICE
0.74
0.72
0.7
0.68
0.66
0.64
0.62
0.6
0.58
0.56
0.54
0.52
0.5
0.48
0.46
MALES
FEMALES
HAVEN'T USED
< 1X/MO.
1-2X/MO.
1-4X/WK.
5X+/WK.
BUS USE IN LAST SIX MONTHS

These data may reflect two processes. First, there is a general feeling of inadequate protection among the west central Los Angeles public, particularly those who take buses. There is an expressed need for greater police presence, if only to reassure patrons. Second, the ability to think of alternatives to the police is a function of education. Design factors which could contribute to safety on a system are subtle and require awareness. Police, on the other hand, are familiar to everyone and symbolize authority. Those who feel vulnerable or who have experienced crimes want to see the police during their transit trip.

DESIGN ELEMENTS FOR A BUS CRIME PREVENTION PROGRAM

Design is a subtle process because it involves incorporating into the physical setting elements that affect human behavior. There have been several studies exploring the effect of the physical environment on crime (Newman, 1972; Rand, 1983). Rand (1983) reviewed the literature and concluded that the effects of physical design on crime have been mixed; in some cases design has improved a situation whereas in others it has been neutral or even worsened it. The effectiveness depends on the particular situation and design elements chosen.

Respondents were asked to choose among several design elements. Table 6.4 summarizes the results.

Types of Buses

In Los Angeles, there are several types of buses that are used though by far the most common is the 43 seat 'regular' bus. The regular buses were perceived as most safe, as would be expected. Almost everyone is familiar with this type. The next highest choice, however, was for mini-buses. Mini-buses are used is specialized situations in Los Angeles (around airports and for special transportation programs for the elderly). On the other hand, there was little support for the long, articulated buses and the double-deck buses. The double-deck buses are rare in Los Angeles and many may have never seen one, but the articulated buses are common. SCRTD has been introducing them in recent years as a means to increase passenger loads. One can assume that most respondents would have seen these. There was not, however, a consensus among respondents that they are particularly safe. Given the fear among many respondents about the back of buses, the longer distance between the back of the bus and the driver might be a reason for this perception.

There are few meaningful social differences. Bus users and the elderly saw regular buses as slightly more safe than non-users and younger persons respectively. Respondents who are more educated perceived mini-buses as more safe than less educated persons,

TABLE 6.4

DESIGN ELEMENTS WHICH ARE PERCEIVED AS MOST FROM BUS CRIME
(Percent Supporting)

	%
Type of Bus	
Regular	68%
Mini-Bus	22%
Articulated	7%
Double-Deck	3%
Type of Glass in Bus Windows	
Clear Glass	43%
Tinted Glass	31%
No Difference	26%
Open or Sheltered Bus Stops	
Prefer Sheltered Bus Stops	39%
Prefer Open Bus Stops	38%
No Difference	23%
Lighting or Proximity of Bus Stops	
Prefer Farther, Better Lit Bus Stop	77%
Prefer Closer, Less Well Lit Bus Stop	23%

though more highly educated persons still perceived regular buses as safer than mini-buses. In general, though, most respondents saw regular buses as more safe, but a sizeable number saw mini-buses as more safe.

Type of Glass Used in Bus Windows

Most buses in Los Angeles have darkened, tinted glass in the windows. This was introduced as a security measure, but there has been controversy about it. Slightly more respondents preferred clear glass over tinted glass with the rest saying there was no difference. Bus users preferred tinted glass more than non-users (35% compared to 26%), though more preferred clear glass than tinted glass (39% of users preferred clear glass). Similarly, people who had experienced a bus crime (either as victim or witness) preferred tinted glass more than people who hadn't, though more preferred clear glass over tinted glass. In short, it appears that more people preferred clear over tinted glass.

Open or Sheltered Bus Stops

Opinion was evenly divided over whether open or sheltered bus stops offered the most protection; 39% preferred sheltered bus stops and 38% preferred open bus stops with the rest saying there was no difference. Slightly more elderly preferred open to sheltered bus stops though the difference was not significant. Bus users preferred sheltered stops more than open bus stops (43% to 35%). Also, Blacks preferred sheltered bus stops more than open bus stops although Whites and Asians preferred open to sheltered bus stops; Hispanics were evenly divided. Aside from these, there were no major social differences on this question.

It is possible that people are thinking about the current bus shelters when they respond to this question. These are structures made of plexiglass, about 8 feet long and closed on three sides. Many people feel 'closed in' by these shelters.

