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VEHICULAR NEGLIGENCE: THE SOCIAL AND CRIMINAL PATTERNS OF AUTO TRAFFIC FATALITIES

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Raymond J. Michalowski Jr., B.A., M.A.

* * * * *

The Ohio State University

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CHAPTER I

INTRODUCTION

This research is an exploratory study of the ecological and demographic patterns of fatal motor vehicle accidents in an urban community. Focusing upon traffic accidents as a violent pattern of behavior in our society, this study will attempt to determine if fatal urban traffic accidents, and particularly those related to driver negligence, exhibit ecological and demographic patterns similar to those found in urban crimes. This question is based upon the supposition that social perceptions conducive to conventional crimes of violence may extend to other areas of human behavior, and thus may be operative in the production of negligent traffic accidents. If this supposition is valid the fatal urban traffic accidents studied should demonstrate patterns of distribution and victimization not dissimilar to those of other violent acts.

Although many researchers have argued that the causal sequence leading to accidents is not intrinsically different from those leading to other everyday events (Haddon, 1964), sociological variables frequently considered in the analysis.
of other phenomena have received much less attention in accident research. Traffic accident research can be divided into two broad categories: those studies concerned with the engineering aspects of accidents, and those concerned with the "human element" in accidents. The former is naturally unconcerned with the role of human behavior in the causal sequence leading to accidents, and the latter for the most part has traditionally focused upon psychological characteristics or syndromes such as "accident proneness" which operate beyond the realm of conscious human awareness. As a result, little attention has been given to the traffic accident as a violent type of social behavior, problematic in its consequences and socially influenced in its causation.

As a study of vehicular negligence, this research applies a criminological perspective to the study of traffic accidents. Negligent operation of an automobile, despite its ubiquity, is no less a violation of law than any other form of criminal behavior, and where it results in death or injury it is clearly a violent pattern of behavior. Despite a general reluctance on the part of the police and the public to view traffic law violations as truly criminal behavior, still each year there are several thousand arrests for negligent homicide by vehicle (U.C.R., 1973). Criminologically, the central theses of this research, based on the fact that the negligent fatal accident involves violation of law, are (1) that violation of law is related to social
perceptions favoring criminal behavior and that (2) these perceptions are more prevalent among certain identifiable social groupings.

As a study of the overall urban accident picture, this research will apply a sociological perspective similar to that used in the study of other social problems. An attempt will be made to show that the patterns of distribution and victimization in urban vehicular fatalities are similar to those of urban crime, and that variables related to this problem are also operative in the causal sequence resulting in fatal motor vehicle accidents.

Critical to this research is the perspective that urban traffic accidents do represent a social problem. Insofar as this perspective is a relatively uncommon one in traffic accident research, it is important to understand the rationale for choosing such a perspective, and the reasons why it is an uncommon one, both among researchers and the general public.

The Traffic Accident as a Social Problem

The motor vehicle accident, like pollution, hypertension and ulcers, has become a commonplace by-product of our mechanized way of life. Seldom does a major American city endure a week without at least one traffic fatality (Reese, 1970). Almost never will a daily newspaper, in any city large enough to have one, fail to report at least one
serious-injury accident. Every holiday weekend the news media ritually report and update the increasing death toll, constantly measuring its progress towards the projected total. There are few people who do not know at least one person who has been involved in a serious automobile accident, and the extent of the automobile insurance business is testimony to the likelihood of becoming involved in an automobile mishap of some type. Each time one pays his auto insurance bill he consciously or unconsciously reaffirms the belief that he may become an accident victim or an accident perpetrator. The traffic accident has become a very familiar part of our daily life, so much so that as a nation we have become relatively insensitive to the severity of the problem.

In the short period of 18 years, from 1950 thru 1967, nearly three quarters of a million people died in motor vehicle accidents in the United States (Reese, 1970). The population-based rate increased from 21.5 in 1969 to 27.9 in 1969 - an increase of 30 percent. The increase in the gross number of deaths for the same period was 49 percent. Although the mileage and registration based rates have remained relatively stable since the mid-1950's [the rate per 100,000,000 vehicle miles traveled was 5.41 in 1959 and 5.30 in 1969, with a high of 5.70 being recorded in 1967 and a low of 5.16 in 1961 (National Safety Council, 1970)] and are substantially lower than during the early history of
automotive travel, they do not represent a real lessening or even a stabilising of the actual problem posed by motor vehicle accidents. Although these statistical calculations provide important insights into the nature of the accident problem, they are primarily a measure of the efficiency of travel, not of the actual consequences of it. While particularly valuable in measuring the relative safety of various forms of travel, mileage and vehicle based rates do not reflect the increasing number of violent traffic deaths. While a mileage-based rate of 5.41 may not sound impressive, at the current level of travel it represents over 50,000 deaths a year. These deaths are especially untimely because the majority of people who die in motor vehicle accidents are young persons, the highest death rate characterizing those between 15 and 24 years of age (National Safety Council, 1971).

It should be noted that recent statistics show motor vehicle deaths decreased by 2 percent in 1970 from 1969. There was also a concomitant reduction in the rate-per-population from 27.7 to 26.9, and in the rate-per-mileage from 5.23 to 4.91 (National Safety Council, 1971). This slight reduction in the gross number of motor vehicle deaths and the variously computed death rates occurred despite the fact that the total number of accidents increased by nearly 50,000 in 1970 over 1969. It is reasonable to speculate that the Federal safety standards requiring both seat belts
(1964) and shoulder harnesses (1968) would have some effect on reducing the proportion of accidents which result in fatalities. The reduction in fatality rates in 1970 may reflect these measures, however, it is too early to determine the actual overall effectiveness of such safety measures.

So far we have not considered the number of people who are injured yearly in traffic mishaps. In both 1969 and 1970 approximately 1.3 million people suffered either temporarily or permanently disabling injury due to motor vehicle accidents. The enormous amounts of property damage combined with the great numbers of deaths and injuries make the motor vehicle accident a most significant form of carnage.

Vehicular Accidents as Social Problems

A social problem is any reoccurring pattern of events having negative social consequences. Death, in itself, is not a social problem, but a natural and vital phenomenon. Yet, the normality of death does not extend to preventable or untimely death. It is this preventable aspect which makes us perceive vehicular accidents as a serious social problem in our present day society.

Few would dispute that untimely death is socially undesirable and most would agree that efforts should be made to reduce the number of such occurrences. Personally, locally, and nationally we subscribe to and underwrite a wide variety
of life-protecting efforts, e.g. locks for our doors, police and fire departments, hospitals, food and drug control agencies, etc. Considerable effort has been directed at the reduction of automobile fatalities and accidents, but when compared with the enormity of the accident problem public concern and governmental action appear limited. This seems particularly true if one compares the societal response to the accident situation with the response toward other perceived social problems involving death or injury.

Although it may be inaccurate to claim that the general population accepts the severity of traffic violence with complete equanimity, it is fair to say that the response to this source of life-threat is considerably less vocal and less demanding of amelioration than the response to other perceived social problems. Many of the same individuals who would buy double locks for their doors and demand stricter law-and-order measures from their legislators, actively avoid wearing safety belts when driving or riding in an automobile, or foregoing a drink or two before driving. In this, as with all things, the perception of the problem is the real determinant of action, or, as W.I. Thomas has said, "If men perceive situations as real, then they are real in their consequences." The motor vehicle accident, although it represents a significant source of violent death and injury in our society, does not receive as much societal attention as do other perceived social problems, some of which
are much less severe in numerical and social cost accounting terms. The motor vehicle accident, the most common form of violence in our society, is not generally perceived as a high priority social problem, despite the fear of violence in the society. It is, therefore, worthwhile to investigate the nature of, and the reasons for this selective perception.

Crimes of violence are considered by the American people to be the most serious problem facing the society. Numerous public opinion polls during the 1972 election campaign found this to be the case and prior to the ascendency of crime to the number one spot, the Indochina war was considered the most serious problem facing the nation. Yet while 17,630 persons were murdered criminally in the United States during 1971 (Uniform Crime Reports, 1972), over 55,000 persons died in automobile accidents during the same year (National Safety Council, 1972). Stated in more personal terms, an individual's chances of dying in an automobile accident are more than three times his chances of being murdered. Another example of the low priority accorded automobile accidents is provided by the Indochina war. A considerable amount of attention and vocal opposition was directed against this war, particularly once American involvement and American casualties rose sharply after the 1964 Gulf of Tonkin resolution. However, the 55,000 motor vehicle casualties which occurred in the United States during 1971 alone exceeded the total number of American combat
fatalities in Vietnam by more than 10,000.

In terms of the consequences, death is an absolute; there are no degrees of dead. Why then is death by a foreign bullet more critical than death by a domestic automobile? Why is death at the hands of a murderer more socially problematic than dying as the result of some driver's negligence? Why is one form of violence more critical than another? Whether a person dies in war, in an automobile or at the hands of an assailant, the effects upon those who knew and depended upon the deceased, whether for financial or emotional support, or both, are essentially the same. It would seem that all forms of violent and untimely death should be viewed as serious problems, distinguished in severity by the degree to which one form of death exceeded another. Yet this is clearly not the case, for the automobile fatality, which is by any standard, the most extensive form of violent death, is perceived as a low priority social problem.

The reason for this lies in the fact that it is not the resultant number of deaths, but the mode of dying which is relevant in determining whether any given category of death is more socially problematic than any other. Whether or not a particular mode of death is perceived as a social problem is related to two factors: (1) the perceived deviance attached to that mode of dying, and (2) the inevitability of that mode of dying.
The concept of a social problem, although not synonymous with the concept of deviance, is closely related to it. Deviance is behavior which violates the conduct norms of a group, or at the societal level, of that group with sufficient power to define normative conduct for all the various sub-groups within the society (Quinney, 1970). Social problems, for the most part, represent behavior in violation of conduct norms. That is, "normal" behavior is seldom viewed as problematic by society. However, it is not all behavior in violation of stated conduct norms which is viewed as socially problematic - only those behaviors in violation of the operative behavioral norms established within the group or society. Many forms of behavior, normally defined as deviant, may in fact be quite acceptable within the group or society defining them as deviant (Dinitz et. al., 1969).

"It is, therefore, the social reaction toward various forms of deviant behavior, which informs us of the social perception of that behavior. If one reverses Blumer's (1969) axiom that "men act towards objects on the basis of the meaning they ascribe to those objects," it becomes apparent that one can best know the meaning ascribed to various social objects by observing the behavior directed toward them. Action against a behavior, not its proscription, is the best measure of the degree to which any behavior is viewed as problematic within the group. The more a behavior is perceived as deviant and socially problematic, the
greater will be the social control efforts directed to preventing and controlling that behavior.

The degree to which any deviant behavior is common within a group is inversely proportional to the strength of that group's reaction against such behavior. If, as Erikson suggests (1966), the enforcement of conduct norms functions to define the boundaries between legitimate and unacceptable behavior within a group, no society can afford to enforce stated conduct norms which would result in labeling the majority, or even a significant minority, of its population as deviant. Numerous patterns of behavior, in contradiction to stated norms, become regularized within any group and even contribute to the functioning of that group as constituted at that time. Thus, "normal" deviance becomes acceptable and little stigma is attached to it despite formal legal norms and statements to the contrary.

Thus, there exists a distinction between "normal" deviance (behavior contrary to stated conduct norms, but so common as to evoke little norm enforcement) and "abnormal" deviance (behavior sufficiently rare to allow strict norm enforcement). This distinction becomes more complex when one considers two other factors: (1) this distinction is not dichotomous, but rather represents a continuum from more to less normal, and (2) the normalcy of any particular behavior will vary depending upon the group surveyed. The first factor suggests that the social perception of these
behaviors is relative to other behaviors. The second factor suggests that the perceived seriousness of any behavior, and thus the strength of the reaction against it, is a function of the group under study. Murder, for example, violates the stated conduct norms of all subgroups in American society. However, as Wolfgang and Ferracuti (1967) have demonstrated, this behavior is more normal, and thus viewed as less of a social problem, among certain groups than for others. Therefore, one must assume that other behaviors will be subject to similar, and even wider variations in group perceptions.

Yet another variable crucial in determining whether or not a particular mode of dying will be viewed as socially problematic is the inevitability attached to that particular type of death. The degree to which a given event or condition is perceived as inevitable is generally a good measure of the social response that event will evoke. Human beings do not characteristically struggle against those factors or conditions perceived as inevitable. Only when a degree of control is perceived possible do individuals struggle to attain this control. The unwillingness to struggle with the inevitable becomes a critical variable in the framing of social problems within any society.

The traffic accident, in contrast to murder or aggravated assault, is less of a perceived social problem, measured by the strength of social reaction because the context
in which it occurs is defined as the more normal. The traffic accident itself is not a criminal occurrence. However, according to the National Safety Council's figures (1971) over 82% of all traffic deaths involve criminal negligence, making the traffic fatality as nearly a uniformly criminal occurrence as murder. Like white collar crime, however, traffic accidents occur during the performance of normal, everyday activities (Sutherland, 1949).

In 1971 over 80% of all American households possessed at least one car, and over half of the nation's population were licensed automobile drivers (Automobile Manufacturers Association, 1970). This leaves very few people who are physically capable, and of legal driving age, who do not drive. In addition, the violation of traffic regulations is only a slightly less ubiquitous phenomenon than driving itself. Thus, the negligent operation of an automobile, the behavior from which traffic fatalities generally arise is a common, acceptable and normal behavior in our society. This correspondence with normal behavior results in a failure to perceive the automotive negligence as criminal behavior and a reluctance to initiate strong social control measures against it.

In contrast, killing of another, when defined as murder, is an inherently illegal phenomenon, and more importantly, the context in which it arises is defined as not being within the realm of normal everyday activity. Murder
is most commonly the culmination of some altercation or verbal hostility, just as the traffic fatality is frequently the culmination of the negligent operation of the motor vehicle. The hostilities leading to murder, however, are perceived as an abnormal form of deviance, particularly by those with the power to define law, while the antecedents to traffic fatalities are not. Therefore, murder is socially perceived and defined as the far more serious and threatening problem. Interestingly enough, the behaviors leading to murder, particularly the simple verbal exchanges between victim and perpetrator, are not necessarily illegal, while the negligent driving resulting in a fatality is always illegal. This suggests anew that it is not the formal definition, but the informal conduct norms which determine the perception of any behavior as problematic or not, even if both behaviors may have equally violent conclusions.

When comparing behaviors which may have undesirable consequences, it is also important to consider the relative social utility of behavior sets as well as their degree of perceived normalcy. The former plays a significant role in determining the latter. In a society oriented toward efficiency, speed and technological advancement, the motor vehicle is a transportation godsend. Over 90% of all intercity travel is by motor vehicle (Automobile Manufacturers Association, 1970). This represents a critical flow of men, materials and machinery necessary to keep a technocracy in
operation. In addition, the automotive industry itself is a mainstay of the American economy. Thus, the motor vehicle, perceived as a positive good in itself, is also seen as a crucial element in achieving other socially defined goals. It is for this reason we are too willing to tolerate and accept the automobile and its consequences. On the other hand, a society which strongly desires at least the form of social and domestic tranquility will inevitably view social hostility, the antecedent of murder, as having no utilitarian contribution whatsoever. This further tips the scales of social control away from the motor vehicle accident and towards violent crimes, even when the undesirable violent consequences of the former may exceed the latter.

The question of inevitability, as previously mentioned, also plays its part in making violent crimes appear to be the more serious social problem. The very fact that violent crimes are crimes and traffic accidents are accidents indicates the differential perceived inevitability of the two phenomena: Crimes are the result of willful human behavior and are therefore, controllable. Accidents are almost acts of God and thus are uncontrollable. The motor vehicle accident, while not perceived solely as an act of God, is seen as the result of an uncontrollable series of singularly harmless events, while the crime is the result of deliberate behavior directed toward that end.

Here the concept of mens rea plays an important role in
determining the societal response to these two types of occurrences. Crimes involve mens rea, and therefore within our perceptual framework it becomes legitimate to direct stringent social control measures against those who commit them. The accident, even the clearly negligent homicide by vehicle, does not directly involve specific mens rea regarding the outcome. Individuals may speed, or violate some other traffic law with premeditation, but it is safe to say that with the exception of the vehicular suicide, drivers seldom premeditate accidents. Thus, the accident is seen to pass further out of the realm of controllable behavior, even though the severity of the accident problem would seem to warrant more active control efforts. Human beings do not seek to alter the inevitable, and the degree to which automobile accidents are perceived as inevitable results in an equivalent reduction in efforts to control them.

In sum automobile accidents are perceived as (1) arising from "normal" deviance, (2) related to socially utilitarian behavior and (3) being inevitable. Murder and violent crimes, on the other hand, are perceived as (1) arising from "abnormal" deviance, (2) related to behavior which has no social utility and (3) being anything but inevitable. It is these distinctions which account for the active social support to suppress violent crimes, and the frequent social resistance to measures to control traffic accidents and lessen the number of fatalities.
Significance of the Research

Since the late 1950's there has been a growing interest in research concerned with specific types of crimes and criminal offenders. This research has provided significant and useful knowledge about a number of specific criminal categories such as homicide (Wolfgang, 1958), forcible rape (Amir, 1965), aggravated assault (Pittman and Handy, 1964), child molesting (McCaghy, 1967) and robbery (Conklin, 1972). The U.S. Department of Justice has also published a volume detailing the patterns of robbery in the United States (1971).

The utility of such research is multifaceted. First, this focus on specific categories of offenders, rather than the general category of criminal, can provide much more specific information about persons with the greatest propensity to commit certain types of crimes. By identifying specific target groups of offenders, such information has utility for both the police and the courts in their attempts to control and prevent, criminal activity. Additionally, this focus can be useful to legal agencies and legislative policymakers in their attempts to develop overall programs for the control of crime. This last point is of particular importance in the matter of negligent driving behavior. The passage of the habitual offender driving statute in the State of Ohio in 1972 brings to 20 the number of states with such laws. These statutes call for the mandatory suspension of
driver's licenses, either temporary or permanent, once an individual has exceeded a set number of points computed on the basis of traffic citations, accidents caused, or both. Research of the type proposed here can provide valuable input for the effective enforcement of statutory controls over negligent driving behavior.

Second, the focus on specific criminal occurrences, tends to highlight situational factors influencing the commission of crimes and the effect of victim-offender relationships upon the course of a particular criminal event. Again, such knowledge can be very useful to both courts and legislatures in determining differential penal sanctions for various classes of offenders, and to police in both investigative work and the allocation of men and resources.

Third, such research can provide useful information regarding the role of the police in affixing a specific legal label to a criminal event.

Finally, those responsible for correctional programs can begin to differentiate the recidivism potential among various classes of offenders, and more accurately assess the various behavior problems each group may present.

The perceived normalcy of traffic accidents and negligent driving has stymied research into the problem of the negligence-related automobile accident. Indeed, there has been little sociological research into the overall problem of traffic accidents. By viewing the motor vehicle accident
as a social problem and the negligent accident as criminal behavior, this study will bring both a criminological and sociological focus to the study of traffic accidents. As a social problem, accidents must be seen in the context of a complex set of interactions between socio-cultural and environmental variables, rather than as the product of any one factor such as alcohol, inclement weather, faulty roads, automobile construction inadequacies or psychological abnormality. As a criminal problem, the negligent accident must be investigated to determine the social patterns characteristic of this deviant behavior. As already noted over 80 percent of all motor vehicle fatalities involve some form of driver negligence.

We are not concerned here with the perceived seriousness of the deviance involved in traffic accidents, but only its simple occurrence. A barroom argument or a severe domestic quarrel is generally perceived as more serious deviant behavior than failing to yield at a red light or stop sign. But both are deviant behaviors, and both may have fatal outcomes. For this reason it is both legitimate and significant to apply a criminological perspective to the study of motor vehicle accidents. Particular attention will be given to determining the extent that negligent automobile accidents exhibit similar patterns to other forms of violent behavior. Ecological and demographic distributions will be compared with known distributions for other crimes.
Particular attention will be given to evaluating the degree of similarity between negligent drivers involved in accidents and other violent offenders.

Investigation of the motor vehicle accident from this perspective can make the following significant contributions to our knowledge about the accident problem:

1. By integrating a broad range of socio-cultural and environmental variables this study will hopefully provide a clearer picture of the urban accident problem than is currently available. The bulk of past research has focused upon specific aspects of the problem rather than the overall pattern of traffic accidents.

2. This study will determine the degree to which urban traffic accidents are similar in ecological and demographic distribution to other urban social problems. To date, discussion of urban social problems have not included the motor vehicle accident as a significant part of the pattern of disruption.

3. This study will provide a better description of the negligent driver than is currently available. With the exception of psychologically oriented studies of the drinking and the "accident prone" driver, little is known about the negligent driver as a criminal or quasi-criminal type. For many years insurance companies have identified those groups
with the greatest liability to have motor vehicle accidents. Yet, it is not known whether the negligent driver, as opposed to the artless or careless driver, possesses social characteristics similar to those of other high risk drivers. Such information, as previously mentioned, can be a particular utility in the formulation of "habitual offender" statutes.