Lighting at Bus Stops

Respondents were asked to choose between two bus stops for taking a bus at night near their home. One stop was closer to their home but not well lit at night while the other was further away but was well lit at night. The overwhelming majority chose the well lit bus stop (77%). There was general agreement across all groups. There were was no difference between bus users and non-users. Females placed an even greater emphasis on the well lit bus stop than males (83% to 70%) but more males chose the well lit bus stop, too. The elderly chose the closer bus stop more often than younger persons (28% compared to 22%), but most still chose the well lit bus stop. In other words, lighting is important in feeling safe

and the most persons place an emphasis on it; people are willing to walk further for better security.

Other Factors which Could Contribute to Safety from Bus Crime

Lastly, respondents were asked what else could be done to increase safety on buses or at bus stops from crime. Over 1000 suggestions were received from respondents. Table 6.5 lists the most common ones. Some of these have been reviewed already and others are new. The heavy emphasis on police (uniformed, plainclothes, at bus stops, voluntary) was consistent with strong support given to the transit police. Support for better lighting was also seen in the last question. Many people argued for silent alarms, not realizing that most buses already have these installed.

Other suggestions, however, were interesting and deserve to be considered. Having drivers better trained to handle crime on buses or rowdy passengers may help to allay some of the ambivalence the public has toward drivers. SCRTD gives special training to drivers in this respect, but there was suspicion about the ability of drivers to intervene. Both from the lack of emphasis given to drivers in the choice between drivers and passengers, and from other data indicating that the drivers were perceived as rarely calling the police in crime incidents, there does appear to be some concern about drivers effectiveness in combating bus crime.

Installing emergency call boxes at bus stops also might be considered, especially at some of the more crowded stops. Currently, victims of crime or persons threatened in a situation would have to find a telephone to call the police, which in public places may be difficult, especially at night. On the other hand, the existence of emergency call boxes would lend itself to misuse easily. There was also concern about overcrowding on buses especially on heavily travelled routes. In Chapter 5, the perception of overcrowding was the most significant factor mentioned in contributing to bus crime. Lastly, educating the public about bus crime would be useful, both for reporting incidents and for teaching people to protect themselves in public.

Using the Public to Combat Bus Crime

There are many possibilities for combating crime on buses, some of which are not expensive. The respondents gave interesting suggestions, many unanticipated. These involve the use of police, but also the training of drivers, public education and improved design. In the next chapter, suggestions and recommendations are outlined. It is important, however, to see bus crime as a public problem. Part of reducing bus crime is to include the public in all stages of decision-making and implementation. Only through active participation and education will bus crime be reduced.

TABLE 6.5

THINGS WHICH CAN BE DONE TO IMPROVE SAFETY FROM BUS CRIMES
(Number of mentions)

Suggestion	Number of Mentions
Uniformed police on buses	176
Police should patrol bus stops	155
Better lighting at bus stops	123
Plainclothes police on buses	88
More police in general	75
Silent alarms on buses	67
Better training of drivers to protect people on buses	57
Emergency call boxes at bus stops	40
More buses on heavily travelled routes	37
Stiffer sentences for criminals	29
Less crowded buses	21
Educate public to report crimes	20
Better bus design	19
Voluntary police force on buses	14
Hidden video cameras/metal detectors on buses	14
More effective management of rowdy teenagers on buses	14

CHAPTER 7

SOME RECOMMENDATIONS FOR IMPROVING BUS SECURITY

Earlier chapters have identified the results of the survey and observations. In this chapter, some recommendations and suggestions for further research are presented. Three main conclusions from this study have policy implications. First, the existing system for collecting information on transit crime has fundamental faults. Correction of this system will require overhaul of the categories used in defining transit crime, probably through redefining the FBI's Uniform Crime Report. Second, environmental information is important for understanding factors contributing to bus crime. There is a need to build an environmental data base. Third, the physical and social causes of bus stop crime are particular to the environment surrounding each stop. There is much diversity between different stops. Any strategy for protecting passengers at bus stops must be based on an assessment of these elements. Similarly, buses have their own micro-environments which vary according to the passengers and neighborhoods which they pass through.

FAULTS IN TRANSIT CRIME REPORTING SYSTEMS

The current method for collecting information on transit crime has faults which are well beyond the capabilities of transit authorities to correct. The incidence of bus crime in central Los Angeles is many times greater than that recorded by the local transit agency (SCRTD), and what is found in Los Angeles would probably be found elsewhere. There are so many sources of information 'leakage' that most transit agencies probably know about a small proportion of actual bus crimes. Unreported crimes constitute a major problem for crime statistics in general. Crime reports for which the police cannot investigate constitute another source of error for crime statistics. For transit-related crimes which are investigated but which have occurred outside buses, data will most likely be collected by local police departments rather than transit police. Existing police reports usually eliminate any reference to transit behavior.