4. By focusing on the negligent driver it may be possible to determine to what extent such behavior correlates with a tendency toward law violations of other types, and whether negligent driving is another manifestation of what has been identified as a "subculture of violence" (Wolfgang and Ferracuti, 1967). This aspect is of particular importance since many writers have suggested that the known demographic distributions for conventional crimes is a function of police discretion. Insofar as the actual occurrence of a motor vehicle accident is unrelated to police discretion, and the measures of negligence used by police are in many cases objective (percent blood alcohol, skid marks, etc.) this research will provide greater control for the variable of police discretion than investigations of more conventional crimes.

5. This study will provide information about those
particular circumstances which may influence the occurrence of negligent auto death and injury. Numerous authors have indicated that a multitude of factors combine in the production of an automobile accident and strongly influence the nature of its outcome. Since accidents involving negligence are generally subsumed under the broader category of accidents, it is not known if the circumstances surrounding negligence-related accidents differ from those where no driver negligence has been detected.

Review of the Literature

While there has been little concern with the phenomenon of accidents in the field of sociology, other disciplines, particularly psychology, medicine and engineering have produced a rather large body of research in this substantive area. Within these broad disciplines accident research has taken a number of divergent paths, all of which forces a certain degree of eclecticism upon anyone interested in accident research. This eclecticism, although beneficial for general understanding of the accident phenomenon, makes organized presentation of the material and concepts somewhat difficult. In an attempt to avoid some of the confusion inherent in a purely eclectic presentation of the literature, past research efforts will be grouped into sub-categories. These sub-categories represent various approaches to the
phenomenon of accidents, each dealing with a somewhat different aspect of the problem. Within these groups the research will be presented chronologically, and where a particular research endeavor has made significant contributions in several areas, it will appear in more than one group.

**Early Research and Accident Proneness**

Early research into the phenomenon of accidents centered around the concept of "accident proneness," the basic principle of which implies "that even when exposed to the same conditions some people are inherently more likely to have more accidents than others — or, in other words, that people differ fundamentally in their innate propensity for accidents" (Shaw and Sichel, 1971). The initial research in this vein was directed not toward road accidents, but work accidents, and the approach was not etiological, but rather an attempt to statistically determine the validity of the "accident proneness" concept.

The first two studies of this nature were conducted by Greenwood, Woods, and Yule (1919,1920). The project itself was a study of minor injury accidents suffered by workers in munitions factories in England during World War I. Its purpose was utilitarian rather than purely scientific. The researchers sought to determine a means of reducing work time lost due to such accidents and thereby increasing the production of shells for the war effort. Using a purely
statistical approach they compared the distribution of accidents among several groups of workers during single periods of time with the distribution expected if one of the following models were operative: (1) a chance distribution, (2) a distribution based on unequal liability and (3) a biased distribution where the occurrence of the first accident altered the probability of having subsequent accidents. The researchers found that the best statistical fit was provided by the negative binomial distribution - a theoretical model calculated on the assumption of unequal initial liability to accidents. From that point on, the negative binomial distribution became the crucial statistic upon which the concept of "accident proneness" was to rest for a long time to come. The researchers themselves, relatively certain that they had demonstrated the existence of unequal initial liability to accidents suggested that the factories establish a program of retraining, disciplining or removing those workers with an undue propensity to have accidents. They also suggested a general upgrading of working conditions and safety standards.

Shortly thereafter, Newbold (1926) attempted to replicate the findings of Greenwood, et. al., using a somewhat more sophisticated research approach. Unlike the previous work, Newbold's study included workers engaged in the production of a broad range of products rather than simply one type of item. More importantly, this research controlled
for a number of intervening variables: eagerness in reporting accidents, age, experience, poor health, and varying exposure to hazards. Despite the inclusion of these control variables he found accident rates indicative of unequal initial liability as suggested by the negative bi-nomial distribution. Although rates varied for different hazards, there was a significant difference in accident rates among individuals exposed to the same hazards. Perhaps the most important contribution of Newbold's study was his inclusion of exposure to hazards as a control variable. This variable then became a permanent part of accident proneness research, and whether or not this variable was adequately controlled became a crucial element in the discourse between accident proneness researchers.

With the concept of accident proneness now firmly established researchers began to direct their attention to the etiology of the phenomenon. The work of Vitles (1932) was a significant contribution on the etiology of accident proneness. His study of accident proneness among electric car motormen extended such research to transportation accidents. After identifying those motormen whose records indicated they were accident prone, he attempted to determine the causes of their proneness through extensive investigation into their physical, psychological and perceptual capabilities. The importance of this investigation was the identification of a multifactor influence upon accident occurrence. In no two
cases was the cause of accident proneness the same, and, generally, several causal factors were identifiable. Additionally it was found that no single variable was sufficient to explain the incidence of accident proneness. Among the causes identified, physical defects were found to be important in 12 percent of the cases; improper mental attitude or personality maladjustment was the primary cause in 22 percent of the cases, and in the remaining 66 percent operating defects, such as failure to recognize potential hazards, incorrect judgement of speed, and improper allocation of attention were found to be the primary elements of accident proneness.

The pioneering work of Vitles in the etiology of accident proneness also focused upon the existence of psychological and perceptual factors which could influence an individual's proneness to accidents. This focus produced a long period of investigation into accident proneness dominated by psychologists and psychiatrists attempting to identify the significant personality characteristics associated with accident proneness.

The work of Farmer and Chambers (1939) represents one of the most influential attempts to solidify the theory that accident proneness was a stable personality characteristic. Feeling that "accident proneness is no longer a theory but an established fact," they attempted to demonstrate that unequal liability could be linked to significant differences
in personality between the accident-free and the accident-prone individuals. Using motor vehicle accident records for bus and trolley drivers in England, Farmer and Chambers again demonstrated that there existed an unequal liability to accidents among those engaged in a similar occupation. Unlike Newbold however, they failed to draw a sample adequately controlled for exposure to hazards. Although the entire sample consisted of professional drivers, no attempt was made to control the differential exposure to hazards inherent in driving different routes. However, once they established that accidents did not distribute themselves randomly among their samples, they proceeded to administer psychological tests to accident-prone and accident-free groups to identify personality characteristics which would explain the observed difference in accident rates. Aesthetokinetic tests, linguistic intelligence tests, and mechanical aptitude tests were administered in the search for significant personality differences. Significant differences between mean accident rates and test scores were found for only one out of five groups tested, and these differences were on the aesthetokinetic tests only.

Despite these limited results the researchers went far beyond their data in presenting their conclusions. Their findings hardly warrant the conclusion that "Accident proneness was shown to manifest itself in all kinds of accidents and throughout all conditions of exposure" and that this
fact is explained by the existence of stable psychological characteristics which manifest themselves during all periods of exposure. Yet, the aesthetokinetic tests, the only battery which proved significant, and then only for one group, can hardly be called personality tests. Rather than present the negative conclusions suggested by the intelligence and perseveration tests, however, the authors expressed dissatisfaction with these tests, suggesting that other forms of these tests would likely yield positive findings. Nevertheless, the conclusions of Farmer and Chambers were well received and contributed to a strong belief in the psychological nature of accident proneness. Their conclusions were accepted at face value and widely quoted, beginning a long period of uncritical use of the proneness concept.

...by the early 1940's such a pleasurable degree of levitation had been achieved that for many years the thinking of accident proneness floated around on a balmy cloud of euphoria, blissfully unconcerned with the gravitational pull of reality...Research on accident proneness became the vogue, with few people bothering to make any further serious attempts to find out whether it really existed, and if so what contribution it made to the total accident picture (Shaw and Sichel, 1970, p. 37).

As subsequent research into the personality characteristics of the accident prone began to produce contradictory and confusing findings, the personality theory of accident proneness advanced by Farmer and Chambers lost its allure for accident researchers.
At the same time, in the United States, Cobb (1938, 1939) published the results of his statistical analysis of the driving records of 29,531 drivers licensed in the State of Connecticut for the six year period from 1931 to 1936 inclusive. His findings also indicated that the distribution of automobile accidents differed significantly from chance, with the distribution being in the shape of a \( J \) curve - a large group of drivers with no, or only one, accident, and a long tail of multiple accident offenders. Cobb found that 4% of the multiple offenders were responsible for 36% of the accidents. However, rather than focusing upon this fact alone he demonstrated that there also existed a large intermediate class of drivers who were responsible for the bulk of the accidents. This represented a significant modification of the accident proneness concept. Rather than suggesting that accident proneness was operative in all accidents as did Farmer and Chambers, Cobb identified the accident prone as only a minority of the accident offenders and clearly not responsible for the total accident problem. Instead, he concluded that accident perpetrators comprised three distinct groups:

1. the great bulk of drivers whose individual accident expectancy is slight, but whose numbers are so vast that they roll up an appalling casualty toll.

2. the high accident or accident prone group; small in number but mighty in deed.
3. youthful drivers, whose mishaps far outrun their proportion in the driving population.

His distinction between the accident prone and the one-time accident offenders lessened the significance of accident proneness as an explanation for what was at that time a growing accident problem. Equally important, his identification of youthful accident offenders as a separate group indicated that accident proneness was in many instances the result of transient, rather than stable personality characteristics as Farmer and Chambers and their followers believed. Cobb himself, however, was most interested in the accident prone driver, and his description of them as "small in number, but mighty in deed" was wholeheartedly accepted by accident researchers and became the watchword for numerous state and Federal programs designed to lessen the accident problem.

The stress which Cobb placed upon the accident prone driver as a significant element in the accident problem was strongly criticised by Forbes (1939) in an article which presented a re-analysis of a portion of Cobb's data. This article which claimed that the contribution of accident prone drivers to the overall accident picture was negligible received little attention due to the general acceptance of the proneness concept at that time. Using Cobb's own 3x3 figure for the Connecticut data he calculated the effect of
eliminating the people who were accident prone during the first time period upon the accident rate of the second period. He found that of the 398 drivers (1.3 percent) prone in the first period, only 23 were prone in the second period. Thus, removing those who were prone in the first period would have reduced the accident rate of the second time period by only 3.7 percent. Since the normal (non-prone) driver constituted 98.7% of the driving population and contributed 96.3 percent of the accidents, Forbes concluded that the effect of accident proneness was more apparent than real.

It thus becomes obvious that for the purpose of traffic design and control we are more interested in the ordinary driver than the accident prone driver. Although the selection and elimination of the small group which may be truly accident-prone is desirable, nevertheless, in order to attack the bulk of the accident problem and the problem of providing highways and traffic facilities which are efficient, we must consider essentially the ability of the majority of 'normal' motorists. This applies to all attacks upon the problem whether engineering, education or enforcement.

The question of how two presentations, Cobb's and Forbes's, based upon the same data can result in such widely divergent conclusions about the nature of the problem, highlights what remains a critical problem in comparing various research efforts into accident proneness. This problem is the lack of uniform accident proneness criteria. The number of accidents required to identify a person as accident prone
has varied widely, making valid comparison of research findings difficult, and conclusions reached through such comparisons dubious. Thus, Cobb considered a driver prone if his accident rate was anywhere from three to eight times that of the group he was drawn from. Forbes, on the other hand, divided the drivers into two discrete groups with an accident rate sixteen times that of the normal group as the criterion for inclusion in the prone group. Thus Cobbs concludes that the prone driver is responsible for 36% of the accidents while Forbes considers their contribution to the accident problem negligible. Unfortunately, since Forbes' article was for the most part ignored since it was outside of the mainstream of belief at that time, the very real problem of the lack of a uniform proneness criterion was never addressed.

With the coming of World War II accident research diminished considerably, and it was not until the work of Tillman and Hobbs (1949) that rekindled interest in the etiology of accident proneness produced a significant research endeavor. Like Farmer and Chambers, Tillman and Hobbs attempted to demonstrate that accident proneness was related to stable, and inherent personality factors. Their measures of personality, however, differed considerably from the earlier study. For each driver in their sample of 40 Canadian taxidrivers - 20 with high accident records and 20 with low accident records - a personal history covering
parental background, childhood, adolescent history, and subsequent adult adjustment was obtained through personal interview and informal interaction. In addition, information regarding drivers sampled was obtained from the police, Juvenile Court and other social agencies. After comparing both groups on the information obtained from the informal interview and the social agencies, the researchers concluded that the high accident group came more frequently from unstable homes, had more difficulty in establishing stable school and work records, more frequently had police records for non-traffic offenses and were more frequently known to social agencies than the low accident group. This led them to say that:

The high and low accident groups differ markedly in their personality characteristics. The high accident group shows marked intolerance for, and aggression against, any authority, dating from early childhood. The origin of this aggressiveness is to be found in an unstable home background. In many instances this personality feature shows up in antisocial behavior in the individual's life history.

This conclusion, like that of Farmer and Chambers, favors the initial hypothesis, but fails to question the validity of the research instrument. There is some doubt whether one can adequately determine an individual's personality from his past experiences and behaviors alone, and there is even greater doubt concerning whether one can assume past behaviors to represent "stable, inherent personality factors."
Undoubtedly, Tillman and Hobbs provided valuable information concerning the divergent behavioral histories of high and low accident individuals. More important, in their concluding remarks the researchers observed that, "Truly it may be said that a man drives as he lives," and it is this conclusion which best reflects their data.

Several years after the work of Tillman and Hobbs, Arbous and Kerrich (1951) delivered a decisive, well-reasoned critique of the accident proneness concept. Although their intention was to make accident proneness a scientifically useful and valid concept by correcting the faulty logic and methodologies connected with it (Arbous and Kerrich, 1971), there were some who felt that this article should have ended accident proneness research entirely (Haddon, 1964). Arbous and Kerrich's criticisms of the accident proneness concept centered around three elements of work in the area: (1) the lack of conceptual clarity, (2) the doubtful validity of accidents as a measure of the concept of accident proneness and (3) the indiscriminate usage of the concept to explain all cases of accident repetition although such generalization was unwarranted.

The authors felt that the lack of conceptual clarity in accident proneness research sprang from a failure to clearly draw and maintain the distinction between accident proneness and accident liability; where accident proneness refers to "personal idiosyncrasies predisposing the individual who
possesses them to a relatively high accident rate," and accident liability includes all the factors affecting the accident rate, both environmental and personal. This distinction, although noted by previous accident proneness researchers, was generally ignored in the construction of theories of accident proneness and methodologies to test these theories. As a result it became impossible to determine whether research employing number of accident events as a criterion were measuring a stable personal characteristic, or the interaction between such a personal characteristic and the environment in which the individual was located, i.e., whether they were measuring "proneness" or "liability." In failing to make this distinction, researchers implied that proneness was an inherent, stable personality characteristic which manifests itself with equal consistency despite alterations in both time and situation. Arbous and Kerrich strongly criticise this assumption, demonstrating that there is little evidence to suggest that an individual's predisposition to have accidents remains the same in all situations, and does not alter from one time period to another.

The authors also levy strong criticism against the lack of correspondence between the concept of "proneness" and the previously used measures of it. Defining an accident as "...an unplanned event, which, being the result of some non-adjustive act on the part of the individual (variously
caused), may or may not result in injury," they excoriate the use of injury-producing accident events alone as the measure of proneness. This, they feel, is a measure of the outcome of, not the propensity to, accident causing behavior. This cannot be considered a true measure of an individual's proneness nor does it consider the interactions between a propensity to have accidents and other personal and environmental factors which may modify the outcome of such a propensity. For example, a highly accident prone but skilled driver may have many near misses, but few accidents while a moderately prone but unskilled driver will turn every near-miss into an accident. Arbous and Kerrich suggest that any effective measure of accident proneness as a solely personal characteristic must include, (1) all errors, slips and near accidents, (2) all minor injury producing accidents, (3) all accidents producing major injuries and (4) all death producing accidents. However, with the exception of constructed laboratory experiments, reliable data for the first two categories is nearly impossible to obtain, making the concept of accident proneness of limited value except at a clinical level.

Finally, Arbous and Kerrich call for a more balanced approach to the question of accident causation saying, "Surely the essence of accident causation is the rather intricate interrelationship which exists between the individual and the environment, and the influences of one cannot be
appreciated without considering its interaction with the other."

Although it is impossible to measure the impact of the Arbous and Kerrich article, the extended use of the accidental proneness concept in research prior to their criticism of it, and the limited use of it after their publication, along with the fact that subsequent research in the area of accident proneness led to much more cautious conclusions, suggests that their work marks a critical point in accident proneness research. Adelstein's (1952) study of shunters accidents led him to conclude that due to the low correlation found between accident proneness and types of accidents, proneness did not operate under all circumstances. Like Arbous and Kerrich he rejects the idea that "...each person had a fixed degree of accident proneness in all situations," and points to some factors inevitably effecting one's degree of proneness such as age, exposure and experience. Presumably too, different character traits may be associated with different types of accidents such as personal injury versus property damage.

In a slightly different vein, McFarland (1954) attempted to corroborate Tillman's finding that "a man drives as he lives" while controlling for exposure to hazards. Using a sample of truck drivers, McFarland was able to control for amount of time driving and nature of the routes driven, which Tillman and Hobbs were unable to do with their
sample of taxi drivers. McFarland found that accident repeaters had more driving offenses, both on and off the job, that these offenses were for more serious violations such as speeding and reckless operation, and that they tended to have more private accidents than the non-repeaters. The repeaters were also found to be more frequently known to the court for non-driving offenses, particularly those of assault, rape, weapons and drunkenness. Reflecting the cautions of Arbous and Kerrich, McFarland also concluded that although his findings provided valuable information about the behavioral patterns of accident repeaters there was no empirical substantiation for the view that the susceptibility to accidents of one kind was a clear indicator of susceptibility to accidents of all kinds (McFarland and Moore, 1955).

Conger (1957, 1959) attempted to identify personality characteristics associated with accident repeating behavior by administering a wide variety of psychological and psychophysical tests to 264 young drivers and comparing these results with a criterion of high, middle and low accident involvement. This research, although similar in form to that of Farmer and Chamber, represents a crucial divergence from the earlier endeavor. While Farmer and Chambers assumed accident proneness to be a stable psychological characteristic in itself, Conger sought to identify characteristics which correlated with the behavior of accident
repeating but did not assume that proneness was itself a personality characteristic. Most of the measures used by Conger failed to discriminate between high and low accident involvement. The individual's value system measured by three scales of a modified Vernon-Lindzey scale proved to be the only consistently stable measure. In 73 percent of the cases this measure was found to accurately discriminate the high and low accident groups. The high accident subjects were consistently less oriented towards religious values, and more oriented towards aesthetic and theoretical values than the non-accident group. To derive a clearer understanding, Conger began an intensive clinical evaluation of ten high-accident and ten no-accident subjects. Using a psychiatric interview, projective tests, intelligence tests, and tests for respiration, muscle tension, and galvanic skin response, he rated the subjects on thirteen factors hypothesized to be relevant to accident frequency and severity. Of these, the high accident subjects were found to differ significantly on 5 factors. They tended to: (1) have less capacity for managing or controlling hostility, (2) be excessively self-centered and indifferent to the rights of others or excessively sociocentric, (3) be excessively occupied with fantasy satisfactions rather than stimulus bound ones, (4) be fearful of loss of love and support and (5) be less able to tolerate tension without discharging it immediately.
Conger's findings, although of a psychological rather than a behavioral nature, would seem to corroborate the conclusions of Tillman and Hobbs and of McFarland. However, one must be cautious when interpreting Conger's findings, particularly in light of the fact that factor (1) appears to be no more than a subcategory of factor (5), and that factor (2) above refers to two diametrically opposed characteristics as correlating with high accident behavior. Although not clear from the findings, it may be the case that it is not the substantive traits which correlate with high accident involvement, but rather the tendency to excess in these traits. This tendency toward excessiveness, on the other hand, may be related to some other characteristics not included in the evaluation. In a research of this type it would be important to determine the interaction among variables. To what degree do these qualities represent discrete types of characteristics? Is it specific characteristics, or their additive effect which correlates with high accident involvement? Also lacking is a consideration of antecedent variables which may explain the existence of the intervening qualities or traits found to be correlated with accident involvement.

A rather extensive Finnish study (Hakkinen, 1958) also attempted, like Conger, to identify psychological variables associated with accident proneness. This study, however, investigated the possibility of using psychological tests
to identify various levels of accident proneness. This attempt to investigate accident proneness as a continuous rather than a dichotomous variable relied more heavily on an experimental rather than a clinical approach. Tests were administered covering attention, involuntary control of motor function, stability of behavior, co-ordination, simple reaction time, and intelligence. The attention factor was found to have the highest loading on the accident criteria (the ability to choose and perform the correct response when presented with a sudden stimulus), and involuntary control of motor function had the second highest factor loading. Accident rates also correlated highly with lack of control in the forms of hastiness, distractability and motor restlessness. Stability and adaptability of behavior also had a relatively high loading. Simple reaction time and intelligence were found to have no association with the accident criterion. Hakkinen therefore concluded that accident proneness was indeed a valid concept. However, he rejected the idea that this potential was operative in all circumstances and that proneness was a stable factor in the individual's personality over time. Instead, he posited three categories of factors comprising the accident proneness syndrome, (1) constant factors which remain relatively stable over time, (2) factors which change slowly with the passage of time such as experience and exposure, and (3) temporary, fluctuating factors such as illness, fatigue,
depression or excitement.

Hakkinen's research represents a significant modification in the concept of accident proneness for several reasons. First, it operationally defined accident proneness, which up to that time had been considered a dichotomous variable, as a continuous variable making possible clearer explanation of the wide variability in the accident rates of individuals similarly exposed to hazards. Second, it directly addressed the question of the stability of accident proneness as a personality characteristic by defining proneness as a syndrome composed of factors having varying degrees of stability, rather than as a unit of characteristic. Such an approach allows the usage of accident proneness as a concept without demanding that it be consistent over time and operative in all situations in which the individual became involved. Thus Hakkinen suggests that individuals can vary from one another in the degree of their propensity to have accidents, in the type of accidents which they have a propensity for, and that within any individuals these propensities can alter over time.

In the 1960's there began a shift away from the driver as the focus for accident research and an increasing emphasis upon road and automobile engineering as the crucial causal factors in accidents. This particularly strong in America shift is observed by Goen (1968) in an article entitled, "Is the Driver Traffic's Forgotten Man?" Here Goen
comments that "Two years after the foundation of the Na-
tional Highway Safety Bureau no new safety measure involving
the driver are even contemplated." He feels that this shift
was caused by the belief of many, particularly road and
traffic control engineers, that attention to the driver as
the cause of automobile accidents resulted in a long period
of inattention to more critical matters in the causation of
motor vehicle accidents.

This shift of focus is strongly reflected in three ar-
ticles highly critical of the accident proneness concept
(Goldstein, 1961a, 1961b; Haight, 1964). Goldstein attempts
to demonstrate that accidents are random events related to
transient rather than stable characteristics by presenting
a distillation of numerous statistical findings. It is
doubtful whether such out-of-context presentation of re-
search findings can be considered an adequate disproof of
the concept. Haight, who engages in the same type of pres-
entations and who is equally convinced that the driver is
not the primary cause of automobile accidents extends the
logic of this belief to the realm of public policy. He
states that prosecuting people for traffic violations is un-
just since such behavior is harmless in itself and has never
been shown to cause automobile accidents. Additionally he
opposes singling out the accident repeater on the basis that
there is no justification for denying someone the right to
drive, no matter how outlandish his accident record may be.
This is a complete about-face of the accident-proneness concept which was primarily based on the belief that such research would enable the identification of the accident-prone individual, and that the removal of those so identified from the population at risk would result in a valuable reduction of the accident rate (Farmer and Chambers, 1939).

Despite the general shift away from accident proneness in recent years, two South African researchers Lynette Shaw and Herbert Sichel (1971) have produced an extensive volume devoted to further proof and refinement of the accident proneness concept. Well aware of the current hostility toward accident proneness the writers comment that:

> There is currently such a strong reaction against the layman's belief that any unequal distribution is a sure sign of accident proneness, that the tendency is to ignore all the evidence provided by this sort of investigation - including the cases where the contribution of multiple offenders is very significantly different from chance.

They also observe, however, that although the scientific community rejects the concept of accident proneness as a valid one, practical programs dealing with accidents (insurance rates and police policies) are based on the existence of the accident prone driver, an individual who "according to widely accepted scientific theory...is virtually non-existent, and certainly does not represent any appreciable danger to the community." This "folk wisdom" of accident proneness as
manifest by insurance companies and police must possess a degree of validity, Shaw and Sichel reason, because it is these agencies which have the greatest first-hand contact with the automobile accident. This unwillingness to wholly reject common sense wisdom and their own extensive, if somewhat prejudiced, evaluation of past research in the area of accident proneness provide the backdrop for the presentation of their own research.

Working for the psychological unit of the Public Utilities Transportation Company of South Africa the authors were given the task of selecting and developing reliable tests to be used in the selection of drivers who would be more accident free than if hired on a random basis. The presentation of their research is a detailed account of both the successes and failures of this attempt extending over 17 years, and is unique in two ways: (1) it demonstrates that social scientists can conduct valid and relatively bias-neutral research while under the auspices of a public agency, a point disputed by many social scientists and (2) it additionally demonstrates the refinement of concepts and the accuracy of measures that can be obtained through ongoing research extending over a long period of time, which to a degree is a fringe benefit of their position as staff, rather than freelance, researchers. Their temporarily extensive connection with PUTCO enabled the authors to continually revise and refine both their concepts and their measures of them. The
authors are also to be commended for their willingness to report and discuss the implications of negative findings, a factor somewhat uncommon in previous accident-proneness research.

Accepting the position that accident proneness was a psychologically related phenomenon the authors began with two sets of tests; a batter of psychometric tests for assessing the intelligence and adaptability of the subjects, and a small battery of psychomotor tests for testing some basic driving skills. With the introduction of these tests as part of the driver selection process there occurred a distinct improvement of new trainees according to the evaluation of driving instructors. The rate for successful completion of the training course increased from a pretest level of 40% to one of 70%, and later with refinement of testing procedures, to a high of 90 percent. This effective selection of individuals likely to complete the training program successfully, however, had little effect upon the accident rate of new drivers. The new drivers, although more skillful than those previously selected maintained what the researchers considered an undesirably high rate of accidents.

This negative finding prompted Shaw and Sichel to a more in-depth study of the high accident drivers. It was found through surveying work records that high accident drivers generally exhibited "unsatisfactory attitude...toward their job as measured by disciplinary offenses such as
carelessness, recklessness, insolence, drunkenness and dishonesty. Of those with bad accident records, 70 percent also possessed bad disciplinary records. Among those with good disciplinary records but bad accident records, high instances of nervous tension, indecisiveness, lack of poise and confidence, and retention of strong primitive beliefs were found. This finding led the researchers to conclude that projective personality tests were necessary in selecting individuals with potentially low accident records.

Their initial attempt with the Rorscharch tests proved a failure since this test was found to be incompatible with their black African subjects. As an alternative, they developed a version of the Thematic Aperception Test which would be compatible with the personality characteristics of urbanized black Africans (de Ridder, 1961). With this test they were able to detect attitudes and gross personality defects which they hypothesized would have a negative effect on driving behavior. The application of this test resulted in a curious selection phenomenon in that so many of the more intelligent subjects showed up badly on the TAT they were forced to lower the intelligence requirements for recruitment. Although Shaw and Sichel do not explicitly discuss the meaning of this finding, it may be that psychological stability, as measured by their version of the TAT, is more difficult to achieve for the intelligent member of the subordinate group in a colonized area than for his less
intelligent counterpart. The psychological stability of a subordinate individual in a colonized status is measured primarily by his willingness to accept the dominant group's definitions of both himself and the environment (Fanon, 1969), and since increased intelligence is generally coupled with an increased ability to perceive alternative realities and such confrontation of realities is inherently disturbing (Berger and Luckmann, 1966), the subordinate individual capable of perceiving a reality other than that defined by the dominant group would inevitably be defined as unstable.

Despite this lowering of the intelligence criteria, the TAT proved to be an effective measure of discriminating between potentially high accident and low accident drivers. The lower intelligence but good TAT scoring drivers clearly recorded far fewer accidents than their higher intelligence but poor TAT scoring counterparts. Situational factors forced a suspension of psychological screening between 1963 and 1965, this resulted in a noticeable increase in the accident records of new drivers. A validation study conducted by Shaw and Sichel in 1967 indicated that the test predicates were valid indicators of potential accident records in 86% of the cases screened. In addition to measuring the effects of their various screening measures the researchers also employed a factor analysis procedure derived by Eysenck (1964) to determine the relationship between various personality characteristics and driving record. The most
significantly correlated characteristics were antisocial attitude (r=68), irresponsibility (r=61), psychopathic tendencies (including dishonesty) (r=60), immaturity (r=60), lack of self-control (r=59) and carelessness and impulsiveness (r=69).

These findings lead Shaw and Sichel to conclude that:

an individual's personality exerts such a powerful and overriding effect on his accident potential that it can make a bad risk out of someone with all the necessary attributes of skill and physical fitness, and a good risk out of someone whose qualifications for driving are anything but ideal. Even experience cannot always compensate for personality defects, and some of the worst and most dangerous accident risks are found among people who have been driving for most of their adult lives.

Despite the compelling nature of their evidence, in favor of the accident proneness concept, particularly the effect of various screening techniques upon overall accident rates, several objections to their research may be raised. First, the use of bus driver applicants only may represent a biased sample, and the correlation between emotional or psychological instability and a poor accident record for this group may be far greater than that for the general driving population. Regarding this question of sampling bias, it may be argued that if Sellin's (1964) contention that deviance results from a conflict of conduct norms is valid, the behavior of the black African subjects capable of perceiving the conflict-nature of their relationship to
the dominant society and thus scoring poorly on the TAT is merely a reflection of a general social phenomenon, and not an invalid basis for generalization to other social situations. From this point of view, it is not unwarranted to reason that those individuals in any society whose perceptions of reality conflict with the stated conduct norms of the dominant group will exhibit patterns of behavior, including driving behavior, which are inconsistent with these stated norms, and that the PUTCO study merely reflects a specific example of this phenomenon. One would then hypothesize that "deviant" (not consistent with the dominant) perceptions of reality would result in deviant driving behaviors, and that such deviant perceptions of reality, although not the sole province of the subordinate groups within the society are more prevalent among them. Secondly, the interperative nature of their measure, the TAT, some may argue, is not sufficiently rigorous to warrant extension of their conclusions beyond the clinical framework. However, the cautiously reasoned presentation of the data and drawing of conclusions by the researchers stands them in good stead in the face of such objections. Further research incorporating these objections would possibly result in contrary findings, but short of such a clear, empirical negation their research remains the best validation of the accident proneness concept to date. Thus, the effect of accident proneness upon the total accident picture may be less significant than the
authors intimate in their conclusions.

The above discussed research into accident proneness, although varying in both methods and sophistication, consistently exhibits several critical concepts, some of which prove to be problematic for the overall viability of the construct of accident proneness. Primary among these are:

(1) **Accidents do not distribute themselves randomly among the population at risk.** This concept derived from the negative binomial distribution of accidents among the population at risk observed by Greenwood et. al. and Newbould, formed the basis of all subsequent accident proneness research. These early research attempts were primarily indicative in nature, and represent what Stouffer (1950) identifies as the one-shot case study. Although they were capable of identifying a variability in accident records, and the researchers speculated as to the cause of such variability, these research endeavors provided little or no evidence from which to conclude the actual causes of the variability.

(2) **An individual's liability to accidents, controlling for exposure to hazards, is a function of inherent personality characteristics.** This assumption directed all subsequent research into the etiology of accident proneness. Reasoning that controls for age, exposure and experience were sufficient evidence external factors could not explain the variability in accident rates, researchers from Farmer
and Chambers on directed their efforts toward identifying the personality characteristics which would explain the variations in accident records of individuals so controlled. Early etiological researchers assumed that "accident proneness" itself was a personality characteristic and sought measures to prove its existence within the personality structure. This approach fails to explain what the concept "accident proneness" refers to, other than the tautological response that it is the characteristic which causes a person to be liable to have accidents. These researchers failed to derive an explanation of "accident proneness" from existing scientific constructs (Lewin, 1951), and thus created a theoretical superstructure grounded in nothing. Later etiological research was more careful to identify accident proneness as a syndrome comprised of other, more recognizable personality characteristics. Unfortunately, the implicit assumption that undesirable behavioral consequences can only flow from undesirable personality characteristics led researchers to link the accident proneness syndrome with pathological personality characteristics. This conceptual linkage may very well made unrecognizable relationships between normal psychological patterns and accident experience. Additionally the validity of measures used to demonstrate the existence of an accident proneness syndrome must be questioned. Many of the measures are in themselves proven clinical psychological procedures, but it is the correspondence
between what they measure and the concept of accident proneness which is doubtful. The failure to establish a strong theoretical link between the characteristics being measured and the concept of accident proneness resulted in correlations with little causal significance, although considerable causality was inferred in numerous research conclusions. The causal link between personality characteristics and accident proneness remains essentially unestablished.

(3) Personality characteristics related to accident proneness remain relatively stable over time and situation. Numerous researchers, although not all, assumed that "accident proneness" or the psychological characteristics comprising the "proneness syndrome" were operative in all environmental situations experienced by the individual and did not alter with time. The interaction between situational factors and "proneness" was seldom considered (Arbous & Kerrich), and only Hakkinen and Shaw and Sichel gave serious consideration to the effect of time upon the operation of "proneness" upon an individual's behavior. This problem is a direct result of the lack of a strong theoretical link between personality characteristics and "proneness." It is never established whether proneness is an antecedent, interactive intervening or perhaps even dependent variable; factors critical in determining the stability of the phenomenon within an individual. Nor have any researchers, with the exception of Adelstein (1952) considered whether accident
proneness may vary in such a way as to alter an individual's liability to certain types of accidents, and not increase his liability to accidents in general.

(4) Identification of accident prone persons and removal of them from the population at risk would result in critical reductions in accident rates. This assumption serves as the basic justification for accident proneness research, and it is also this concern with identification rather than explanation which is in large part responsible for the theoretical vagueness of the concept. As long as researchers could demonstrate the ameliorative utility of their work, there was little necessity to construct clear explanations of the dynamic processes related to accident proneness. The contribution of the accident prone individual to the overall accident picture remains unclear, and each researcher has presented a slightly different conclusion regarding this question. The reason for this is due to the following methodological difficulty.

(5) Proneness research has lacked a uniform criteria. Accident proneness is identified by empirical events - accidents. The number of accidents which constitute a clear indication of "proneness" varies considerably from research to research, as does the time frame in which to count accidents. The gross number of accident events have varied from 3 to 16, time spans from 6 months to 11 years, and the higher gross number of accidents is not always associated
with longer time frames. Clearly the selection of a proneness criteria will have critical effects upon research conclusions, and the lack of a uniform criteria makes the comparability of accident proneness studies limited at best. Finally, the entire concept of accidents as the unit of measure for the criteria remains questionable. If accident proneness is a truly psychological phenomenon does this necessarily mean that it will result consistently in accidents? As Arbous and Kerrich have indicated, a truer measure of an individual's psychologically-based propensity to have accidents would include not only completed accident events, but also slips and near misses which except for the intervention of skill or some external factor could have been an accident.

In spite of these problems accident proneness research has produced several significant contributions. First, it initiated the scientific study of accidents as a phenomenon related to human behavior and not merely the workings of "some unportentious god" beyond the realm of human control. Secondly, it has reasonably established that there is some variability in individual accident rates which cannot be explained by wholly external variables. It has demonstrated that there does exist a degree of individual agency in the causation of accidents.
Personality and Accidents

A considerable amount of work in the field of psychology has been devoted to the study of accidents. However, as Haddon indicates, the bulk of this research has been psycho-physiological. Color perception, depth perception, perceptual constancy, spatial discrimination, reaction time, kinesthetics and the like have been extensively researched. This research has been translated and incorporated in the design of automobile instruments, road lighting, and road construction. It is not directly relevant, however, to the research at hand. Of more immediate interest is the psychological and attitudinal research directly concerned with accident involvement.

An implicit assumption of this latter research is that accident involvement is affected by personality traits, and that these characteristics can be altered either by the individual himself, or through some change in the external stimuli to which he is exposed. From this perspective, theoretical approaches to accident behavior can be divided into those which view accidents as resulting from an internal source or external strain not recognized by the individual, and those which view accidents as the behavioral product of consciously held attitudes.

Kerr's (1957) typology of theories of safety research provides an excellent description of thinking oriented
toward the unconscious or subliminal experiences influencing accidents. Kerr identifies three approaches — accident proneness, goals-freedom-alertness, and adjustment-stress. The accident proneness theory, previously discussed, refers to a constitutional tendency to have accidents which is relatively stable over time. The goals-freedom-alertness theory, applied primarily to work accidents suggests that the lack of freedom to set reasonably attainable goals in the work situation results in undesirable emotional states conducive to involvement in accidents. The adjustment-stress theory states that "unusual, negative, distracting stress upon the organism increases its liability to accident or other low quality behavior." Although, only accident proneness has been applied extensively to the study of accidents, the other two may also prove useful in understanding accidents. Shaw and Sichel (1971) assert that an individual's emotional state can increase or decrease his liability to have an accident. They and others (Vitales, 1932; Keenan et. al., 1951; Hersey, 1961; Marcus, et. al., 1960) have held that states of anxiety or depression can have a noticeable impact upon an individual's accident liability. These theories which focus on relatively transient emotional or anxiety states may provide some explanation for the consistently higher accident rates of single, divorced or separated drivers.

Another notable quality of Kerr's analysis is his
explanation-of-variance approach to competing psychological theories. Unlike many writers concerned with the human factor in accidents, Kerr does not view accidents as causally uniform. Instead he suggests that each of these theories has utility in explaining a certain proportion of the accidents since various types of accidents may differ significantly in the causal factors influencing their occurrence.

**Social Psychology of Accidents**

In addition to the purely psychological theories of accidents analyzed by Kerr, a number of psychologically-oriented investigators have focused upon the relationship between attitudes and accident behavior.

DeSilva (1942) identified what he called "safety-mindedness" as a critical attitude effecting one's accident liability. He writes:

> Although our present roads have not been designed from the safety point of view, they can be driven on with impunity. The automobile also, in most respects a safe piece of machinery, can be used with a minimum of danger. It is the driver to whom we must impute responsibility for the hazards presented in these instruments.

After this statement, clearly indicating that his focus is upon the driver he evaluates the extensive literature covering various factors related to accident liability: exposure, speed, road hazards, visibility, climatic conditions, age,
road and vehicle construction and alcohol. Observing that driving presents the individual with a number of hazards, that driving skill enables one to avoid such hazards, that youthful drivers have greater skill in manipulating an automobile but have worse accident records than older drivers, he concludes that an attitudinal factor which he calls "safety-mindedness" must be operative. This he defines as:

...a complex state of mind involving a recognition of the inherent hazards of driving and their relation to the lives of those who use the roads. Among its basic constituents are caution and consideration for the lives, property and comfort of others...foresight, emotional stability, mental balance and a desire to understand one's limitations as a driver with a view to surmounting them.

This "safety mindedness" then is not a simple attitude, but a complex of attitudes which seem to describe an individual's entire outlook on life, a fact which DeSilva later states explicitly. Furthermore, he relates the development of "safety mindedness" to an individual's background and socialization experiences, a point which will be discussed at greater length later.

Although much of DeSilva's data is now outdated his contribution lies in his identification of driving behavior as an expression of an overall attitude and value set. His work, although not cited by Tillman and Hobbs, despite the fact that it was published six years earlier, provides a
rudimentary explanation for their finding that "a man tends to drive as he lives."

Another attitude set or complex effecting driving behavior was identified by Cohen and Hansel in their work on "risk-taking." In two studies, one of pedestrians' street-crossing behavior (1955), and one of bus drivers' estimation of the risk involved in certain driving maneuvers (1956), these authors submit evidence that individuals vary in their propensity to take risks in traffic-related situations. The pedestrian study was conducted using hidden observation techniques. Hence, it provides little information about the characteristics of high and low risk takers except to show that men are the greater risk takers. The bus driver study, on the other hand, was more controlled. Individual trainees were asked to predict their ability to perform certain driving maneuvers varying in difficulty. They were then asked to perform these tasks. The correlation between expectation and accomplishment was then analyzed. The primary finding was that inexperienced drivers tended to underestimate their ability to accomplish simple tasks, but overestimated their ability to successfully complete difficult ones. Unfortunately, little information was reported about the individual drivers themselves except for their level of experience.

Suchman and Scherzer (1960) took the essentially atheoretical work of Cohen and Hansel and attempted to derive an explanation for the variation in levels of risk taking among
drivers and pedestrians. Suchman and Scherzer state that the quality of an individual's decision making and subsequent exposure to risk is dependent upon the degree to which his perception of a situation approximates the real situation itself. This in turn, they hypothesize, is dependent upon the entire range of social, environmental and psychological factors influencing an individual's perception. Once again, however, there is no presentation of demonstrable social factors which can predict an individual's level of risk-taking. On the other hand, their work does provide valuable sensitizing concepts with which to understand the relationship between an individual's attitudinal structure and his liability to taking driving risks and accidents.

A number of others have attempted to demonstrate the existence of attitudes or attitude sets which correlate with accident behavior. The essential methodology employed by these researchers has been the application of attitude scales specifically constructed for the purpose of measuring driver attitudes, to subject groups differing in either their accident records or their number of traffic violations.