There is a need to overhaul transit crime reporting systems. There are efforts in this direction. Riley and Dean (1984) have recently reviewed crime reporting forms for detecting crimes at California intercity bus stations; they proposed a uniform transportation crime reporting system. Currently, the U.S. Department of Transportation is undertaking a review of existing transit crime data bases throughout the country. The Southeast Michigan Council of Governments has for several years provided a *de facto* standard by compiling information from transit agencies throughout the U.S. and Canada (SEMCOG, 1979; 1981). Their

system, based on the Uniform Crime Report allows some degree of standardization. Recently, SEMCOG has developed an analytical program for delineating transit crimes by combining information from both transit crime and local police reports. This system relies on building a computer data base which has the capabilities for mapping crimes on a small scale, similar to the bus stop matrix described in Chapter 5 (SEMCOG, 1984). It is unclear how effective their system has been in detecting transit crimes from police reports for without re-defining the UCR categories there probably will be sizeable information loss.

Standardization is Only One Goal for a Data Base

Although standardization is an important goal of a transit crime information system, it is not the only goal. A transit crime information system must have several goals, including:

1. The need to build legal evidence. This is more the need of a police department which compiles evidence from police reports to arrest and convict specific individuals;

2. A basis for deployment of manpower. A key goal of an information system would be to aid in more efficient use of personnel;

3. Information which can help in crime prevention. Data defining particular locations, times or situations which contribute to crimes is useful for designing preventive strategies;

4. Political influence. It has been noted frequently that crime statistics are used for political purposes by police departments to lobby for funds from local councils, state legislatures or Congress;

5. A basis for establishing value over property loss. For transit agencies, such considerations are real. There are costs to any preventive alternative and these must be compared to any benefits that derive from a preventive alternative. For example, some bus stops are so dangerous that the cost of providing security may be greater than simply moving the stop;

6. Information to evaluate the effectiveness of crime prevention. Statistics become important for testing whether programs have worked or not;

7. Information to establish the liability of the 'owner' of a public space. This issue has received some attention in the press. Legal suits involving attempts to establish public liability for dangerous locations (e.g., a school being sued because the playground has many crime incidents; a transit authority being sued because a particular bus stop has many crimes) have been filed and tried. Sometimes the court has found the public agency liable and othertimes not. The potential for this type of case may increase dramatically for transit operators; and

8. Lastly, there is standardization of the data base to allow comparisons between different locales or the same locale over time.

A transit crime data base should try to fulfill all these goals if it is to be effective. The concern of this report has been obtaining information which can be used for prevention. This, of course, is only one goal but it is an important one that should concern the U.S. Department of Transportation and most transit authorities in the country. The main purpose in developing a uniform transit crime reporting system would be to monitor actions that have been instituted to reduce crime. Data which is aimed at improving crime prevention should, therefore, be the foremost consideration for an improved data collection system.

To this aim, the current system has deficiencies that will not be eliminated by standardization alone. If operators are only detecting a small proportion of existing crimes, it is impossible to know whether any procedures or changes have improved security. Without changing the UCR system, it is unlikely that major improvements can be made in detecting transit crimes.

This would require high level negotiations between the U.S. Department of Transportation and the U.S. Department of Justice. The way changes in statistical reporting systems usually proceed is that first the appropriate secretaries agree on the need to re-define the system. Next, a committee is appointed to review all evidence for and against the changes. A cost-benefit analysis is then conducted to assess the economic feasibility of the changed system. Several local experiments are set up to test a model of the new system. Lastly, after several reviews and revisions, Congress approves the changed system. The process is time-consuming but it can lead to a better data collection system. The history of statistical information systems in this country has many examples of reporting forms being changed from new information and circumstances (the U.S. Census Bureau goes through such a procedure between every census).

Therefore, our first recommendation is that consideration be made for creating a dialogue between the U.S. Department of

Transportation and the U.S. Department of Justice to review the Uniform Crime Reporting system and establish changes that would allow transit crime incidents to be better detected.

THE NEED FOR ENVIRONMENTAL INFORMATION

There is an additional information need, however. If a data base is to be useful for transit crime prevention, it must include information about the physical and social context of transit crimes. Information on type of crime, exact location and time of day would be necessary as well as information on the number of persons nearby (if the crime was at a bus stop), how crowded the bus was (if the crime was on a bus), lighting and visibility at the time of the crime, descriptions of actual behavior patterns of the victim and assailant (e.g., where the victim was standing or sitting, where the assailant came from) as well as the usual information describing the assailant (age, sex, race, clothing). In addition, for crimes committed at bus stops or on the way to and from bus stops, information should be collected on the land use around the place where the incident occurred.