Much of the work in this area of driving attitudes has focused upon the young driver in an attempt to determine why youthful drivers are grossly overrepresented in the accident group, and what factors differentiate the high accident young driver from the accident free young driver. Rommel (1959) applied a Driver Attitude Inventory and a test of
emotional and personal adjustment to a sample of young drivers selected from Pennsylvania high school students. He found that young drivers with accidents and youthful accident-free drivers score high and low respectively on the following attitudes:

1. driving as an activity which relieves psychic tension.
2. driving as a form of behavior by which youthfulness may be compensated for and the role of an adult assumed.
3. driving as a form of activity in which confidence in one's ability may be manifested.
4. does not consider speed as an element of danger, or, if it is considered dangerous, an attitude manifesting a desire for danger.
5. places greater emphasis on the power of a vehicle than on its style or utility.

He further concluded that having the following tendencies increased behaviors likely to result in accidents:

1. a desire to leave home.
2. the urge to do something harmful or shocking.
3. the tendency to be influenced by people about them.
4. association with peers to whom parents object.
5. desire to frighten other individuals for the fun of it.
6. tendency to become readily impatient with people.
7. tendency to be somewhat suspicious of overfriendly people.

8. having been in trouble with the law for non-traffic offenses.

It is interesting to note that many of the attitudes associated with high accident records bear a marked similarity to attitudes regarding self-esteem and powerlessness identified by others as correlated with involvement in juvenile delinquency, and also to the "focal concerns" discussed by Miller as the wellspring of lower class delinquent behavior.

In the same vein, McFarland and Moore in their now-classic address to the 1960 White House Conference on Children discuss critical attitudinal traits and cultural characteristics related to the high accident involvement of young drivers. Speaking of the behavioral and cultural implications of the automobile for young drivers in general they indicate:

1. For many youth the auto represents freedom and escape, both real and symbolic, from parental control and authority.

2. The automobile is a necessary cultural artifact in the sexual competition associated with dating.

3. Since the automobile is one aspect of contemporary life which makes it possible for persons to express hostility, discourtesy and emotional conflict without much fear of reprisal, and often with complete anonymity the young driver
can express his revolt against adult authority by various driving behaviors with relative impunity.

4. Youth, oversensitive to the behaviors of others, can engage in "get even" behavior such as racing, speeding or obstructionist tactics toward other drivers for behind the wheel of a car they are on equal footing.

In their discussion of the role of the automobile among the "hot-rodders," the above characteristics are extended to the point where "the automobile can become part of the body image, with the ego expanding to include the car," giving the driver a "feeling of megalomaniacal power and invulnerability." They also point out, however, that such drivers as these are involved in relatively few accidents, since their devotion to the automobile and development of driving skills enables them to have a number of exciting "near misses," but to avoid actual accidents. This finding would seem to be consistent with that of Fergenson (1971) who, in investigating the relationship between information processing ability and accident and violation records, found that those with a high record of violations but no accidents were the best information processors. If, as McFarland and Moore indicate, the "hot-rodders" are physically advanced and devote considerable time to driving and refining their driving ability it is reasonable that they would develop the skill of quickly perceiving hazards and making the appropriate correction to a greater degree than other young drivers who
do not devote as much energy to the art of automobile operation.

Barmack and Payne in two studies of off-duty accidents incurred by young airmen (1961a, 1961b) identified the following factors related to such accident involvement:

1. Pre-accident drinking occurred in nearly two-thirds of all accidents surveyed.

2. 40 percent of the drinking drivers as opposed to 16 percent of the non-drinking accident drivers had traumatic family backgrounds involving separation of the parents at the very least.

3. 61 percent of the single, or married but living apart, accident drivers had been drinking while only 39 percent of the married accident drivers had been drinking prior to the accident.

4. 32 percent of the accident drivers and 58 percent of the no-accident control group were married.

From their findings it became apparent that the majority of accidents of young airmen involved unmarried men driving near the airbase in an evening hours in "quest of recreation and entertainment." Furthermore, there is some indication that the formation of attitudes and psychological patterns favorable to high accident liability are related to an individual's socialization experience with particular respect to the stability of home life.

Beamish and Malfetti (1962) in a comparison of youthful violators and non-violators in the 16-19 age group applied a
number of measures including the Guilfor-Zimmerman Temperament Survey, Minnesota Counseling Inventory, Otis-Self-Administering Higher Examination and the Siebrecht Attitude Scale. From the data generated by these tests the authors conclude that the deviant behavior of the violator group can be attributed at least in part to the following psychological characteristics:

1. By accepted standards they do not give proper thought to the implications of their behavior for themselves and others.

2. They tend to be in disagreement or conflict with others, including those closest to them.

3. They perceive themselves as held down and imposed upon.

4. They are rebellious and selfish.

5. Their hypersensitivity, lack of self-confidence and feelings of personal unworthiness lead them to compensate with erratic and ill-considered action resulting in traffic violations.

After attending the Cleveland Driver Improvement School the violation records of the subjects for the year after were compared with their previous record. A full 75 percent showed an improvement in driving records. The 25 percent who showed no improvement had scored more negatively on scale items pertaining to variety of social contacts, respect for others, foresight, and co-operation.

In a recent study Carlson and Klein (1970) analyzed the
driving records, academic performance and police contacts of 8,094 male undergraduate students and compared their driving records with that of other fathers. The findings suggested:

1. There was a positive correlation between the driving records of sons and fathers. From this they conclude that attitudes favoring negligent driving are learned.

2. Delinquent familial socialization results in delinquent traffic behavior.

3. Those with poor traffic records were found to have poorer academic records than the violation-free control group, and poorer than their own capabilities would indicate.

4. Those with poor traffic records also were involved in more non-vehicular offenses than the violation-free group.

Their findings lend support to the notion that the attitudes one brings to driving can have a significant influence on one's violation and accident liability; that these attitudes are formed either through early socialization processes or later peer-group interaction; and that attitudes which influence driving behavior are also related to involvement in other types of deviant behavior.

Although the studies of young driver attitudes each derive somewhat different conclusions regarding the specific attitudes critical in increasing one's accident and violation liability, a number of themes appear consistently. Of particular interest are the notions that:
1. Attitudes do correlate with driving behavior.

2. For young drivers, the operation of an automobile is often compensatory behavior enabling them to partake of adult status.

3. The automobile is associated with a youthful search for excitement and fun.

4. The automobile serves as a mechanism to release hostility and aggression engendered by the frustrations of non-adult status, and can be used as a symbol of open revolt against the adult world.

5. That youthful attitudes towards the automobile vary with socialization experience and cultural exposure.

This last notion, that socialization and cultural experience influence one's attitude toward driving, is of particular interest to the sociologist. Although it has been shown that attitudes do effect driving records, the majority of the research in this area has been psychologically oriented. As a result, there is little indication of the degree to which such attitudes are more than consequences of personality characteristics. It has not been shown by past attitude research whether or not there exist culturally induced differences in attitudes affecting driving, or whether or not the accident and violation patterns of various cultural groupings differ significantly from one another. Nor has it been demonstrated whether the known tendency of those with poor traffic records to be involved in other areas of
deviant behavior is at all related to cultural as well as psychological differences. Such questions provide an ideal basis for research by both sociologists and criminologists.

The Sociology of Accidents

There has been little study of the sociology of traffic accidents. This fact is noted by Haddon in the introduction to the "Social and Cultural Factors" chapter in his volume Accident Research:

Social factors related to accidents may be studied on the societal or on the individual level. From the societal point of view, broad social forces influence the ways in which the community or group views and deals with hazards in its environment...Although much research has been done on the influence of social factors on a wide range of individual behavior - voting, for example, or purchasing habits - few studies have been done on accidents.

What work has been done in this area has been primarily, with a few notable exceptions, concerned with the ecological and demographic distributions of accidents rather than the socio-cultural influences upon accidents.

In the area of the ecological and demographic distribution of accidents the work of DeSilva (1942) and of Iskrant and Joliet (1968) has provided valuable information. Despite the 26 years separating their publication dates, both studies report similar findings, suggesting that the factors influencing the distribution of accidents are relatively
stable. Most of their findings have also been corroborated at one time or another by other research efforts. From these two works, a number of seemingly stable distribution characteristics can be stated.

Demographic Distribution of Traffic Accidents

1. Men are involved in fatal and injurious motor vehicle accidents in far greater proportion than women. This is true for both pedestrian and moving motor vehicle accidents, and for all ages with the exception that past the age of 65 the injury rates for females due to moving motor vehicle accidents exceed those for males.

2. The elderly (over 65) and the young (2-14 years of age) contribute the bulk of pedestrian deaths. Men over 65, comprising less than 5 percent of the population, account for 25 percent of the pedestrian fatalities. Death from motor vehicles are the greatest single cause of death to children after the first year of life up to age 14.

3. Rates are higher for non-whites for pedestrian fatalities, while rates are higher for whites for non-pedestrian auto fatalities.

Regarding this DeSilva, however, comments that while non-whites are not overrepresented on the basis of licensed drivers, their annual mileage is much less than whites making their accident rate actually higher than that of whites.

4. Pedestrian deaths are about three times as high for foreign-born whites as for native born whites, with the differences greatest for children and the elderly.

5. Among non-whites, American Indians have the highest motor-vehicle death rate, nearly three times that of blacks. Chinese and Japanese have the lowest motor-vehicle death rates among non-whites.

6. The motor-vehicle death rate is higher for
whites ages 15-24 than for non-whites of the same age group. Access to motor vehicles at an earlier age among whites may account for this (Iskrant and Joliet).

7. People who live alone, or with others not related to them have the highest death and injury rates resulting from motor vehicle accidents.

Ecological Factors Related to Traffic Accidents

1. The highest moving motor vehicle death rates occur on main rural roads, with straight level stretches of such roads having higher accident and death rates than curvy or hilly sections.

2. The greatest actual number of deaths by automobile occurs in the Eastern states.

3. Basing death rates on number of miles traveled, or number of vehicles registered, the Southern states have the highest traffic death rates. When based on population the highest vehicular death rates are recorded for the Western states.

4. The majority of pedestrian deaths occur in urban rather than rural areas.

5. Individuals from lower socio-economic census tracts are overrepresented among urban pedestrian fatalities.

6. Census tracts having the highest proportion of the drivers in accidents are located in portions of the city surrounding the downtown business district. (DeSilva)

Regarding this last point DeSilva reports an analysis of traffic accidents in St. Paul, Minnesota which found that the overall ratio of accident-involved to accident-free drivers was one in 21 for the entire city, one in 13 in the lower income areas and one in 30 in the higher income suburban areas.
Although other ecological and demographic patterns of traffic accidents have been identified, the ones cited above appear to be the most consistent. This is demonstrated by the fact that the 1942 analysis of DeSilva and the 1968 work of Iskrant and Joliet concur on nearly all the points mentioned, and that they can be re-substantiated from current 1972 accident data.

Of particular interest for this study are those accident patterns which indicate that socio-cultural variables may explain part of the variance in the distribution of traffic accidents. The indications that non-whites have higher pedestrian death rates than whites, that foreign born whites have higher pedestrian rates than native born whites, that individuals from the poorer socio-economic areas are overrepresented among traffic fatalities, and that the traffic death rates for miles traveled and number of vehicles registered are higher for the Southern states than for other parts of the country suggest that socio-cultural differences may play some role in making the distribution of accident involvement and fatalities other than random. Given the overrepresentation of certain identifiable social groups in various categories of accidents it is not unwarranted to question whether or not the same sociological variables which influence the distribution of other social problems such as crime, disease, alcoholism and delinquency may have similar influence upon the distribution of traffic accidents.
and fatalities. This question is of particular importance for the study of urban traffic fatalities. It may be the case that the urban traffic accident represents a somewhat different phenomenon than those which occur on rural roads, and are influenced to a greater degree by the same variables which effect other urban social problems than are rural road accidents. To the validity of this notion it is necessary to understand the possible relationship between cultural or subcultural experience and driving behavior.

**Culture, Subculture and Accidents**

A number of researchers have found some correlation between the propensity for accidents and other forms of social deviance (Tillman and Hobbs, 1949; Willet, 1964; Barmack and Payne, 1961a, 1961b; McFarland, 1964; Beamish and Malfetti, 1963; Coppin, 1964; Shaw and Sichel, 1971). Furthermore, most of these researchers found that the propensity to have accidents correlated with a tendency to be involved in various types of non-motoring offenses. Other researchers have identified social perceptions particularly among youthful drivers which are related to high accident and high violation rates (DeSilva, 1942; Conger, 1957, 1959; Rommel, 1969; Beamish and Malfetti, 1962). These two bodies of findings suggest that (1) social perceptions do effect driving behavior, and (2) the crucial perceptions influencing driving behavior may not be wholly distinct from those influencing
other spheres of daily conduct.

These studies into the perceptual and behavioral correlates of accidents were primarily psychological in orientation, and as such were not concerned directly with the relationship between perceptions influencing driving behavior and social variables. Modern criminological research, on the other hand, has frequently focused upon the relationship between criminal involvement and social variables such as race, economic status, family experience and social background, and has repeatedly demonstrated that involvement in conventional crime is significantly related to these variables. Other criminologists have attempted to explain the relationship between criminal behavior and these variables through the development and application of theories of culture and subculture. Insofar as previous accident research has demonstrated a correlation between accident involvement and other forms of deviance, and criminological researchers have developed culture-oriented explanations of involvement in deviant behavior, it may be fruitful to consider whether such theories can explain at least part of the variance in the distribution of traffic accidents.

The basis of cultural theory is the concept that individuals are socialized to perceive and react to the world on the basis of the shared meanings of the group to which they belong, and that the variations in shared perceptions among groups are the result of the different social
experiences to which each has been exposed. In the area of criminological theory this broad notion of culture has given rise to three explanatory models.

The first model, best typified by the work of Sellin (1938) is based upon the conflict inevitably engendered when two pre-existing ethnic cultures are somehow brought into contact with one another, and individuals from one cultural group are subjected to the laws derived from the cultural experiences of another group. The second is based upon the cultural differences identified with the economic and social stratification of society. The "focal concerns" theory of Walter Miller (1958) and the "subculture of violence" thesis of Wolfgang and Ferracuti (1967) represent this orientation. The third model is that of the reactive subculture, the subculture which forms in reaction to and in rejection of the values of the dominant culture in a society. Cohen (1955) is the principal proponent of this approach.

The models are not wholly exclusive of one another and share certain concepts. The conflicting ethnic culture of the Sellin model may also be located in the lower class culture of Miller's model, just as the "subculture of violence" may reflect certain ethnic inputs, particularly in the case of blacks. Yet while there do exist similarities, each of these models offers a unique perspective for understanding the accident problem.

Sellin indicates that when individuals are evaluated
by laws based on a culture other than their own they run a significantly higher risk of violating these laws. This may be for two reasons. First, to obey the law to which they are subject may require a violation of their own normative system, an act which the individual may perceive as having informal consequences more severe and more certain than the formal sanction risked through violation of the law. Second, the differences in cultural perception may make the formal law difficult to comprehend. The law may prohibit acts which are neither forbidden nor denigrated in his own culture, and so the law is dismissed as irrational.

Laws against gambling and public intoxication, for example, may appear wholly unreasonable to an individual socialized into a culture where such behavior is both normal and acceptable.

In the area of traffic accidents this approach may explain to a certain degree the overrepresentation of foreign-born whites among accident statistics, particularly those for pedestrian fatalities. Ethnic patterns of child-rearing may be inconsistent with contemporary traffic patterns, just as certain traffic regulations may be non-sensical to individuals whose cultural backgrounds are inconsistent with such ideas. These explanations, however, would not seem to explain a great deal of the variance in accident distribution. With the exception of pedestrian fatality rates for foreign-born whites, there is little empirical verification
of significant ethnic differences among accident victims, and the fact that Orientals have a rather low rate of involvement in traffic mishaps suggests that ethnic difference itself is not a sufficient cause for high accident liability. Furthermore, the criminological research finding that it is the second generation of ethnic group members - those more familiar with the dominant culture - who tend to have the highest rate of criminal involvement would seem to lessen the strength of a cultural explanation based solely upon ethnic differentiation.

The work of Miller, and that of Wolfgang and Ferracuti differ from Sellin's thesis in that the parameters around the subculture whose behavior is to be explained are socio-economic rather than strictly ethnic. However, like Sellin, they view deviant behavior arising from values and patterns of behavior normal for the subculture in which they are located. The "subculture of violence" thesis suggests that a readiness to express violence through overt aggression among certain groups of people is part of a subcultural normative system that defines the life-style, the socialization process and the interpersonal relationships of individuals living in similar conditions. Individuals exposed to this subcultural experience will have a greater willingness to engage in aggressive behavior than those exposed to a different subcultural experience, and furthermore may suffer social censure for failing to be aggressive in situations perceived
as requiring aggressive behavior.

The negligent operation of an automobile is a type of aggressive behavior which can certainly have violent consequences. It is reasonable to assume that social perceptions favorable to aggressive behavior, derived through exposure to a subculture of violence will extend themselves to driving behavior no less than to face-to-face interactions. That is, those homogeneous subcultural groupings with a high rate of interpersonal violence should also exhibit high rates of automotive violence. The work of Porterfield (1960) provides a significant, if somewhat indirect, confirmation of this idea. Hypothesizing that "a significant number of drivers of death dealing cars, as well as their victims, have attitudes similar to those who become involved in suicide and homicide," he compared the fatal accident rates of 39 metropolitan areas with the highest and lowest suicide and homicide rates. Combining homicide and suicide into an overall measure of violence he found that the rate of fatal automobile accidents correlated significantly with his combined measure of violence. In explanation of this correlation Porterfield said:

Drivers who have little regard for their own lives or the lives of others, or both (other things being equal) will have higher rates of accidents than drivers who place a high value on human life. As a corollary, if the populations of some areas have a higher ratio of persons who do not value
life than have other areas, it may be predicted that the former populations will experience more motor vehicle fatalities.

Although not expressly concerned with the existence of a subculture of violence, Porterfield's work lends further credibility to the hypothesis that driving behavior may be related to the same culturally derived perceptions effecting other forms of violent behavior.

Walter Miller suggests that much lower-class gang delinquency, particularly of the destructive and violent type, is a reflection of certain basic "focal concerns." These include "fate," "physical toughness," "smartness" (the ability to con or dupe) and the desire for "excitement." These concerns, particularly "fate," "toughness" and "excitement" can significantly affect attitudes towards driving. Individuals for whom the concept of "fate" is salient are less likely to view negative consequences of their own behavior as subject to their control. In driving, if one relies on "fate," or "luck," there is less reason to take precautions against accidents, since one will believe there is little he can do to prevent their occurrence. The desire for "excitement" can also lead to aggressive, chance-taking driving behavior, and certainly placing one's life in jeopardy through deliberate aggressive driving provides an opportunity to demonstrate "toughness."

These focal concerns, as Miller portrays them, define
desirable character traits which an individual well socialized into a lower class world would attempt to demonstrate. These concerns may not be wholly isolated within any one social class, but are given specific contextual meaning by the subculture defining them. Within a "subculture of violence" these concerns are most likely to result in the type of violent and aggressive behavior which Miller associates with them. Within other social groups they may be given different behavioral expressions.

What is essential to both these formulations is the existence of social perceptions centering around machismo as a significant element of the subculture. This particular concept appears to be a summation of Miller's focal concerns. Machismo is the demonstration of maleness. One demonstrates he is truly a man by exhibiting the behaviors and characteristics associated with maleness. The focal concerns are simply guidelines to desirable adult male qualities within a lower class subculture.

It is also important to note the correspondence between Miller's "focal concerns" and attitudes identified as significantly related to high accident and traffic violation records investigated by other researchers. This relationship appears particularly strong when one considers that the focal concerns are closely related to the expression of machismo. The work of Rommel, previously reported, identified attitudes such as, viewing driving as a means of
compensating for youthful status, the desire for danger, the wish to demonstrate one's confidence in his ability through driving and emphasis on the power of the vehicle as significantly related to accident involvement. Compensating for youthful status is an attempt to demonstrate manhood, i.e. machismo. The desire for danger represents "excitement." Demonstrating confidence in one's ability is similar to Miller's definitions of "smartness," particularly where this ability takes the form of outmaneuvering and outwitting other drivers. And certainly the emphasis on power is similar to a demonstration of "toughness." Similarly, the attitudes discussed by McFarland and Moore, the desire to escape parental authority, the desire to use an auto to enhance one's chances in sexual competition, the desire to "get even" with other drivers through various driving tactics and the tendency to express hostility through driving behavior correspond to machismo, excitement, smartness and toughness respectively.

Both the subculture of violence thesis and the theory of focal concerns are concerned with the relationship between deviant behavior, group perceptions favorable to such behavior and the location of the group within the social structure. Beginning with Durkheim, sociological research has made it almost axiomatic that deviant behavior is not randomly distributed through the social structure. Ecological research has repeatedly demonstrated that the spatial
distribution of various forms of deviant behavior is not random (Shaw and McKay, 1931, 1942; Burgess, 1932; Dunham, 1935; Faris, 1933; Hayner, 1933; Lander, 1968; Wilks, 1967) and others have demonstrated that class position, ethnicity, occupational status and other measures of social location are effective indicators of various forms of deviance. According to Wolfgang and Ferracuti the indicators of social class, particularly race and socio-economic status are significantly related to the existence of a subculture of violence. Both blacks and working class individuals, particularly the unskilled laborer group, were grossly overrepresented in the 1958 Philadelphia homicide study. These authors also report numerous other studies which confirm the hypothesis that homicides and other aggressive crimes are most frequently committed by persons from the lowest stratum of a social structure. The "focal concerns" which Miller identifies are also those of the lowest stratum of the social structure. Thus, both approaches identify social perceptions favorable to violent, aggressive behavior with groups low on the socio-economic scale. Considering that violent, aggressive behavior requires social perceptions favorable to such behavior, that such perceptions are more common among lower socio-economic groups, and that negligent driving is a form of aggressive, violent behavior, one can hypothesize that: (1) the same culturally shared perceptions related to the commission of conventional violent
crimes may be operative in the production of a certain percentage of negligent accidents, (2) the negligent behavior of a certain percentage of drivers responsible for an accident is not an isolated event, but correlates with involvement in other deviant and criminally violent behavior and (3) those drivers whose negligent behavior is part of an overall pattern of criminal involvement will tend to belong to the lowest socio-economic group.

The third model of subcultural theory, that of Cohen, identifies the delinquency of working-class youths as a reaction to perceived social blockage. Working class youths, socialized to accept and desire middle class standards of achievement experience blockage from the means to achieve these goals. Realizing this, they attempt to compensate for their inevitable failure by rejecting these secretly held goals and uniting with similarly frustrated youths to express their rejection. Behavior contrary to accepted standards becomes the norm by which these youths reject their rejectors.

For individuals desiring to reject the standards of behavior of the dominant culture, the automobile provides a ready tool. It is entirely possible that aggressive and negligent operation of an automobile may perform the same demonstration of rejection of society that does juvenile vandalism (Martin, 1956). Insurance companies have long identified young drivers as a high risk group. Certainly,
a percentage of young driver accident involvement is related to a lack of experience, even though generally their level of driving skill is higher by virtue of quicker reaction times than adults. However, it is interesting to note that many insurance companies also provide insurance discounts for both students with high scholastic averages and young drivers in college, indicating that this particular segment of youth represent a less significant risk group. This would suggest that other variables may intervene in the relationship between age and driving risk, and that the automobile is less important for those individuals who have access to other culturally prescribed and acceptable demonstrations of status.

The perception of social blockage during adolescence, on the other hand, may result in an increase in the importance of the automobile as an alternative expression of adulthood. Although Cohen focused upon the delinquency of working class youths, his concept of blockage may explain a certain degree of the negligent driving behavior of young drivers in any social status group. Even middle-class youths may experience an inability to attain symbols of adult status during adolescence, despite the knowledge that they will eventually attain them. Such experience would most likely increase the compensatory role of the automobile.

These theories of culture and subculture cannot explain the entire distribution of automobile accidents. Undoubtedly
many accidents result from momentary inattention, transient stress, fatigue and other factors essentially unrelated to one's cultural experience. On the other hand, numerous researchers discussed above have identified a correlation between high accident involvement and participation in other deviant behaviors, while criminologists such as Sellin, Miller, Wolfgang and Ferracuti, and Cohen have demonstrated the role of subcultural exposure in producing deviant behavior. Insofar as the negligent operation of an automobile represents a form of deviant and violent behavior, it is not unlikely that the same social perceptions which account for much involvement in crime also account for a proportion of traffic accidents.

For many drivers, involvement in and perhaps responsibility for an automobile accident represents a simple error of judgment or a relatively chance occurrence. For others, however, it may represent an overall pattern of criminal involvement influenced by certain culturally derived perceptions.

Alcohol and Traffic Accidents

Numerous studies have related alcohol in the blood to an increased accident liability. These studies have been primarily of two types: those which have investigated the incidence of alcohol consumption among individuals actually involved in accidents, and laboratory research which has
attempted to demonstrate the effect of alcohol consumption upon the ability to effectively perform various motor and perceptual tasks. The National Safety Council has long reported the number of accidents involving alcohol consumption by one or more of the participants, and current statistics show alcohol consumption involved in approximately 50 percent of all traffic accidents (National Safety Council, 1972). These statistics, derived from police reports, however, do not provide any information regarding the patterns of alcohol consumption related to accidents or the actual role of alcohol in accident causation. Although such statistics make reasonable the inference that alcohol increases one's liability to have an accident, they do not provide information regarding the dynamics of alcohol consumption and driving behavior.

There is now a large body of research, both field and experimental, on the role of alcohol in the accident picture. The amount of research in this area is far too considerable to review each endeavor separately, and since the findings are generally consistent, there is little reason to do so. Field research in the area of alcohol and accidents has consistently demonstrated that:

1. Alcohol consumption is related to a significant proportion of all traffic accidents, both fatal and non-fatal. The actual percentage of alcohol-related accidents varies from 30 percent to 65 percent.
2. Men are more frequently involved in alcohol related accidents than women.

3. Alcohol-related accidents occur most frequently in the late evening or early morning hours, with weekends having a slightly higher percentage of alcohol-related accidents than weekdays.

4. Variables such as road condition, age of automobile, weather conditions and amount of traffic are much less important than alcohol consumption.

5. Alcohol consumption is significantly more frequent among accident-involved drivers than accident-free drivers.

6. Alcohol consumption is significantly more common among drivers responsible for accidents than drivers involved but not responsible.

7. Alcoholism is significantly related to a poor accident record.

Experimental research projects on the relationship between alcohol and driving ability, or the performance of motor and perceptual functions critical to driving, consistently demonstrate:

1. Alcohol consumption increases an individual's reaction time.

2. An individual's ability to correctly perceive distance and speed are impaired by alcohol consumption.

3. While an alcohol blood content of .10% or more generally results in severe impairment of motor and perceptual efficiency and actual driving behavior, alcohol consumption in any amount reduces one's driving ability.

4. Alcohol consumption, for certain types of persons (particularly the inexperienced drinker or the introverted), results in a greater tendency to take risks and to violate traffic laws.
The effects of alcohol, both behavioral and psychological, on various individuals are not uniform.

The work of Haddon et al. has provided a novel approach to better determining the actual role of alcohol usage in the overall traffic picture. In three studies, one concerned with single-car fatalities in Westchester county (1959), one of pedestrian fatalities in Manhattan (1961) and one concerned with vehicular deaths in Manhattan (1962), Haddon and his co-workers constructed control groups from a random sample of either pedestrians or drivers passing the site of a fatal traffic mishap at approximately the same day of the week and time of day as the actual accident. The control subjects were tested for alcohol consumption and also interviewed to gather information on other significant variables. Through this method the researchers were able to document suppositions regarding alcohol consumption and traffic accidents which previously could only be inferred from statistical analysis of accident groups. The findings indicate that a greater percentage of fatally involved drivers and pedestrians were intoxicated or had been drinking than members of the non-involved control groups, a notion which had long been held but never clearly proven. Only 38 percent of the accident involved drivers were alcohol free, while 76 percent of the driver control sample, which was three times larger than the accident group, were alcohol-free. In the case of pedestrians, 25 percent of the fatally
injured were alcohol-free while 65 percent of the control subjects were found without blood alcohol content. A number of other hypotheses regarding the distribution of accidents, particularly those related to sex and age, were supported by Haddon's research.

Despite the methodological soundness of Haddon's work, and his clear demonstration that alcohol is present in those involved in accidents significantly more often than those not involved, the dynamics of the relationship between accident involvement and accidents was not substantially illuminated. Does the alcohol cause the accident, or is driving after drinking a manifestation of some antecedent variable which increases the individual's accident liability? It is known that alcohol does effect one's ability to perform motor functions relevant to driving and tests of visual perception have equally demonstrated that alcohol consumption reduces one's performance capabilities in this area. However, little is known about the interaction between the alcohol-reduced capacity of the driver and the actual driving behavior. Do intoxicated drivers as a group drive more recklessly than sober ones, or do they drive in their normal manner but simply incur a somewhat greater risk due to slower reaction time, decreased motor control and attenuated visual capacity? Does the knowledge that one is intoxicated tend to increase or reduce normal risk-taking? What factors differentiate between the individual who knows he is
intoxicated and therefore refuses to drive, and one who readily drives despite his intoxication? How safe is it to generalize the effects of alcohol upon driving behavior to all drivers? Some consideration, discussed below, has been given to these questions but in the main, they are still unanswered.

DeSilva (1942) classifies alcohol consumption as an "indisposition affecting driving" on the basis of a number of studies relating alcohol consumption to increased accident liability. However, he also intimates that the response to being drunk and not the drunkenness itself may be a crucial variable determining whether or not the drinking driver is involved in an accident. Similarly, Carpenter (1968), after an extensive review of the literature relating alcohol to accident involvement concludes that research does not support the belief that alcohol produces uniform effects on driving behavior. Instead he concludes that an individual's driving behavior is a result of his "response to alcohol" and that this response is determined by the individual's personality, skill, experience, and age. This position is given further support by the finding of Carlson (1972) that individuals who drink in bars as opposed to private residences are disproportionately represented among night-time drivers, and subsequently among drinking drivers involved in traffic accidents. On the surface, this finding may seem only to corroborate the common-sense logic that those who
drink in bars must transport themselves home eventually and therefore are on the road in greater numbers than those who drink in private residences. However, if one considers that drinking in a bar is a more prevalent pattern for certain subcultural groups than for others, and that individuals arrested for non-traffic alcohol offenses are most frequently individuals who have been drinking in a tavern (Stinchcombe, 1963) the effect of both personality and cultural experience upon one's liability to an alcohol-related accident becomes clearer.

Cohen, Dearnaley and Hansel (1958) conducted an experimental study using professional bus drivers to determine the effects of alcohol consumption on an individual's willingness to take risks. The drivers were asked at various stages from sober to clearly intoxicated to identify the smallest gap between two moveable stanchions through which they could drive their bus. After identifying the smallest size gap with which they felt confident, the drivers were then asked to perform the task. As drivers consumed more alcohol they were prepared to drive through narrower gaps than when sober. As they consumed more alcohol they needed a wider gap before they could succeed. It was determined that alcohol consumption adversely effected judgment as well as performance. That is, as the level of alcohol consumption increased the drivers became more willing to expose themselves to hazards they would not have attempted when
sober, despite the fact that their ability to negotiate the hazard was reduced. The generalizability of this finding, however, is significantly moderated by their finding of broad individual differences. In their own words:

...the variation in the margin of hazard within groups is so large as compared with the variation between them that a knowledge of the blood alcohol of any individual driver tells us little about the degree of hazard in which he might become involved.

Cohen et. al. do not attempt to explain the individual differences except to say that it is a widely known fact that individuals vary considerably in their reaction to the same amount of alcohol. Whether this variation is psychologically or physiologically induced is unknown.

The work of Drew et. al. (1958) attempted through the use of a driving simulator to determine the relationship between alcohol-induced changes in driving behavior and personality variables. The most interesting finding of this research was that extroverts (measured by the Maudsely Personality Inventory) showed very little change of driving speed after alcohol consumption while introverts changed speed considerably. The nearer the introverted end of the scale a subject fell, the more his speed changed. These speed-changers separated into two distinct groups: those who increased their speed considerably, and those who reduced their speed considerably. From this they conclude
that personality variables, at least those related to the extrovert-introvert dimension significantly affect the response to alcohol.

Thus, while research has demonstrated that alcohol consumption is involved in more than half of all traffic accidents, and that alcohol consumption definitely affects one's driving capabilities, there is significant indication that it is not the alcohol consumption alone which causes accidents, and that a given level of intoxication will not produce identical driving behaviors in various individuals. There apparently exist other variables which affect an individual's "response to alcohol." These may be physiological or psychological and it is likely that the actual behavioral result of alcohol consumption is a product of interaction between both classes of variables. It has been suggested that individuals learn culturally prescribed methods of demonstrating emotional or psychiatric disturbance, and that these vary from cultural group to cultural group. It may also be the case with intoxication; one learns the culturally acceptable way to be drunk. This variation of response to intoxication may have a significant affect upon one's liability to traffic accidents, with one mode increasing liability more significantly than another.

Criminologists have frequently demonstrated that alcohol consumption is related to the commission of many types of criminal behaviors. Among these, the violent crimes of
murder, aggravated assault and robbery are significantly related to the consumption of alcohol (Wolfgang, 1957, 1967; Amir, 1967). Furthermore, it has long been known that involvement in conventional criminal activity, particularly of the violent type mentioned above, is more frequent among members of the lower socio-economic groups, and among certain ethnic groups. Does the consumption of alcohol itself lead to involvement in conventional crimes? If one answers in the affirmative, one must also then assume that alcohol consumption is much more frequent among lower social groups than among others, for how else can one explain the over-representation of the lower stratum of society in conventional crime? Given the business and social patterns of drinking among the middle and upper classes, it is unreasonable to contend that the lower classes engage in far more drinking, and therefore are more criminally involved. If a member of the blue-collar working class is more likely to be involved in conventional criminal activity after the consumption of alcohol than is the middle-class businessman after an intoxicating lunch, one must look to variables other than the consumption of alcohol to explain the differences in their liability to crime.

Where conventional crime is concerned, it is an individual's response to alcohol rather than merely the consumption of alcohol which is important. Since one's response to alcohol is, in part, a learned response, the cultural
context in which one learns this response must be seen as a critical antecedent variable in any analysis which attempts to relate alcohol consumption to behavior. That is, the increase in accident liability due to alcohol consumption may vary markedly among individuals who have learned different cultural modes of responding to intoxication.

Summary

The previous discussion has explicated the reasons why the fatal traffic accident warrants consideration as a social problem, and has presented an overview of accident research. It has been shown that while a substantial amount of research has been conducted on the phenomenon of traffic accidents, little of it has been sociological in nature. What sociological accident research there is has been based upon gross statistical compilations (generally, national in scope), and has not provided an adequate portrait of the accident problem within a specific social and structural context.

The exploratory accident analysis presented in the following sections will consider many of the same ecological and demographic variables employed by other accident researchers. The importance of this research, however, lies not in variables employed, but in its attempt to develop an overall contextual portrait of the fatal urban traffic accident. By focusing upon the traffic accident as an urban
social problem it brings a new perspective to traffic accident research, and will hopefully provide sensitizing concepts regarding the urban accident problem - a critically important step in the development of any theoretical formulation.

The essential research question asked is, "As an urban social problem, what ecological and demographic characteristics do fatal traffic accidents share with other urban social problems, particularly crime?" Since little viable sociological theory regarding traffic accidents exists, the research must be exploratory in nature. This approach is consistent with Blumer's (1968) admonition that sociological researchers should devote considerable energy toward understanding and developing sensitizing concepts about a particular social phenomenon before attempting to develop theories and test hypotheses regarding that phenomenon.

While this research is exploratory in nature, and as such does not involve classical hypothesis-testing, given the assumption that fatal urban traffic accidents represent a social problem not dissimilar from other urban social problems, certain predictions can be made:

1. Fatal urban traffic accidents will not distribute themselves in an ecologically random fashion. Instead, certain areas will have higher, and other areas lower, accident rates than would be predicted from one distribution of population.

2. Higher rates for fatal accidents will be found in the more densely populated areas surrounding
the central business district.

3. Areas of low socio-economic status will tend to have fatal accident rates higher than those for higher status areas.

4. A disproportionate number of involved persons will be of lower socio-economic status.

5. A disproportionate number of involved persons will be black.

Additionally, if, for a portion of individuals, involvement in a fatal urban traffic accident is not a random occurrence but part of a general behavior pattern related to criminal aggressivity it can be predicted that:

6. A relatively high percentage of involved individuals will have prior records for criminal offenses.

7. Those with prior records will have a greater propensity to be violators when involved in fatal urban traffic accidents than those without prior records.

8. Those with prior criminal records will be characterized by a disproportionate number of individuals with records for crimes against the person.

9. Those with prior records for traffic violations only will tend to be violators somewhat more frequently than those with no records, and somewhat less frequently than those whose prior records also include criminal law violations.

10. Those with prior records for crimes against the person will have a greater frequency of alcohol consumption when involved in a fatal urban traffic accident than those with prior records for property crimes.

The above predictions are based upon what is already known about the ecological and demographic distribution of a major urban social problem - conventional crime - and the relationship between violent crimes against the person and
culturally learned patterns of behavior. These predictions, while not hypotheses in the classical sense, provide a basis upon which to determine if similarities exist between fatal urban traffic accidents as a social problem and urban crime. Should the following exploratory research validate these predictions, strength would be given to the assumption that fatal urban traffic accidents represent a conventional urban social problem.
CHAPTER II

METHODOLOGY

Nature of the Data

After approval for the proposed research was granted by the Columbus Police Department, contact was made with the Accident Investigation Squad (AIS) to determine the nature and availability of data concerning traffic accidents. A fatal injury accident can result in a charge of manslaughter by vehicle in either the first (felony) or second (misdemeanor) degree (O.R.C. 4511.18, 4511.181). For this reason, such incidents are investigated to a far greater extent than either injury or property damage only accidents. Accidents involving no fatalities are investigated by the uniform subdivision officer(s) responding to the accident call, and a standardized accident report form is filed (see Appendix A). If a fatality, or a possible fatality is involved, a member of the AIS is called in to conduct further investigation, both at the scene of the accident and during subsequent days, to determine if a charge of manslaughter by vehicle should be brought against an involved driver. The sole function of the AIS is to investigate all fatal and hit-skip
(hit and run) accidents in the city of Columbus.

This study focuses upon fatal accidents for two reasons. First, in an urban environment which is highly traffic-controlled a fatal accident generally requires significant violation of traffic regulations. While property damage and minor injury accidents can frequently result from minor errors in judgment, accidents within a city frequently must involve clearly negligent driving behavior. On rural roads and highways where the normative speed limit is in excess of sixty miles per hour, any accident, regardless of how minor the driving error involved, may very likely be a fatal accident. Contrastingly, in an urban environment with considerably lower normative speed limits and more stringent traffic control, minor law infractions and judgment errors will seldom result in a fatal accident. That is, urban traffic accidents generally require more extensive violation of legal and normative traffic regulations before they will result in a fatality than do rural road or highway accidents. Thus, the urban traffic fatality is an inherently more criminal phenomenon than the rural road fatal accident. This correspondence of the fatal urban traffic accident with law violation makes it an appropriate focus for the research undertaken here.

Second, the selection of fatal accidents would enable the utilization of the rather extensive data gathered by the AIS, in contrast to the limited accident reports available
for non-fatal accidents. In an attempt to determine the sociological aspects of traffic accidents, this more extensive data concerning involved individuals is a critical necessity.

In addition to the basic accident report form completed for all accidents, each fatal accident packet includes the following: (1) A written, chronologically presented report of the investigation process. This report, compiled by the investigating AIS officer(s) begins with the initial investigation at the scene of the accident and includes all subsequent investigations and contacts made leading to the disposition of the case. (2) Written statements from survivors involved in the accident and witnesses to the accident. These statements are generally obtained either at the scene of the accident or during subsequent contacts with survivors or witnesses. (3) Photographs of the accident scene taken from a number of angles. (4) Death certificates for those fatally injured. (5) Lab reports on the alcohol content of the blood taken from those fatally injured. (6) The results of breathalizer tests given to surviving drivers. (7) A diagram of the accident showing the direction of vehicle travel, point of impact with either a pedestrian, another vehicle or a fixed object and the final attitude of the vehicles and individuals involved. (8) A special accident report form (see Appendix A) which includes information regarding the condition of various vehicle components, and
information regarding estimated speed of the vehicle derived through a computation involving length of skid marks and the coefficient of friction for the particular type of road surface involved. (9) A list of personal effects found either on the fatally injured individual or in the vehicle of a person killed in the accident. (10) A list of prior police contacts involving either traffic or non-traffic offenses for those fatally injured or surviving drivers and passengers. (11) A copy of the arrest warrant issued for those individuals determined to be liable for prosecution for manslaughter by vehicle. (12) Miscellaneous communications between the AIS officer(s) and individuals involved in the accident, survivors of individuals involved, attorneys for those charged with manslaughter by vehicle or some other related offense, and the city prosecutor are also included.

These items are contained in a separate envelope or packet which on the outside contains information providing a brief synopsis of the accident and subsequent disposition of the case (see Appendix A). These pockets are numbered and filed according to year and date of occurrence.