As shown in Appendix C, the land use and social behavior around bus stops are critical factors contributing to crimes. Possibly it will be necessary to develop a typology of land uses which seem to predominate in locations with many bus stop crimes, and then identify dangerous bus stops with this typology. This could allow preventive solutions to be specifically targeted to definite locations. Transit crimes are not uniformly spread throughout the city but are usually concentrated at particular locations (even within so-called 'high crime areas'). In west central Los Angeles, there were 8 dangerous bus stops which accounted for a sizeable proportion of bus stop crimes. Detailed environmental information would aid this process by detecting land-use elements which are dangerous.

A Study of Transit Crime Reporting Forms in Southern California

As a part of this project, transit crime reporting forms used by local transit authorities and police departments in the Los Angeles area were reviewed. Few agencies in the area collect any environmental information. Some of the people interviewed saw the importance of this type of information. A model form for the collection of transit information was developed which includes a significant number of environmental indices. The form is designed for a mini-or micro-computer data base so that local agencies can have immediate access to locational and environmental information which would be useful in preventive actions. A key problem in using transit crime information is difficulty in gaining access to the information quickly. With the growth of data base programs for mini-computers and micro-computers, such difficulties should be reduced. The full report is presented in Appendix D. It is a first attempt at a reporting form for an environmental data base.

Observational Data as a Complement to Existing Data Bases

In the absence of environmental information in existing transit crime data bases (or even as a complement to such information), observational studies can be used to obtain information about difficult bus stop locations. The method outlined in Chapter 5 and Appendix C can be applied to detecting dangerous bus stops and isolating variables which contribute to crimes. This method can be applied in other cities of the United States.

STRATEGIES FOR PROTECTING PEOPLE USING BUSES

Designs must be specific to the particular location. What worked at one bus stop may not necessarily work at another. The same can be said of buses, even though the internal environment of the bus is generally consistent. Crime is not totally a product of a physical environment, but involves passengers and locations as well. The number of passengers on the bus, the time of day, and the particular locale that the bus passes through are undoubtedly contributing factors to crimes on the bus.

In Chapter 1, four approaches toward bus crime prevention were outlined: 1) 'Target hardening'; 2) Surveillance; 3) Scheduling; and 4) Community building. Of these, 'target hardening' has been the most commonly attempted strategy. There has been a 'high technology' approach to protecting bus patrons and drivers. Although many of these measures may have been effective, others may not have been. Little has been done to protect passengers at bus stops. Several suggestions are discussed below for improving protection for passengers on buses and at bus stops which rely on the other approaches, in combination with 'target hardening'. It is not meant to be an exhaustive list, but to generate ideas for combating crime. Some of these suggestions are inexpensive; others are not. The effectiveness of any, however, would depend on where it is implemented. For most, it would be necessary to conduct experimental trials to evaluate their utility.

PROTECTING PEOPLE IN BUSES

Of the preventive actions that have been implemented for bus travel, the majority have been on buses. Silent alarms, exact change fare policy, flashing lights on the outside of the bus, and two-way radio devices have been in operation for sometime in many cities of the United States.

Scheduling for Heavy Passenger Loads

A key variable in bus crime is the passenger load. The critical load for 'overcrowding' probably varies among transit systems, but

it was clearly perceived by respondents as a major factor contributing to crime. By altering trip schedules or re-deploying buses from less-utilized areas, overcrowding might be significantly reduced. Of course, there is a cost to this, which might be small (for redeployment) or considerable (if new buses have to be purchased). But it appears that crime on buses could be reduced through changes in scheduling.

Changing bus schedules is a politically-sensitive issue, of course. Buses are crowded in inner city areas and less so in affluent suburbs for reasons related to the sources of tax revenues. The public in more peripheral communities may object to removing bus service even if ridership is low; politicians from these areas would certainly resist the change. However, for reasons of cost effectiveness as well as for a broad societal consensus over combating transit crime, some progress in this direction may be possible.

Protecting Passengers in the Back of the Bus

Surprisingly, little has been done to protect passengers in the back of buses. Given that the back of the bus is more dangerous and that many people fear sitting there, security must be improved. Mirror-systems have been used to allow the driver to see the back better. The effectiveness of this would depend, however, on the willingness of drivers to intervene. Another suggestion would be to arrange seats in the back in a circular pattern. This would allow better visibility between passengers and would cut-down on pick-pockets. A third suggestion would be to design buses so that the exit is in the back, such as in the English double-decker buses. Crimes may occur in the back partly because the drivers can't see clearly and partly because there is no through-traffic to disrupt an incident. If people were to walk through, on the other hand, the chances of serious assaults occurring in the back might be reduced.