The above detailed information was included in all accident pockets with some slight variation. Accidents requiring less investigation to determine both the cause and the degree of responsibility of individuals involved understandably included less information. Single vehicle accidents, where the fatally involved driver was clearly
intoxicated, naturally included less information since no charges could be filed. Accidents involving two or more vehicles or a pedestrian, where the violating individual survived, generally received more investigation and generated more information. However, the above described information occurred consistently where the logic of the accident dictated that it should be included, and the consistency of information available eliminated most research problems associated with non-comparability of data.

Construction of the Instrument

After an initial period of familiarization with the data an instrument to gather and arrange the data in a usable format was constructed and pretested. The pretest resulted in little change in the format of the instrument with the exception of some very minor changes. The final form of the instrument (see Appendix B) is nearly identical to the one first constructed and pretested on 15 accident cases from a year not included in the sample.

It was decided to group the data into several separate units which could then be transferred to individual data cards. The first unit included all information relevant to the accident itself, and is identified on the instrument as "Event Information." The bulk of this information, including type, location date, time and season of the accident, weather, light, road and traffic control conditions, and
whether or not a citation was involved was gathered from the initial accident report form completed at the scene of the accident.

Subsequent data units concerned information regarding the individuals involved. For each individual either killed or injured various items of information were collected. Unlike the accident event information, however, this information was not readily available from any single source and frequently had to be determined from various sources, particularly through evaluation of written statements both by the investigating officers and survivors.

Individual information regarding age, sex, race, address, physical condition and contributing driving behavior was generally available from the initial accident report form. In certain instances, however, information regarding race and address had to be derived from either death certificate or the written report of the investigating officer.

Information regarding an individual's marital status and occupation was generally the most difficult to locate since it was not consistently presented in any particular place. Fortunately, however, such information was available for most of the individuals involved. Reading of the written reports of investigating officers, and statements by survivors, along with the death certificate, where included, generally provided the information sought. Notification of next of kin, generally included in the written report,
provided an excellent indication of marital status and death certificates generally included the individual's usual occupation. In their written statements, survivors also frequently indicated their own occupations and that of the fatally injured party.

Information regarding citations issued and the disposition of these was normally found in the written report or on the exterior of the pocket. In several instances no indication of disposition was included in the information available. In the majority of these cases, however, members of the AIS were more than willing to contact the clerk of courts or other sources of information to determine the disposition.

Identification of the vehicle involved proved to be more problematic than expected. Although the accident report form noted the vehicle make, it did not generally specify the type of automobile. Since one of the pieces of data being gathered concerned the size of the vehicle, e.g. full size, mid-size, compact, sports car, etc., this information was unsatisfactory. Fortunately, each pocket included pictures of the accident scene, and from these it was relatively easy to determine the actual vehicle model involved. In a few instances these photographs, which generally also included pictures of the victims, were utilized to determine the race of the subject where no other information was available.
Information regarding each individual's prior contacts with the police department for either traffic or non-traffic offenses was gathered from two sources. In many instances report of arrests and dispositions was included in the case record. For those cases where it was not, or where it was included for only one of the drivers or pedestrians, a form indicating the subject's name, race, age and social security number was submitted to the record office of the police department (see Appendix A). This form was with the requested information and returned to be included with the other information gathered for that particular individual.

Finally, the pretest revealed that many accidents involved circumstances not easily recorded in a standardized and uniform manner, but nevertheless important in sensitizing one to the types of behaviors related to many fatal urban traffic accidents. It was subsequently decided to record this information also, but in prose format at the end of the instrument, for possible case-study analysis.

Thus, the pretest while revealing that the initially constructed instrument was a workable one, did provide valuable information regarding the nature and possible location of various data items.

**Exposure to Risk**

Exposure to risk has been identified as an important variable in accident research. The concept of "exposure"
suggests that the greater number of risks an individual is exposed to, the greater will be his liability to accident. In both industrial research (Newbold, 1926; Vitles, 1932) and in traffic research (Coppin et. al., 1965; Hakkinen, 1963; Shaw and Sichel, 1971), the variable of exposure has been given considerable attention.

It has been shown that those drivers who have higher annual mileage rates also have higher rates of accident involvement. This factor has been used frequently to explain the overinvolvement of men in traffic accidents and the underinvolvement of older persons in such incidents. Unfortunately, the data available for this study does not make possible any control for exposure to risk. In a retrospective analysis of data of this type it is extremely difficult to determine annual miles driven by persons involved.

However, while exposure to risk may be important as a predictor variable when considering repeated involvement in accidents, it is by no means the sole explainent. Coppin and Samuels (1961) found that while repeated accident involvement was not an effective predictor of a bad driving record in terms of traffic law violations, a poor violation record was an effective predictor of accident involvement. That is, while a driver whose travelling is considerable or who drives in high risk areas may have many accidents which are not his fault, the driver who habitually violates traffic law is likely to have many accidents which result from
his behavior.

A major focus of this research is the role of the negligent driver in fatal traffic accidents. As Coppin's research indicates while exposure is important in explaining and predicting repeated accident involvement, it is less significant where patterns of repeated law violation are involved. As Willet (1968) has said:

...it is possible that while exposure to risk may be a powerful influence on the propensity to have accidents, it may not be so relevant to the propensity to commit offences...

Insofar as the present study is concerned with the characteristics of negligent drivers involved in fatal urban traffic accidents, and information regarding past driving records (that is, propensity to commit offenses) is incorporated into the data, the inability to control for exposure to risk, while regrettable, does not invalidate the research.

Selection of the Data Parameters

After examining the rates of fatal accidents for the city of Columbus for a number of years, it was decided that the universe of fatal accidents occurring over a three-year period would provide a large enough number of cases for analysis. It was also determined to collect the most recent data available. For this reason data were gathered for the universe of fatal accidents occurring on public roadways in Columbus, Ohio during the years of 1971, 1970 and 1969.
inclusive. Although this sample was based on the number of fatal accidents occurring within the three year period from 1969 to 1971, it includes all involved drivers, regardless of injury, pedestrians fatally injured, and vehicle passengers killed. Omitted were passengers of involved vehicles not fatally injured.

This selection yielded a total of 223 accidents and 429 involved individuals either killed or injured. The sample chosen does not include several fatal automobile accidents occurring on private property during the time frame selected. Since such accidents are not under the jurisdiction of the AIS of the Columbus Police Department and the data available regarding them are not comparable to these for accidents occurring on public roadways, it was decided to exclude them from the study.

It should also be noted that the number of accidents and the number of individuals involved is not evenly distributed among each of the years selected. When questioned about these yearly fluctuations, members of the AIS indicated that they are not attributable to any significant factors related either to weather, number of vehicles or varying levels of traffic enforcement. Rather, indicating the patterns of fatal accidents over a long period of years, they suggested that such fluctuations are normal occurrences. This notion would seem to coincide with national accident figures which also reveal minor upward or downward
fluctuations in successive years. For this reason it is felt that combining the three years into a single grouping posed no severe methodological problems, nor would it mask any significant variations in the accident problem from year to year.

**Constructed Data and Coding**

It will be noted that on the instrument used for data collection there are columns provided to indicate the socio-economic-character of the census tract of accident occurrence (col. 17 Event Information) and the census tract of residence for an involved individual (col. 18, Individual Information card), and that the individual's occupation is recorded by a two digit number (col. 20-21, Individual Information card). These two values are derived from sources other than the actual raw accident data being surveyed.

The AIS information gives accident location by cross streets, and individual residences by addresses. These were translated into their respective census tract numbers on the various information cards. To determine the socio-economic character of the various census tracts indicated it was decided to utilize the 1970 census of population and housing. For each census tract within the corporation limits of Columbus - the extent of the Columbus Police jurisdiction - information was obtained relevant to the socio-economic characteristics of that census tract. From the first count
tape of the 1970 census information was obtained regarding the percent of black population, the average value of housing and the average rent. From the fourth count tape of the 1970 census information was obtained regarding the mean income of families, the mean income of individuals, the percent of high school graduates, the percent unemployed, the percent of families with public assistance, the percent of individuals receiving public assistance, the percent of families below the poverty level, the percent of unemployed individuals below the poverty level, and the percent of individuals in each tract living in the same house in 1970 that they did in 1965. Each census tract was assigned a rank for each of these twelve variables. These ranks were summed and then divided by twelve to determine the average overall rank score. On the basis of these average ranks the census tracks were re-ranked and divided into three categories. For the purpose of analyses those census tracts falling in the upper third of the final ranking are identified as high socio-economic status, those in the middle third as middle socio-economic status and those in the bottom third as low socio-economic status.

It is felt that these variables provide valid information regarding the socio-economic characteristics of the various census tracts, and that the process of locating census tracts according to an average rank based on the rankings for all twelve variables will adjust intra-variable
differences thus providing a relatively sensitive measure of socio-economic status.

The individual subject's occupation is directly translated into a value derived from the seven-point occupational scale devised by Hollingshead (1957) as a part of his "Index of Social Position." The values assigned, however, are reversed so that the lowest numbers are assigned to the lowest occupational statuses. As Hollingshead arranged it, the higher numbers indicate lower position. For the purpose of analysis the categories of higher executives, business managers and administrative personnel (values 7, 6 and 5 according to our ranking) were labeled as white collar status. Categories including lower level clerical and sales workers, technicians, and skilled manual employees (values 4 and 3) were identified as middle status occupations. Occupations corresponding either to semi-skilled, machine operators or unskilled laborers (values 2 and 1) were identified as having low occupational status.

Certain other variables such as vehicle make, violation for which an individual was cited, sentence received, state in which the driver was licensed, and sentencing judge were identified on the basis of a code derived directly from the available data. For these variables the various alternatives and combinations of alternatives which appeared in the data were listed and assigned a value. This value was then transferred to the appropriate form.
A final data coding step was performed for the individual's traffic and other violations. Each report was evaluated to determine, (1) the total number of violations, both traffic and non-traffic, (2) the total number of arrests for criminal offenses, (3) the total number of felony arrests, (4) the total number of felony arrests for personal offenses, (5) the total number of felony arrests for property offenses, (6) the total number of misdemeanor (non-traffic) offenses, (7) the total number of misdemeanor arrests for personal crimes, (8) the total number of misdemeanor arrests for property crimes, (9) the total number of traffic violations, (10) the total number of moving traffic violations and (11) the total number of non-moving violations. These values were transmitted as raw numbers to the corresponding location on the individual information cards.

Collection of the Data

The data from the AIS files was collected during the period from July, 1972 through September, 1972. The period of data collection also provided a valuable opportunity to interact with members of the AIS. After an initial period of familiarization, the various AIS members tended to ignore, in a very positive sense, the presence of a researcher in their midst. Conversation was both free and open providing an opportunity to view the normal operation of the AIS, and members of the AIS responded willingly to questions about
various accidents either included in the study or currently under investigation. In fact, the period of data collection would have been significantly shorter except for the fact that a considerable amount of the day was given over to accident-related conversation.

During this period of time topics frequently discussed included the problem of obtaining convictions against individuals for manslaughter by vehicle for various legal reasons, the role of alcohol and racial background in the causation of accidents, the problems of establishing responsibility for accidents, methods of locating hit-skip drivers and numerous anecdotes regarding unusual accidents investigated by the AIS. These interchanges proved invaluable in understanding both the nature of the urban accident problem and the role of the Accident Investigation Squad in assigning responsibility for accidents to the various individuals involved. Of particular importance was conversationally derived information regarding methods of assigning responsibility for accidents.

The two most frequently assigned contributing behaviors were intoxication and excessive speed. It was learned that a fatally injured individual was listed as being intoxicated only if his blood alcohol content was measured, otherwise his physical condition was listed as unknown. For those surviving drivers intoxication was determined by a breathalyzer. Those registering over 0.10% alcohol were listed as
intoxicated, and those less than 0.10% but more than 0.01% were identified as drinking but not intoxicated.

The question of whether an individual was driving at speed in excess of the law was generally determined from a coefficient of friction applied to length of the skid mark adjusted for type of road, a condition of tires made by the automobile, if such a mark was made. If such information was not available for measurement, witness' statements were used to establish excessive speed. Lacking either one of these information sources, no judgment regarding speed was made.

Such information lends credibility to data found in the accident records, and numerous conversations both with and among AIS officers indicated that they generally refrained from ad hoc determinations based on little or no information.

Analysis and Presentation of Data

This research is exploratory in nature, and as such does not involve verification of theory through testing of hypotheses in any strict methodological sense. Instead we seek to better understand the overall pattern of urban traffic fatalities, to determine the characteristics of, and the part played by, various types of drivers in the causation of such fatal urban accidents, and to ascertain whether the ecological and demographic patterns of urban traffic fatalities indicate that this problem may be influenced by
variables known to effect the distribution of criminal behavior.

In 1955, Herbert Blumer called for a return to exploratory research which would provide sociologists a familiarity with various social phenomena, an antecedent criteria he felt essential before undertaking more rigorous forms of scientific investigation. We take this perspective as a valid view of the sociological endeavor and attempt to here-in accomplish such an exploration of the patterns of urban traffic fatalities.

The actual analysis of the data involves several distinct modes. First, an assessment of the overall ecological distribution of fatal urban traffic accidents will be presented. This particular mode of analysis is presented, not so much for its uniqueness, since numerous researchers have reported somewhat similar analyses, but to provide an appreciation for the general accident framework in which other factors to be analyzed are located. In the ecological presentation particular attention will be given to: (1) the degree to which accident occurrences distribute themselves in a non-random manner, (2) the clustering of high liability areas in certain portions of the city, (3) the socio-economic characteristics related to the clustering of high liability areas, (4) the degree to which the ecological distribution of involved persons diverges from what would be predicted on the basis of a random distribution of
involvement throughout the population, and (5) the varia-
tions in socio-economic status between those areas with high
rates for involved persons and those with lower rates.

In this section consideration will also be given to the
effect of certain physical variables such as light condi-
tions, type of road, weather conditions and road conditions
upon the distribution of accidents.

The second mode of analysis will present the demo-
graphic and social status characteristics of involved per-
sons. The distribution of age, race, sex, marital status,
occupational status and residence will be compared with that
predicted from the characteristics of the population from
which the study sample was drawn. Additionally, these
characteristics will be analyzed for any possible relation-
ship which may exist between demographic factors and in-
volve as a victim or a violator. Parenthetically it
should be noted that status as a victim or a violator is de-
termined by involvement in negligent behavior at the time
of the accident, and not by the consequences suffered. Vic-
tims - those involved but not responsible - unlike the vic-
tims of murder are not necessarily those who die as the re-
sult of a traffic accident. We are considering a victim
here to be anyone involved in a fatal accident, and not re-
sponsible for the accident. For example, if an intoxicated
driver fails to yield at a stop signal and strikes another
automobile injuring the driver of that vehicle, but killing
himself, the dead, law-violating driver would still be considered the perpetrator, and the injured non-violating driver would be considered the victim.

The demographic mode of analysis will give particular attention to (1) any distribution of characteristics different from the distribution of these characteristics in the general population at risk, (2) those characteristics which appear to have some relationship to status as a victim or a violator, (3) the degree to which any group of involved persons demonstrates demographic characteristics similar to individuals involved in conventional crime.

A third mode of analysis will focus specifically upon the criminal and traffic histories of individuals involved in fatal urban traffic accidents. An overall analysis of the types of prior records found among individuals involved in urban traffic fatalities will be presented. Specific attention will be given to (1) any relationship which may exist between prior record and involvement as a victim or a violator upon victim or violator status, (2) any differential effect which may exist between a traffic-only prior record and one which also includes violations of criminal law, (3) the distribution of criminal records between personal and property crimes, and (4) the relationship between type of criminal history and alcohol involvement at the time of the accident. This particular mode of analysis is of crucial importance in determining what possible relationship
there may be between criminal involvement and traffic involvement.

Finally, there will be presented a typology of fatal urban traffic accidents. This will focus specifically upon the various types of individuals who become involved in traffic accidents and the differential relationship between their personal histories and accident involvement. This presentation will rely upon specific accident cases for substantive imagery to provide a degree of sensitization to the dynamics of various types of urban traffic fatalities.

Research into any social problem is of limited utility if it cannot provide some suggestions aimed at ameliorating the problem. Toward this end, a section will be included which will attempt to derive from the data presented viable concepts which may prove useful in lessening the problem of the urban traffic fatality.
CHAPTER III

ECOLOGICAL DISTRIBUTION OF URBAN TRAFFIC FATALITIES

Our principal hypothesis is that the urban traffic fatality is a form of violence and as such exhibits sociological characteristics similar to other forms of violent behavior, e.g. murder, rape, assault, etc. This hypothesis is based upon the propositions that urban traffic fatalities generally involve significant violations of traffic norms, that those social perceptions favorable to the commission of conventional forms of violent crimes are also favorable to involvement in traffic accidents and that such social perceptions are more prevalent among certain social groups than others.

Since Durkheim it has become nearly anxiomatic that social problems are not randomly distributed in society. A considerable proportion of the sociological research concerned with social problems has been devoted to the demonstration of this differential distribution, and to the identification of variables or variable clusters which have both predictive and explanatory power. Beginning with Burgess...
and Park (1925) the analysis of ecological distributions has become a critical tool in the exploration of numerous social phenomena. The contributions of Park (1925, 1936), Hawley (1950), Alihan (1938) and others have provided the theoretical basis for explaining the findings generated by analyses of ecological distributions. In the area of social deviance numerous writers (Shaw and McKay, 1931, 1942; Burgess, 1932; Dunham, 1935, 1937; Faris, 1938; Hayner, 1933, 1946; Lander, 1968; Wilks, 1967) have demonstrated the utility of ecological analysis as a method of investigating social problems.

Shaw and McKay were the first to demonstrate empirical regularities in the variation of crime rates in a large American city. Several years later, the National Commission on Law Observance and Enforcement (1931) published a replication of the Shaw and McKay study extending the analysis to six other American cities: Philadelphia, Richmond, Cleveland, Birmingham, Denver and Seattle. This study, and numerous others that followed repeatedly substantiated Shaw and McKay's findings that:

1. Rates of delinquency and crimes vary widely in different neighborhoods within a city, town or SMSA.

2. The highest crime and delinquency rates generally occur in the low rent areas located near the center of the city, and the rates decrease with increasing distance from the city center.
3. The differences in area rates reflect differences in community background. High rate areas are characterized by such things as physical deterioration and declining population.

4. ...delinquency and crime follow the pattern of the social and physical structure of the city with concentration occurring in disorganized, deteriorated areas.

In addition to these ecological regularities in the distribution of both crimes and criminals, it has been repeatedly demonstrated that certain types of crimes tend to cluster in certain geographic areas, and that there is a high correlation between the distribution of crime and that of other social problems. Schmid (1960a, 1960b) found in Seattle a high correspondence (intercorrelation over + .90) in the spatial distribution of vagrancy, disorderly conduct, drunkenness, lewdness, petty larceny and robbery. Furthermore, the distribution of these offenses was found to correlate highly with the factor of "low family and economic status," a complex of socio-economic conditions which Schmid called the "urban crime dimension par excellence." Shaw and McKay found that crime rates correlated significantly with such indicators of social disorganization as school truancy (+ .89), infant mortality (+ .64), and mental disorder (+ .72). Other researchers have found the distribution of crime to correlate significantly with a high percentage of land used for business purposes.
While such ecological analysis may not be sufficient in itself to derive a complete understanding of any social phenomenon, the information it can provide has proved useful in understanding social problems and is particularly useful in exploratory research. For these reasons the ecological distribution of urban traffic fatalities will be presented and discussed as a means of laying a groundwork for an understanding of urban traffic fatalities. The ecological distribution of urban traffic fatalities can provide both a certain level of understanding about the problem itself, and because of the extensive ecological research devoted to various criminal phenomena in the past, can also serve as a basis for comparing traffic fatalities with other urban social problems.

The Ecological Distribution of Fatal Accidents

During the three years studied (1969, 1970 and 1971) there were 223 fatal accidents occurring on public roads within the corporation limits of Columbus, Ohio. These 223 events ranged from single car mishaps involving one individual to four and five car collisions involving as many as ten persons. Included in this figure were 36 accidents (17.5 percent) which occurred on divided, six lane, limited access interstate highways. When discussing the ecology of urban traffic fatalities it is necessary to take into consideration that Columbus like most major American cities, has
within its boundaries an extensive system of interstate highways. Accidents occurring on these roads, although under the jurisdiction of the city's police department and included in the accident total for the entire city, represent a different class of accidents from those occurring on city streets. For this reason the following discussion of the ecological distribution of urban traffic accidents does not for the most part include those accidents occurring on six lane divided highways.

All accidents occurring on city streets were plotted using census tracts as the areal unit. An area was considered a low accident tract if during the three years studied there had been one fatality or less occurring within its boundaries. Medium liability tracts were those with two or three fatal accidents during the study, and high accident tracts were those with four or more accidents resulting in death. The distribution represented in Fig. 1 includes all fatal accidents regardless of type, i.e. single car, multiple vehicle or pedestrian.