Improving Drivers' Roles in Protecting Passengers

The role of drivers in protecting passengers is important and needs to be understood better. This was not studied in any systematic way and what is known comes from several interviews with drivers and union officials. But there does appear to be tension among drivers. Some drivers feel resentful about having to police the bus; others tend to ignore problems. One driver stated that "we're not paid to be policemen on buses" and felt that the transit agency did not back up the drivers sufficiently. Another driver felt that he was continually having to ward off verbal and physical attacks from disgruntled passengers. One drivers' union official even speculated that some drivers provoke attacks from passengers as part of a 'paranoid' cycle (fearing attack, one then attacks first). There has been recent concern

about stress on bus drivers and the effect this may have on their ability or willingness to protect passengers on the bus. It may be necessary for transit systems to discuss ways of improving the status, performance and effectiveness of drivers in combating transit crime.

PROTECTING PEOPLE AT BUS STOPS

Protecting people at bus stops involves different considerations. Most bus stops are part of public space and legally, physically and socially are outside the province of the transit operator. Five suggestions are made for improving protection at bus stops.

Deploying Police at Dangerous Bus Stops

Consideration should be given to deploying police at dangerous bus stops during times when crimes are most likely to occur. There would be an obvious cost to this which would have to be carefully evaluated. But given the request of many persons for more police protection and given the specific location of many bus stop crimes, stationing police at bus stops might be the most effective means for combating the problem. The cost may not be prohibitive, however. In a city like Los Angeles, if, for example, twenty bus stops were to be protected for four hours a day, 80 extra man-hours per day would be required. The revenues could possibly be raised through a crime prevention fare increase or a localized tax on businesses. At 7th and Hill in downtown Los Angeles, several merchants were talked to about financing extra police at the corner. All were supportive, if not enthusiastic. Many of the shops hire security officers in any case, so that a marginal increase in business security expenditures could improve public safety a great deal. This would be a benefit both to the bus-using public and the merchants, shops and businesses involved. However, there may be reluctance by local police departments to change their operating procedures so that policemen are stationed at corners rather than staying in cars.

Moving Bus Stops from Dangerous Locations

Another possibility is altering routes of buses and the stationing of bus stops. At Hollywood Blvd. and Western Ave., for example, it was recommended that the bus stop be moved a block or two away or eliminated altogether. The extra distance that some patrons would be required to walk (others would have a shorter walk) would be more than offset by improved security at the bus stop. The same logic could be applied to other locations. Three obvious arguments could be made against changing bus stops. First, it could be argued that if a bus stop was moved, then the 'crime' would move along with it. Most crimes are coincidental in that an assailant finds a sudden opportunity. Unless the person is a

professional thief, people aren't likely to go out of their way to locate a potential bus stop victim. At Hollywood Blvd. and Western Ave., for example, the southeast corner was safe. The pattern of social exchange and dangerous behavior was localized on the northwest and southwest corners. If the two bus stops at the northwest corner were moved a block away each, there is no reason to believe that the 'street people' at Hollywood Blvd. and Western Ave. would alter their social behavior.

Second, moving a bus stop might alter a bus route or relocate a transfer point, thereby causing confusion to patrons and nearby residents. This would be have to be tested first with several experiments to make the relocation feasible. There are undoubtedly costs to a transit agency. On the other hand, if crime was significantly reduced, thereby making patrons feel safer, the extra cost would be justified. The Los Angeles Police Department told us of a bus stop in south Los Angeles that was moved two blocks; there was a significant drop in crime incidents occurring there.

A third argument against moving bus stops is that it would penalize elderly persons unnecessarily. As shown in Chapter 6, when given the choice between a closer, but poorly lit bus stop and a farther, but better lit one, the vast majority (including the elderly) chose the farther one. Only 28% of the elderly chose the close one. The comparison was for lighting not for a dangerous bus stop. But the results would probably be the same if respondents had been given the choice.

Physical Separation at Crowded Bus Stops

At some bus stops, there is a problem of crowding on sidewalks. As documented at 7th St. and Hill St., the physical positioning of persons waiting for a bus and those passing by create much disorder. It may be necessary to physically separate people waiting for a bus from people passing by. Various shelters could be used. The example given in Appendix C of an adaptation of the New York City bus shelter would be useful in places like downtown Los Angeles. Another arrangement which might provide separation would be 'peninsulas', either protruding into the street or created artificially by physical objects, such as small stone pillars in a circular arrangement which allow people to pass between but which would make it more difficult for petty thieves to escape quickly. The design must be experimented with at a particular site to take into account sidewalk space, variance from the curb, height and other considerations.

Community Outreach Around Dangerous Bus Stops

Another suggestion for improving security around bus stops is to involve persons who work or live near the stop. One could easily

imagine a community-outreach program that involved the local merchants or residents around a dangerous bus stop. For if a bus stop environment is dangerous to persons waiting there, then it will also be dangerous to those who work or live there. Awareness of the bus stop and a willingness to check out 'suspicious' persons hanging around would help to make the bus stop environment 'feel safer'.

Special Outreach for Schools

Schools pose a special, though related, problem. There is clearly a tension that exists between teenagers and elderly in some locations. The observations at Melrose Ave. and Fairfax Ave. highlighted this problem. The Los Angeles Police Department have also told us that crime incidents are higher on blocks around junior high schools and high schools than on blocks farther away. The crimes vary from pranks and petty larcenies to more serious robberies and assaults. It is a problem frequently related to economic and ethnic tensions existing within the schools themselves. Several possibilities could be developed. For one thing, separate buses for students could help to separate youths from adult passengers. This would raise several delicate legal issues about discrimination against teenagers, particularly those in high crime areas. But it would be acknowledging that youths as a collective group differ from these persons as individuals.

A possibly more effective solution could be to create an awareness within the school about the need to protect people at bus stops outside the school. An effective school outreach program could be designed whereby the students are introduced to elderly persons who have been victimized and encouraged to extend support and protection to the elderly in general. If youths are given responsibility for protecting bus stops in front of their school, crimes occurring there might be reduced.

PAYING FOR BUS CRIME PREVENTION PROGRAMS

These suggestions may or may not work. Unless they are tried, it will not be known if they would work or not. However, at any bus stop which happens to be dangerous, something can be done to improve the situation. But solutions have to be unique to bus stops and locales. They all involve costs, some greater than others. Possibly with an economic feasibility examination, many of these suggestions would prove to be too expensive. But cost is always relative. There is a cost for not protecting passengers, too. For victims, there is a personal cost which must be borne. For others, there is a cost in not feeling safe on a bus or in being reluctant to use buses in any case. For the transit system as a whole, fear of using buses by the public translates into reduced ridership and lack of support for improving facilities. As shown in Chapter 6, most respondents are willing to pay for

improved protection for crime, with the majority willing to bear this cost through increased fares. If a transit agency added a few cents to each fare and earmarked the revenues for protective measures, the whole set of suggestions made could be easily financed (plus more). In short, bus crime prevention is a high priority for bus users, and for society as a whole.

SUGGESTIONS FOR FUTURE RESEARCH

There are several areas of research which can build on this study:

1. The first priority is to replicate the results in other cities of the United States. We have argued that there are fundamental faults in transit crime reporting systems based on the Los Angeles survey. Intuitively, such results would be expected to be found in other cities of the United States. However, there is a need to examine this to lend credence to the argument.

2. There is a need to develop a more extensive category system for coding environmental information. There should be the development of a land-use typology which is predictive of transit crimes. Research can be conducted by obtaining more extensive case studies to define a broader range of variables, and testing whether a land-use typology can predict transit crimes.

3. Another issue is to understand the effects of overcrowding on crimes occurring on buses and at crowded bus stops. Research could be done at a macro-level, to model system-wide associations between high passenger loads and crime incidents, and at micro-levels to explore how passenger movements in and around a bus occur.

4. A related area for research would be to understand physical behavior on buses (where people stand, where they sit, etc.). Many crimes appear to occur at the exits where an assailant will grab a woman's purse and run out. Confusion in crowds creates conditions which are conducive for petty thieves. An understanding of the dynamics of passenger movement in a bus would help in designing measures to lessen such crime.

5. There is a need to understand bus drivers' experiences and attitudes about bus crime. Any solution to protect passengers on buses will depend partly on the willingness of drivers to provide aid. An understanding of their experiences, fears and attitudes about their working role is essential in improving their effectiveness in criminal situations.

6. A cost-benefit comparison of different preventive strategies should be conducted. This should try to assess both direct costs (the cost to the transit authority, patrons and taxpayers) and indirect costs (the cost to the society as a whole).

7. Bus crime prevention can also be seen as a social service in which the 'service' is the prevention of a crime. An area of research that needs to be done is to model this service.