The city of Columbus contains 161 census tract divisions within its corporation limits. Of these, the 12 high accident tracts, 7.4 percent of the total number of tracts, accounted for 34.2 percent of the total number of fatal accidents. An additional 24 medium-accident tracts, 14.9 percent of the total number contributed 30.5 percent of the fatal accidents. Thus, only slightly more than 22 percent
Figure 1  Distribution of High, Medium and Low Accident Liability Tracts

High - 4 or more fatal accidents
Medium - 2-3 fatal accidents
Low - 1 or no fatal accidents
of the total number of tracts accounted for approximately two-thirds of the fatal accidents (see Table 1).

When considering the population contained within the various census tract groups, the proportions remain much the same. The 12 high-accident tracts contain within them 8.9 percent of the total population yet contribute 34.2 percent of the accidents. An additional 18.4 percent of the population live in the medium-accident tracts and account for another 30.5 percent of the accident total. Taken together the high and medium tracts contain 27.3 percent of the total population yet account for 65 percent of all fatal accidents in the city (see Table 1). Using either the number of census tracts or the population contained in each category to determine expected frequencies, the above distribution of accidents differed significantly from chance at the .001 level of significance.

From a sociological perspective this information strengthens the hypothesis that fatal urban traffic accidents do not distribute themselves in a geographically random fashion, but it alone fails to identify either predictive or explanatory variables which can account for this differential distribution. Although the question of demographic variables will be taken up extensively later, it is necessary to mention that the distribution of blacks does bear some relationship to the distribution of traffic fatalities in an urban setting. While the 12 high-accident
Table 1  Distribution of Fatal Urban Accidents Among High, Medium and Low Accident Liability Tracts

<table>
<thead>
<tr>
<th>Liability</th>
<th>No. of Tracts</th>
<th>% of Pop.</th>
<th>Multiple Vehicle</th>
<th>Pedestrian Accident</th>
<th>Single Vehicle</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>High</td>
<td>12</td>
<td>8.9</td>
<td>17</td>
<td>30.9</td>
<td>27</td>
<td>36.0</td>
</tr>
<tr>
<td>Medium</td>
<td>24</td>
<td>18.4</td>
<td>14</td>
<td>25.5</td>
<td>27</td>
<td>36.0</td>
</tr>
<tr>
<td>Low</td>
<td>125</td>
<td>72.7</td>
<td>24</td>
<td>43.6</td>
<td>21</td>
<td>28.0</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>100.0</td>
<td>55</td>
<td>100.0</td>
<td>75</td>
<td>100.0</td>
</tr>
</tbody>
</table>
tracts contained only 8.9 percent of the total city population, they contained 17.5 percent of the black population, and the medium-accident tracts contained 18.4 percent of the total but 34.2 percent of the black residents. Taken together the high and medium accident tracts contain 27.3 percent of the total population but 51.7 percent of the black population and only 21.9 percent of the white residents. It is clear from these figures (see Table 2) that blacks are overrepresented and whites underrepresented in those census tracts contributing 65 percent of all the fatal accidents. This distribution of blacks among the various census tract groups differs significantly (P < .001) from expected frequencies based upon their representation in the population.

Urban blacks, due to their generally lower socio-economic status, have traditionally been forced to cluster in the more deteriorated center-city areas characterized by what Shaw and McKay and others in the Chicago school of human ecology called indicators of "social disorganization." As a result, the presence of a high proportion of blacks in any particular area of a city has been found to correlate significantly with numerous social problems, particularly crime and disease. It is interesting to note that fatal traffic accidents, a phenomenon which would appear to be relatively random in its selection of involved persons, does exhibit a similar relationship to the presence of a high proportion of black residents as does other social problems.
### Table 2  
**Comparison of Accident Distribution with Percentage of Total Black Population in Various Liability Tracts**

<table>
<thead>
<tr>
<th>Liability</th>
<th>No. of Tracts</th>
<th>% of Total Population</th>
<th>% of Black Population</th>
<th>Accidents N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>12</td>
<td>8.9</td>
<td>17.5</td>
<td>64</td>
<td>34.2</td>
</tr>
<tr>
<td>Medium</td>
<td>24</td>
<td>18.4</td>
<td>34.2</td>
<td>57</td>
<td>30.5</td>
</tr>
<tr>
<td>Low</td>
<td>125</td>
<td>72.7</td>
<td>48.3</td>
<td>66</td>
<td>35.3</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>100.0</td>
<td>100.0</td>
<td>187</td>
<td>100.0</td>
</tr>
</tbody>
</table>


This fact becomes even more interesting if one considers that blacks are also overrepresented as involved persons. While they constitute 18.5 percent of the total population of the city, 25.8 percent of the involved persons were black. This suggests that the distribution of urban traffic fatality bears a similarity to the distribution of other urban social problems, particularly conventional crime.

To further investigate the possible similarity between the ecological distribution of fatal urban traffic accidents and other urban social problems a concentric zone model was applied to the geographic distribution of fatal accidents. As Fig. 1 shows, those census tracts contiguous to the central business district fall into the low accident category, a pattern unlike the distribution of rates for conventional crimes which are generally very high in the central business district. Immediately beyond this however, there is a cluster of medium-accident tracts to the north, east and south which is in turn surrounded by a belt of high-accident tracts. Beyond this clustering, there are scattered medium accident tracts with a notable cluster in the north, and two high accident tracts in the south. From this second clustering of medium accident tracts to the boundaries of the city the bulk of the census tracts reveal a low accident distribution. Visually, Fig. 2 suggests that a gradient does exist but that it is somewhat different from that usually found when applying a zonal model to the distribution
Figure 2  Zonal Distribution of Fatal Accident Rates
For 10,000 Population
of conventional crime. To ascertain how similar this pattern is to the distribution of conventional crimes, it is necessary to analyze the distribution using population based rates which provide a measure somewhat more sensitive than gross numbers of accidents.

Figure 2 shows the fatal accident rate per 10,000 population for concentric zones radiating at one mile intervals from the central business district. Since the circumference of the various zones cut through a number of census tracts, accidents were located according to their area of occurrence rather than on the basis of location within any particular census tract. Zones one through five contain only those census tracts falling within the circumference of that zone; zone six, however, contains the balance of all census tracts not falling within the first five zones. This was done to accommodate the shape of the city. As Figure 3 shows, while zone five extends to the southern boundary of the city it does not include a number of census tracts falling in the north and eastern parts of the city.

The accident rate per 10,000 population decreases steadily from zone one through zone six, with a range of 5.35 per 10,000 to 2.12 per 10,000. The rates for each zone and the percentage difference between them are as follows:
Figure 3 Zonal Distribution of Fatal Multiple Vehicle Accidents Per 10,000 Population
Table 3  Fatal Accident Rate per 10,000 Population for Concentric Zones of 1 Mile Increments

<table>
<thead>
<tr>
<th>Zone</th>
<th>Rate per 10,000</th>
<th>Percent Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>5.35</td>
<td></td>
</tr>
<tr>
<td>Zone 2</td>
<td>4.88</td>
<td>8.7%</td>
</tr>
<tr>
<td>Zone 3</td>
<td>3.69</td>
<td>24.3%</td>
</tr>
<tr>
<td>Zone 4</td>
<td>2.86</td>
<td>22.4%</td>
</tr>
<tr>
<td>Zone 5</td>
<td>2.33</td>
<td>18.5%</td>
</tr>
<tr>
<td>Zone 6 (balance of city)</td>
<td>2.12</td>
<td>9.0%</td>
</tr>
</tbody>
</table>

Although the range is not so broad as that found for the zonal distribution of crime and delinquency, there does exist a clearly decreasing gradient from the center of the city outward, similar to that which exists for the distribution of conventional crimes. Furthermore, the distribution of accidents through the various zones differs significantly from the expected frequencies based upon the population in each zone at a probability level between .01 and .001.

The importance of this decreasing trend is further heightened by the fact that the percentage of high speed roads increases as the distance from the city increases. The latter have increased markedly because, among other variables, Columbus has expanded its corporate limits to include many relatively rural areas within its boundaries. This expansion can readily be demonstrated by the number
of census tracts in the outlying portions of the city which have populations of less than 1,000, while the normal range of population for census tracts is from 3,000 to 5,000. Unlike conventional crimes for which opportunity is more readily available in the center-city, the risks of high speed collisions resulting in death are greater near the boundaries of the city.

It may, however, be the case that the population density of the center city area results in a high proportion of pedestrian deaths occurring there, thus accounting for this seemingly decreasing rate despite increasing opportunity. If this assumption is correct the steadily decreasing accident rate found when all accidents are taken together should not appear when rates are computed on the basis of type of accident. Following are the rates per 10,000 population for each zone based on the type of accident resulting in a fatality (see Figures 3, 4 and 5).
Figure 4  Zonal Distribution of Fatal Pedestrian Accidents
For 10,000 Population
Figure 5  Zonal Distribution of Fatal Single Vehicle Accidents Per 10,000 Population
### Table 4  Fatal Accident Rate per 10,000 Population by Type of Accident for Concentric Zones of 1 Mile Increments

<table>
<thead>
<tr>
<th>Zone</th>
<th>Multiple</th>
<th>Pedestrian</th>
<th>Single Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>0.446</td>
<td>2.67</td>
<td>2.23</td>
</tr>
<tr>
<td>Zone 2</td>
<td>1.22</td>
<td>2.80</td>
<td>0.854</td>
</tr>
<tr>
<td>Zone 3</td>
<td>0.979</td>
<td>1.62</td>
<td>1.41</td>
</tr>
<tr>
<td>Zone 4</td>
<td>0.573</td>
<td>1.52</td>
<td>0.382</td>
</tr>
<tr>
<td>Zone 5</td>
<td>0.954</td>
<td>0.742</td>
<td>0.848</td>
</tr>
<tr>
<td>Zone 6</td>
<td>0.921</td>
<td>0.425</td>
<td>0.779</td>
</tr>
</tbody>
</table>

As these rates based upon type of accident show, the smoothly decreasing trend away from the center city found for all accidents taken together, does alter somewhat. However, it did not reverse itself either for moving vehicles or single car accidents. In fact, for all types of accidents the more centrally located zones have the higher rates despite the irregularity which does appear. If the opportunity for fatal high speed collision afforded by the roads located nearer the perimeter of the city were a crucial variable in the distribution of such accidents one would expect to find that for these types of collisions the highest rates would be in zones 5 and 6. However, in only one case did the rates in these two zones exceed the rate for similar accidents in zones one or two.
For multiple vehicle accidents the central business district, which is the major component of Zone 1, recorded the lowest rate. This zone also, recorded the highest single car rate and the second highest pedestrian rate. Zone 2 had the highest rates for both moving and pedestrian accidents, and a moderate rate (third highest overall) for single car accidents. Ideally, the low rate for multiple car accidents in Zone 1, and the low rate for single car accidents in Zone 2 should not appear if the zonal hypothesis of distribution were perfectly represented. Where such divergences from the normal pattern appear, additional variables are required to explain them. Unfortunately, it is impossible from the available data to clearly determine whether these divergences from the overall pattern represent significant differences in the character of these zones, or whether they are the result of other factors essentially unrelated to the character of the zones.

Despite these two deviant cases, the highest rates for the three types of accidents analyzed were found in the more centrally located zones, with the peripheral zones not recording noticeably high rates for any category of accidents, and in a majority of instances recording the lowest rates. Given this general trend for those zones located nearer the center city to be highest for all types of accidents, the assumption that the decreasing accident gradient is an artifact of the predominance of pedestrian accidents in the
central area cannot be maintained. Furthermore, the fact that Zone 2, and not Zone 1, recorded the highest rates for both moving and pedestrian accidents suggests that it is not simply density of traffic, but the type of traffic which is critical in the causation of fatal traffic mishaps. Zone 1, encompassing the central business district, is the most densely trafficked area of the city. Zone 2, primarily an area of lower class residences, however, recorded the highest rates for moving and pedestrian accidents. Furthermore, although Zone 1 had the highest rate for single car accidents, the majority of these occurred not within the central business district but on the edges of the central business district. Because they occurred near the boundaries they fell into Zone 1, but in actuality occurred in areas far more similar to the "zone of transition" than to the central business district.

Thus, fatal accidents are distributed similarly to violent urban crimes. The distribution of fatal accidents is not unaffected, of course, by population density, type of road, traffic control and other such variables. However, the influence of such variables does not diminish the significance of the ecological distribution anymore than the predominance of taverns in the center city diminishes the distribution of murder and assault rates.
Ecological Distribution of Involved Persons

In addition to examining the ecological distribution of accidents themselves, we also considered the distribution of involved persons. The issue is the degree to which the distributions of events and individuals involved do or do not correspond.

During the three years studied there were 429 individuals involved in fatal accidents as either drivers or fatally injured non-drivers. Of these, 384 lived within the corporation limits of the city studied. The residences of these individuals were plotted according to census tract, and further analysis was based upon this areal unit (see Fig. 6). Census tracts were grouped as high, medium and low residence areas of involved persons, with those having less than 3 being low, those with 3 to 6 fatally injured persons as medium and those with 7 or more involved residents as high. The maximum number of involved persons from a single census tract was 14, and 34 percent of all census tracts had no residents involved in a fatal traffic mishap.

Those census tracts falling in the "high" group accounted for 39.4 percent of all involved persons residing in Columbus, while they constituted only 9.9 percent of the census tracts and contained 12.3 percent of the total population. Those falling in the "medium" range, 26.0 percent of the total number of tracts, accounted for 42.3 percent
Figure 6  Distribution of High, Medium and Low Residence Tracts

High - 7 or more fatally injured residents
Medium - 3 to 6 fatally injured residents
Low - 2 or less fatally injured residents
of involved persons while containing only 28.9 percent of the population. Thus, the high and medium tracts, containing 41.2 percent of the population contributed 82.7 percent of the individuals involved in fatal traffic mishaps (see Table 5). This distribution of individuals involved in fatal accidents is significantly different from expected frequencies based upon either the number of tracts or the population in each category at the .001 level.

The relationship between a high percentage of blacks and the number of individuals involved in fatal accidents appeared weaker than that found in the number of accidents (see Table 6). The high tracts on the basis of involved persons contained 12.3 percent of the total population and 13.2 percent of the city's black population. This overrepresentation of only 0.9 percent was considerably lower than the 8.6 percent overrepresentation of blacks in tracts highest on the number of accident events. The medium tracts contained 28.9 percent of the city's population and 34.7 percent of the black population. Although blacks were somewhat overrepresented in the residence tracts (5.8%), this imbalance was clearly less than that found for medium accident tracts, which contained 18.4 percent of the population but 34.2 percent of the blacks. Overall, the tracts high and medium on the number of involved persons contained 41.2 percent of the total population and 47.9 percent of the blacks. This 6.7 percent overrepresentation of blacks was
<table>
<thead>
<tr>
<th>Liability</th>
<th>No. of Tracts</th>
<th>% of Pop.</th>
<th>Violators</th>
<th>%</th>
<th>Victims</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>16</td>
<td>12.3</td>
<td>80</td>
<td>40.4</td>
<td>63</td>
<td>38.0</td>
<td>151</td>
<td>39.4</td>
</tr>
<tr>
<td>Medium</td>
<td>42</td>
<td>28.9</td>
<td>93</td>
<td>42.7</td>
<td>69</td>
<td>41.6</td>
<td>162</td>
<td>42.3</td>
</tr>
<tr>
<td>Low</td>
<td>103</td>
<td>45.4</td>
<td>37</td>
<td>16.9</td>
<td>34</td>
<td>20.4</td>
<td>71</td>
<td>18.3</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>100.0</td>
<td>218</td>
<td>100.0</td>
<td>166</td>
<td>100.0</td>
<td>384</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 6  Comparison of Individual Distribution with Percentage of Total Black Population in Various Residence Liability Tracts

<table>
<thead>
<tr>
<th>Liability</th>
<th>No. of Tracts</th>
<th>% of Total Population</th>
<th>% of Black Population</th>
<th>Individuals N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>16</td>
<td>12.3</td>
<td>13.2</td>
<td>151</td>
<td>39.4</td>
</tr>
<tr>
<td>Medium</td>
<td>42</td>
<td>28.9</td>
<td>34.7</td>
<td>162</td>
<td>42.3</td>
</tr>
<tr>
<td>Low</td>
<td>103</td>
<td>58.8</td>
<td>52.1</td>
<td>71</td>
<td>18.3</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>100.0</td>
<td>100.0</td>
<td>384</td>
<td>100.0</td>
</tr>
</tbody>
</table>
substantially lower than the 24.2 percent overrepresentation of blacks in tracts high and medium for the number of accidents occurring there.

This finding suggests that while the percent of the census tract population which is black, and the other social and structural variables known to co-vary with this, may have some effect on the selection of census tracts as high or low accident liability areas, the power of this variable to predict or explain the ecological distribution of involved individuals is clearly less. That is, those social and structural characteristics which predominate in census tract areas with a high proportion of black residents appear to have more influence on the occurrence of accidents than on the selection of individuals involved in them.

The residential distribution of involved persons was also examined on the basis of concentric zones extending at one mile radius intervals from the downtown business district, as was the distribution of accident occurrences (see Fig. 7). The overall distribution of involved persons per 10,000 inhabitants for the six zones is as follows:
Figure 7  Zonal Distribution of Fatality Rates Per 10,000 Population
Table 7  Fatality Rate per 10,000 Population for Concentric Zones of 1 Mile Increments

<table>
<thead>
<tr>
<th>Zone</th>
<th>Rate per 10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>5.80</td>
</tr>
<tr>
<td>Zone 2</td>
<td>8.79</td>
</tr>
<tr>
<td>Zone 3</td>
<td>6.96</td>
</tr>
<tr>
<td>Zone 4</td>
<td>6.50</td>
</tr>
<tr>
<td>Zone 5</td>
<td>5.50</td>
</tr>
<tr>
<td>Zone 6</td>
<td>6.39</td>
</tr>
</tbody>
</table>

While the zonal gradient here is not as regular as that found for the distribution of accidents, the overall trend is clearly for reduced rates as one moves away from the center of the city. This distribution of involved individuals through the various zones is statistically significant from expected population frequencies at the .001 level of significance. The two deviant cases were Zone 1, nearest the center city, and Zone 6, farthest from it. The fact that the rate for zone one was considerably smaller than that for Zone 2 is understandable in that Zone one is the least residential of all 6 zones. The total population of this zone is only 22,409 while the next smallest zone has a population of nearly four times as great (Zone 2, 81,859). Thus, while Zone 1 is an exceedingly heavily traveled area, it is sparsely populated. Perhaps of most importance is that
Zone 2, which had the highest rate for both multiple vehicle and pedestrian accidents also had the highest rate for involved individuals. Zone 2 thus contributes both a high percentage of the accidents and of involved individuals.

A further investigation of the ecological distribution of involved persons was made on the basis of whether the individual's participation in the fatal accident was as victim or violator. Following are the rates for victims and violators and the percent of the victim rate by which the violator rate exceeds it (see Figures 8 and 9).

Table 8  Fatality Rates of Violators and Victims per 10,000 Population for Concentric Zones of 1 Mile Increments

<table>
<thead>
<tr>
<th></th>
<th>Rate per 10,000</th>
<th>Percent of violators in excess of victims</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Victim</td>
<td>Violator</td>
</tr>
<tr>
<td>Zone 1</td>
<td>3.12</td>
<td>2.67</td>
</tr>
<tr>
<td>Zone 2</td>
<td>3.54</td>
<td>5.25</td>
</tr>
<tr>
<td>Zone 3</td>
<td>2.61</td>
<td>4.35</td>
</tr>
<tr>
<td>Zone 4</td>
<td>2.96</td>
<td>4.20</td>
</tr>
<tr>
<td>Zone 5</td>
<td>2.22</td>
<td>3.18</td>
</tr>
<tr>
<td>Zone 6</td>
<td>3.40</td>
<td>3.32</td>
</tr>
</tbody>
</table>

The highest rates for both victims and violators was again Zone 2, and when considering the excess of the violator rate over the victim rate two deviant cases appeared, Zone 1 and
Figure 8  
Zonal Distribution of Fatality Rates for Violators Per 10,000 Population
Figure 9  Zonal Distribution of Fatality Rates for Victims Per 10,000 Population
Zone 6. Only in these two areas did the victim rate exceed the violator rate. This excess is more notable when one considers that in gross numbers violators exceeded victims by 60, and in percentage by 37.7. That is, the greater number of violators would prejudice any distribution toward a higher rate of violators than victims. The fact that in zones 1 and 6 victim rates exceeded violator rates represents a strong deviation from the expected distribution one would find if victims and violators were distributed randomly.

Socio-Economic Factors and the Urban Traffic Fatality

Taking all traffic accidents together the percentage distribution by socio-economic status was: 17.1 percent of all accidents occurred in the upper third of the ranked census tracts, 31.6 percent in the middle third and 51.3 percent in the lowest third. These figures suggest that by far the greatest proportion of accidents occur in those census tracts falling lowest on the socio-economic ladder, and do so with regularity sufficient to result in a distribution significantly different from the expected frequency at the .001 level of probability.