8. Another economic area that can be researched is to assess the effects on employment by hiring more local or transit police. Security can be a major employer of people from poor economic backgrounds. By providing more security jobs, the problem of bus crime may be attacked in a multiplying manner.

REFERENCES

1. Andrle, S., B. Barker, and M. Golenberg. (1980). "Security Considerations in the Design and Operation of Transit Stations". Transportation Research Record, #460: 42-45.

2. American Public Transit Association. (1979). Transit Security Guidelines Manual. American Public Transit Association: Washington, D.C., (February).

3. Austin, Thomas L. and Eve S. Buzawa. (1984). "Citizen Perceptions on Mass Transit Crime and its Deterrence: a Case Study". Transportation Quarterly, Vol. 38, No.1, (January): 103-120.

4. Blalock, Hubert M.,Jr. (1979). Social Statistics, Revised 2nd. Edition. McGraw-Hill: New York.

5. Budds, Harry. (1982). "Los Angeles Transit Police: a Unique Agency Taking on Unique Challenges". The Police Chief, (February).

6. Carnegie-Mellon University, Transportation Research Institute. (1975). Security of Patrons on Urban Public Transportation Systems. Transportation Research Institute, Carnegie-Mellon University: Pittsburgh.

7. Chaiken, Jan M., Michael W. Lawless and Keith Stevenson. (1974). The Impact of Police Activity on Crime: Robberies on the New York Subway System. Report R-1424-NYC, The Rand Corp.: Santa Monica, (January).

8. W.G. Cochran. (1963). Sampling Techniques, 2nd. Edition. John Wiley and Sons: New York.

9. Data Sciences, Inc. (1981). 1981 Service Awareness and Transit Ridership Study: Summary Report. Data Sciences: Van Nuys, Ca.

10. Federal Bureau of Investigation. (1983). Uniform Crime Reports for the United States: 1983. U.S. Government Printing Office: Washington, D.C.

11. Feldman, Laurence P. and David B. Vellenga. (1977). The Role of Security in Marketing Urban Mass Transportation. Final Report DOT Contract IL-11-0008. Urban Systems Laboratory, University of Illinois at Chicago Circle: Chicago.

12. Ferrari, Neil D. and Michael F. Trentacoste. (1974). Personal Security on Public Transit. Preliminary Research Report 61. Planning and Research Bureau, New York State Department of Transportation: Albany, N.Y., (May).

13. Groves, R.M. and R.L. Kahn. (1979). Surveys by Telephone: A National Comparison with Personal Interviews. Academic Press: New York.

14. Haines and Co., Inc. (1983). Los Angeles Criss-Cross Directory. Haines and Co.,Inc.: Buena Park, CA.

15. Hargadine, E.O (Mandex, Inc.). (1983). Case Studies of Transit Security on Bus Systems. Final Report DOT Contract OG-0088-83-1, Urban Mass Transportation Administration, U.S. Department of Transportation: Washington, D.C.

16. Hawkins, Walter et al. (1977). Proceedings of Workshop on Methodology for Evaluating the Effectiveness of Transit Crime Reduction Measures in Automated Guideway Transit Systems. National Technical Information Service: Springfield, VA. UMTA-MA-06-0048-77-1, (July).

17. Jacobson, I.D., L.G. Richards, C.T. Seiner, L.A. Hoel, and A. Braden. (1979). AGT System Passenger Security Guidebook. Final Report DOT Contract OG-0048. Urban Mass Transportation Administration, U.S. Department of Transportation: Washington, D.C.

18. Kish, Leslie. (1965). Survey Sampling. J. Wiley: New York.

19. Klein, F. (1980). "The transportation implications of women's fear of assault". In S. Rosenbloom, Women's Travel Issues: Research Needs and Priorities: Conference Proceedings and Papers. U.S. Government Printing Office: Washington, 479-484.

20. Los Angeles Police Department. (1984). Statistical Digest, 1983. Los Angeles Police Department: Los Angeles.

21. Levine, Ned. (1982). "Bus Crime Exposure in Santa Monica: Results of a Survey". Graduate School of Architecture and Urban Planning, UCLA.

22. Metropolitan Washington Council of Governments. (1974). Citizen Safety and Bus Transit. National Technical Information Service: Springfield, VA. PB 237-740/AS, (June).

23. Newman, Oscar. (1972). Defensible Space: Crime Prevention through Urban Design. Macmillan: New York.

24. Olsen, William T. (1973). "Psychological Implication of Public Transportation Service". Transportation Center: Florida State University, (January).

25. Patterson, Arthur H. and Patricia A. Ralston. (1983). Fear of Crime and Fear of Public Transportation Among the Elderly. Urban Mass Transportation Administration, U.S. Department of Transportation: Washington, D.C. Final Report, DOT Contract PA-11-0026, (April).

26. Pearlstein, Adele and Martin Wachs. (1982). "Crime in Public Transit Systems: an Environmental Design Perspective". Transportation, 11, 277-297.

27. Rand, George. (1983). Crime and Environment: An Approach for Los Angeles. Policy Research in Environmental Design. The Urban Innovations Group: Los Angeles.

28. Richards, Larry G. and Lester A. Hoel. (1980). Planning Procedures for Improving Transit Station Security. Final Report DOT Contract)S-50233. Department of Civil Engineering, University of Virginia: Charlottesville, VA.

29. Richards, Larry G. and Ira D. Jacobson. (1980). Passenger Value Structure Model. Final Report DOT Contract TSC-1314. Dunlap and Associates, Inc.: Darien, CT.

30. Richards, L., I. Jacobson, R. Pepler, and R. Bloom. (1980). "Perceived safety and security in transportation systems as determined by the gender of the traveler". In S. Rosenbloom, Women's Travel Issues: Research Needs and Priorities: Conference Proceedings and Papers. U.S. Government Printing Office: Washington, D.C., 441-478.

31. Riley, Norman E. and Donald L. Dean. (1984). Bus Station Security: A Look at Crime in Intercity Bus Stations. California Department of Transportation: Sacramento.

32. Roemer, F. and K. Sinha. (1974). "Personal Security in Buses and its Effects on Ridership in Milwaukee". Transportation Research Record, No.487: 13-25.

33. SAS Institute. (1982). SAS User's Guide: Statistics. SAS Institute: Cary, N.C.

34. Southern California Association of Governments (SCAG). (1976). Transit Safety and Security: A Design Framework. Criminal Justice Planning Department, Southern California Association of Governments: Los Angeles, (April).

35. Southern California Rapid Transit District. (1982a). Loading Data. SCRTD Marketing Department.

36. Southern California Rapid Transit District. (1982b). Yearly Crime Report. SCRTD Transit Police Department.

37. Southern California Rapid Transit District. (1982c). Yearly Crime Report, 1970-1981. SCRTD Transit Police Department.

38. Southern California Rapid Transit District. (1983). Yearly Crime Report. SCRTD Transit Police Department.

39. Southeast Michigan Council of Governments (SEMCOG). (1979). Crime and Security Measures on Public Transportation Systems: A National Overview. Public Safety Division, Southeast Michigan Council of Governments: Detroit, (February).

40. Southeast Michigan Council of Governments (SEMCOG). (1981). Crime and Security Measures on Public Transportation Systems: A National Assessment. Southeast Michigan Council of Governments: Detroit.

41. Southeast Michigan Council of Governments (SEMCOG). (1984). An Analytical Safety and Security Program for Public Transportation in Southeast Michigan. Division of Public Safety, Southeast Michigan Council of Governments: Detroit, (June).

42. Shellow, Robert, James P. Romualdi and Eugene W. Bartel. (1974). "Crime in rapid transit systems: an analysis and a recommended security and surveillance system". Transportation Research Record, 487: 1-12.

43. Stanford Research Institute (SRI). (1970). Reduction of Robberies and Assaults of Bus Drivers. Vol 1. Summary and Conclusions. National Technical Information Service: Springfield, VA. PB-197532, (April).

44. Thrasher, E. and J. Schnell. (1974a). "Scope of Crime and Vandalism on Urban Transit Systems". Transportation Research Record, No. 487: 34-45.

45. Thrasher, E. and J.Schnell. (1974b). "Summary Report on Vandalism and Passenger Security in the Transit Industry". Transportation Research Record, No. 487: 46-54.

46. Tuchfarber, A.J. and W.R. Klecka. (1976). Random Digit Dialing: Lowering the Cost of Victimization Surveys. Police Foundation, University of Cincinnati: Cincinnati.

47. U.S. Census Bureau. (1980). 1980 Census for Los Angeles County . U.S. Census Bureau, U.S. Department of Commerce: Washington, D.C. Summary File Tapes, 1A (1981), 3A (1982).

48. U.S. Census Bureau. (1972). "Who's Home When?", by D. Weber and R.C. Burt. Working Paper No. 37 . U.S. Government Printing Office: Washington, D.C.

49. Wachs, Martin. (1979). Transportation for the Elderly. University of California Press: Berkeley and Los Angeles.