Even when controlling for type of accident, this over-representation of accidents in the lowest socio-economic tracts remained (see Table 9). For multiple vehicle accidents, 18.2 percent occurred in the highest third, 34.5
Table 9 Distribution of Fatal Urban Traffic Accidents by Type in High, Medium and Low SES Census Tracts

<table>
<thead>
<tr>
<th>SES</th>
<th>No. of Tracts</th>
<th>% of Total Population</th>
<th>% of Black Population</th>
<th>Multiple Vehicle</th>
<th>Pedestrian Accident</th>
<th>Single Vehicle</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>High</td>
<td>54</td>
<td>34.0</td>
<td>5.6</td>
<td>10</td>
<td>18.2</td>
<td>8</td>
<td>10.7</td>
</tr>
<tr>
<td>Middle</td>
<td>53</td>
<td>28.5</td>
<td>19.8</td>
<td>19</td>
<td>34.5</td>
<td>23</td>
<td>30.7</td>
</tr>
<tr>
<td>Low</td>
<td>54</td>
<td>37.5</td>
<td>76.6</td>
<td>26</td>
<td>47.3</td>
<td>44</td>
<td>58.6</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>100.0</td>
<td>100.0</td>
<td>55</td>
<td>100.0</td>
<td>75</td>
<td>100.0</td>
</tr>
</tbody>
</table>
percent occurred in the middle third and 47.3 percent in the lowest third. Pedestrian accidents distributed themselves so that 10.7 percent were in the upper third, 30.7 percent in the middle third and 57.3 percent in the bottom third. For single car accidents, the distribution was 24.6 percent in the upper third, 29.8 percent in the middle third and 45.9 percent in the bottom third. Thus, in all three types of accidents, the middle and upper third were underinvolved and the bottom third overinvolved, with some degree of variation. The overinvolvement of the lowest socio-economic tracts was found to be greatest for pedestrian accidents and the least for single car accidents. The converse was also true; the upper third was least involved in pedestrian accidents and most involved in single car accidents. The most likely reason for this difference lies in the structural and physical arrangements which predominate in each of the different socio-economic groups of census tracts. Lower ranked socio-economic tracts are generally characterized by relatively high population density and subsequently a greater amount of pedestrian traffic. The higher ranked census tracts, on the other hand, are less dense, with lighter pedestrian activity and hence, a high percentage of the high speed roads which provide greater opportunity for the single car mishap. It must be remembered, however, that these differences are in the underinvolvement of the upper socio-economic tracts, and that in no case does their contribution
to the overall accident picture exceed, or even approach, that of the lower ranked census tracts.

The relationship between involved individuals and the socio-economic characteristics of the census tract reveals the same overinvolvement of individuals from the lower socio-economically ranked tracts. As Table 10 shows there is a clear bias for involved individuals to reside in the lower third of the tracts. Of all fatalities, 48.7 percent lived in the poorest census tract group; 28.6 percent lived in the middle status group, and 22.7 percent lived in the upper third of the census tract groups. This distribution was significantly ($P < .001$) different from expected frequencies based on the proportion of the population residing in each socio-economic group of tracts. There was a slight (5.6 percent) increase in the number of individuals contributed by the upper third when compared to its contribution to the number of accidents, but the distribution of individuals killed was about the same as that of events when considering the socio-economic characteristics of census tracts.

Controlling for individual involvement as either violator or victim resulted in no marked change in the percentage distributions. The upper third of the tracts contributed 22.0 percent of the violators and 23.5 percent of the victims. The middle third accounted for another 28.9 percent of the violators and 28.3 percent of the victims. The bottom third once again contributed the largest amount
Table 10  Distribution of Involved Persons by Status as Violator or Victim in High, Medium and Low SES Census Tracts

<table>
<thead>
<tr>
<th>SES</th>
<th>No. of Tracts</th>
<th>% of Total Population</th>
<th>% of Black Population</th>
<th>Violators N %</th>
<th>Victims N %</th>
<th>Total N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>54</td>
<td>34.0</td>
<td>5.6</td>
<td>48 22.0</td>
<td>39 23.5</td>
<td>87 22.7</td>
</tr>
<tr>
<td>Middle</td>
<td>53</td>
<td>28.5</td>
<td>19.8</td>
<td>63 28.9</td>
<td>47 28.3</td>
<td>110 28.6</td>
</tr>
<tr>
<td>Low</td>
<td>54</td>
<td>37.5</td>
<td>76.6</td>
<td>107 49.1</td>
<td>80 48.2</td>
<td>187 48.7</td>
</tr>
<tr>
<td>Total</td>
<td>161</td>
<td>100.0</td>
<td>100.0</td>
<td>218 100.0</td>
<td>166 100.0</td>
<td>384 100.0</td>
</tr>
</tbody>
</table>
with 49.1 percent of the violators and 48.2 of the victims residing in lower ranked tracts. The distribution of both victims and violators are statistically different from expected frequencies at a probability level falling between .01 and .001. Thus, the greatest percentage of both victims and violators lived in the lower ranked tracts. This suggests that involvement in a fatal traffic accident may very well be an intra-class phenomenon. That is, since individuals involved in traffic accidents are generally near their own residence area when it happens, the likelihood that one will be involved in a traffic mishap with an individual of similar socio-economic standing is increased.

In sum, census tracts with the greatest predominance of those characteristics repeatedly shown to correlate with conventional crimes, particularly crimes of violence, (1) had over half of all the fatal accidents on city streets and (2) nearly half of all the individuals involved in such accidents. Yet, these tracts constitute only a third of all the census tracts in the city. Further, this overinvolvement of the lower ranked tracts was slightly greater for accidents than for individuals, suggesting that the relationship between socio-economic characteristics and fatal accidents may be somewhat stronger for the selection of accident sites than for accident involved persons.
Physical Variables

In addition to ecological and demographic data concerning fatal accident and involved individuals, data were gathered concerning certain physical variables which are known to be related to the occurrence of accidents. These variables fall into two categories, meteorological and engineering.

Season

Each accident was seasonally identified using the dates for the summer and winter solstice, and the vernal and autumnal equinox as the dividing points. Of the 223 accidents 21.1 percent occurred in the spring, 30.0 percent in the summer, 25.1 percent in the autumn and 23.8 percent in the winter. This is a relatively even distribution of accidents by season. The degree to which the observed frequencies differed from expected frequencies was not statistically significant (P.<.30). These figures are quite similar to national averages (National Safety Council, 1970,1971) for the same years as those studied, and indicate that the seasonal distribution of fatal accidents in urban environments does not differ noticeably from data based on all accidents resulting in death.

Day

The accidents were distributed evenly throughout the
days of the week with a slight bias towards increased rates on the weekend. The percentage distribution of fatal accidents was: Monday, 11.2; Tuesday, 15.2; Wednesday, 11.7; Thursday, 12.6; Friday, 14.3; Saturday, 15.7; and Sunday, 19.3. This distribution was not statistically significant (P. < .20). Despite this lack of statistical significance, however, it is important to note the somewhat higher accident rates on the weekend. This finding, like that for season, is consistent with National Safety Council Statistics (1970,1971) for the entire nation. It is also to be noted that while our highest percentage of accidents occurred on Sunday, the majority of these (63%) happened during the early morning hours (between 12:00 midnight and 6:00 A.M.). This finding is also consistent with national data.

Day and Time

All accidents were distributed by day and time as follows: weekday morning, weekday afternoon and evening, weekend morning and weekend afternoon and evening. This categorization yielded the following results: weekday AM, 24.7 percent; weekday PM, 36.3 percent; weekend AM, 19.3 percent; weekend PM, 19.7 percent. Adjusting for the greater number of hours during the week than on the weekend, this distribution was statistically significant (P. < .01). The direction of this significance was toward a greater number of accidents occurring on weekends than would be predicted if
accident occurrences were randomly distributed throughout all the hours of the week.

**Light Conditions**

All accidents were further identified as having occurred during either daylight, darkness, or dusk, and the distribution showed a higher rate during the hours of darkness. Some 36.3 percent of the accidents occurred during the daylight hours; 5.8 percent during dusk, and 57.8 percent during darkness. This distribution was statistically significant (P. < .01). The general direction of this significance was toward the hours of darkness as one would suspect, and as the National Safety Council has repeatedly demonstrated. However, contrary to NSC findings, our rate during the twilight fell below the expected frequency.

**Road Conditions**

The condition of the road, whether dry, wet, or covered with snow or ice, was determined for each case. The 223 accidents distributed themselves by road condition as follows: 78.9 percent occurred on dry roads, 16.6 percent on wet roads and only 4.5 percent on snowy or icy pavement. This distribution was statistically significant (P. < .05). A greater number of accidents occurred on dry roads than expected. While inclement weather may increase the total number of accidents, it appears to have a beneficial effect for
fatal accidents in an urban environment. That is, while wet or snowy road conditions may increase property damage and personal-injury-only accidents, they also limit driving speed thereby reducing the likelihood of a fatal accident.

Weather

In addition to the condition of the roadway, information was also obtained regarding weather conditions at the time. These figures are very similar, as would be expected, to those for the road conditions reported above, with 82.5 percent of the accidents occurring during clear weather, 13.5 percent during rain and 4.0 percent during snow. Once again, however, it is apparent that inclement weather is not positively related to the causation of fatal traffic accidents.

Other Variables

Data pertaining to three other variables -- the type of area in which the accident occurred, the number of lanes, and the presence of traffic control devices -- were also gathered. Unfortunately, information necessary to determine valid expected frequencies was unobtainable and therefore, this material can only be presented in a descriptive fashion.

The accidents studied distributed themselves through various area types in the following manner: 0.9 percent of the accidents occurred in manufacturing or warehouse areas,
38.6 percent in business areas, 28.3 in residential areas, 2.2 percent near schools, 20.6 percent in open areas and 9.0 in areas listed by the police department as "other." Although business areas had the highest percentage of accidents, this figure (38.6) percent is somewhat misleading unless one understands that a "business area" means not only the central business district but also major streets in residential – particularly inner city residential – areas which are lined with the stores, shops and taverns servicing that particular section of the city. Although this local type of area and the central business district are reported together, the type of accident and the type of individuals involved will necessarily be different. It would be erroneous to conclude that this 38.6 percent figure describes accidents involving workday traffic. On the contrary, as discussed previously, the central business district, despite the high density of traffic has a relatively low rate of fatal accidents due in part to the relatively slow-moving traffic and the more extensive use of traffic control in these areas.

Traffic control mechanisms were present at the scene of the various accidents studied in the following proportions: traffic signal, 22.0 percent; stop sign, 12.1 percent; railroad crossing, 1.3 percent; other control mechanisms, 3.1 percent and no traffic controls, 61.4 percent. These figures suggest that while a substantial proportion of the accidents happened at traffic controlled cross streets (34.1
percent), the majority of the accidents occurred where no such mechanisms were operative.

The number of lanes involved in the various accidents studied varied from one to four undivided, and up to six lanes divided on the expressway. The distribution for these various types of roads was as follows: one lane streets and alleys, 1.8 percent; two lane roads and streets, 26.9 percent; three lane streets, 7.6 percent; four lanes undivided, 30.0 percent; divided or one way streets of less than four lanes, 8.5 percent; divided highway or expressway 17.5 percent; and 7.7 percent listed as "other." It is clear from these figures that the two-lane and four-lane undivided street contributed the largest proportion of the fatal accidents (56.9 percent combined). The lowest percentages, 1.6 percent for alleys 7.6 percent for the three-lane streets is an artifact of the limited number of such streets, not their inherent safety.

These variables indicate that while fatal traffic accidents may be primarily a rural-road phenomenon as suggested by the National Safety Council a sufficient proportion of them occur within urban environments — on city streets as well as expressways contained within the city's limits — to warrant their consideration as an urban social problem, as well as a national concern.
In addition to information concerning the accident event, data were gathered concerning all individuals involved as drivers whether fatally injured or not, and fatally injured non-drivers. Information was obtained on the age, sex, race, marital status, occupational status and residence of each person. The overall distribution of these characteristics, and the distribution by victim or violator status, is presented in summary Tables (11 and 12) on the following pages. Additional information specific to the accident occurrence was also obtained. This distribution of these variables, injury sustained, physical condition at the time of the accident and contributing behavior of the driver or pedestrian, are also discussed in this chapter.

This section will present the distribution and significant differences in demographic characteristics and accident-specific variables for various categories of involvement. The data will be presented by variable with consideration given to the overall distribution and its difference from expected frequencies based upon the universe from which
Table 11
Distribution of Violators and Victims by Selected Demographic and Social Status Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Violators</th>
<th>%</th>
<th>Victims</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td></td>
<td>N</td>
<td></td>
<td>N</td>
<td></td>
</tr>
<tr>
<td><strong>Race and Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both Races:</td>
<td>240</td>
<td>100.0</td>
<td>189</td>
<td>100.0</td>
<td>429</td>
<td>100.0</td>
</tr>
<tr>
<td>Male</td>
<td>188</td>
<td>78.3</td>
<td>130</td>
<td>68.8</td>
<td>318</td>
<td>74.1</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>21.7</td>
<td>59</td>
<td>31.2</td>
<td>111</td>
<td>25.9</td>
</tr>
<tr>
<td>Black:</td>
<td>59</td>
<td>100.0</td>
<td>52</td>
<td>100.0</td>
<td>111</td>
<td>100.0</td>
</tr>
<tr>
<td>Male</td>
<td>46</td>
<td>78.0</td>
<td>38</td>
<td>73.0</td>
<td>84</td>
<td>75.6</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>22.0</td>
<td>14</td>
<td>27.0</td>
<td>27</td>
<td>24.4</td>
</tr>
<tr>
<td>White:</td>
<td>181</td>
<td>100.0</td>
<td>137</td>
<td>100.0</td>
<td>318</td>
<td>100.0</td>
</tr>
<tr>
<td>Male</td>
<td>142</td>
<td>78.5</td>
<td>92</td>
<td>67.1</td>
<td>234</td>
<td>73.6</td>
</tr>
<tr>
<td>Female</td>
<td>39</td>
<td>21.5</td>
<td>45</td>
<td>32.9</td>
<td>84</td>
<td>26.4</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>under 16</td>
<td>23</td>
<td>9.6</td>
<td>10</td>
<td>5.3</td>
<td>33</td>
<td>7.7</td>
</tr>
<tr>
<td>16 to 20</td>
<td>24</td>
<td>10.0</td>
<td>38</td>
<td>20.1</td>
<td>62</td>
<td>14.5</td>
</tr>
<tr>
<td>21 to 35</td>
<td>94</td>
<td>39.2</td>
<td>78</td>
<td>41.3</td>
<td>172</td>
<td>40.1</td>
</tr>
<tr>
<td>36 to 65</td>
<td>72</td>
<td>30.0</td>
<td>54</td>
<td>28.6</td>
<td>126</td>
<td>29.4</td>
</tr>
<tr>
<td>over 65</td>
<td>27</td>
<td>11.3</td>
<td>9</td>
<td>4.8</td>
<td>36</td>
<td>8.4</td>
</tr>
<tr>
<td>Total:</td>
<td>240</td>
<td>100.0</td>
<td>189</td>
<td>100.0</td>
<td>429</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 12  Distribution of Violators and Victims by Selected Demographic and Social Status Variables (continued)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Violators N</th>
<th>Violators %</th>
<th>Victims N</th>
<th>Victims %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>69</td>
<td>31.4</td>
<td>51</td>
<td>31.8</td>
<td>120</td>
<td>31.6</td>
</tr>
<tr>
<td>Married</td>
<td>108</td>
<td>49.1</td>
<td>94</td>
<td>58.8</td>
<td>202</td>
<td>53.2</td>
</tr>
<tr>
<td>Divorced or Sep.</td>
<td>43</td>
<td>19.5</td>
<td>15</td>
<td>9.4</td>
<td>58</td>
<td>15.2</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>220</td>
<td>100.0</td>
<td>160</td>
<td>100.0</td>
<td>380</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unskilled Labor</td>
<td>147</td>
<td>70.4</td>
<td>96</td>
<td>55.2</td>
<td>243</td>
<td>63.4</td>
</tr>
<tr>
<td>Craft or Clerical</td>
<td>54</td>
<td>25.8</td>
<td>66</td>
<td>37.9</td>
<td>120</td>
<td>31.3</td>
</tr>
<tr>
<td>White Collar</td>
<td>8</td>
<td>3.8</td>
<td>12</td>
<td>6.9</td>
<td>20</td>
<td>5.3</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>209</td>
<td>100.0</td>
<td>174</td>
<td>100.0</td>
<td>383</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High SES</td>
<td>48</td>
<td>22.0</td>
<td>39</td>
<td>23.5</td>
<td>87</td>
<td>22.7</td>
</tr>
<tr>
<td>Middle SES</td>
<td>63</td>
<td>28.9</td>
<td>47</td>
<td>28.3</td>
<td>110</td>
<td>28.6</td>
</tr>
<tr>
<td>Low SES</td>
<td>107</td>
<td>49.1</td>
<td>80</td>
<td>48.2</td>
<td>187</td>
<td>48.7</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>218</td>
<td>100.0</td>
<td>166</td>
<td>100.0</td>
<td>384</td>
<td>100.0</td>
</tr>
</tbody>
</table>
the sample was drawn, distribution for victims and violators, and the distribution among the four categories of involvement: driver violator, driver victim, pedestrian violator, and pedestrian and passenger victim. Where appropriate the distribution of these variables will be presented with controls for type of accident.

**Sex**

Of those individuals involved in fatal traffic accidents 74.1 percent (N = 318) were men and 25.9 percent (N = 111) were women. This distribution differed significantly (P < .001) from the expected frequency based on the sex composition of the population from which the sample was derived. While males were overrepresented among those involved in fatal accidents they were not significantly (P < .05) overrepresented as violators when considering the dichotomous variable of victim-violator (see Table 13). However, the expanded violator-victim variable including the distinction between pedestrians and drivers, produced a significant (P < .001) difference between the involvement of men and women (see Table 14). Men were clearly overinvolved and women underinvolved as driver violators, while women were significantly overinvolved as pedestrian violators and as pedestrian-passenger victims, with an underinvolvement of men in these categories. This relationship between sex and category of involvement remained significant
### Table 13  Violator - Victim Status by Sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Violator</th>
<th></th>
<th>Victim</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>188</td>
<td>78.3</td>
<td>130</td>
<td>68.8</td>
<td>318</td>
<td>74.1</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>21.7</td>
<td>59</td>
<td>31.2</td>
<td>111</td>
<td>25.9</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
<td>100</td>
<td>189</td>
<td>100</td>
<td>429</td>
<td>100</td>
</tr>
</tbody>
</table>

\[ x^2 = 4.54256 \quad P > .05 \]

### Table 14  Sex Distribution of Involved Persons for Selected Involvement Categories

<table>
<thead>
<tr>
<th>Sex</th>
<th>Driver Violator</th>
<th></th>
<th>Driver Victim</th>
<th></th>
<th>Pedestrian Violator</th>
<th></th>
<th>Pedestrian Victim</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>145</td>
<td>83.8</td>
<td>96</td>
<td>78.0</td>
<td>43</td>
<td>64.2</td>
<td>34</td>
<td>51.5</td>
<td>318</td>
<td>74.1</td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>16.2</td>
<td>27</td>
<td>22.0</td>
<td>24</td>
<td>35.8</td>
<td>32</td>
<td>48.5</td>
<td>111</td>
<td>25.9</td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>100</td>
<td>123</td>
<td>100</td>
<td>67</td>
<td>100</td>
<td>66</td>
<td>100</td>
<td>429</td>
<td>100</td>
</tr>
</tbody>
</table>

\[ x^2 = 30.50407 \quad P < .001 \]
(P < .001), as would be expected, for multiple vehicle accidents (see Table 15) but disappeared for pedestrian accidents (see Table 16). Although not statistically significant, men were also slightly overrepresented (4.3 percent) as violators in single vehicle accidents and underrepresented as passenger victims (19.4 percent) (see Table 17).

The fact that men were involved in fatal accidents three times as frequently as women is consistent with national data and is explained by their greater exposure and access to automobiles and occurs, despite the fact that women constitute over 40 percent of the licensed drivers in the country. These data also show that men tend to be involved in negligent driving when involved in fatal non-pedestrian accidents significantly more often than women, even when adjusting for their greater involvement in accidents generally. Thus, it appears that men are involved in vehicular law-violation more frequently than women, just as men are involved in conventionally criminal law-violations more than women.

In summary the sex distribution of involved persons demonstrates that:

1. Men are significantly more frequently involved in fatal urban traffic accidents than their proportion of the population would suggest.

2. Women are more frequently involved as pedestrians and passengers than their proportion of the total involved persons would predict.
Table 15  Sex Distributions of Persons Involved in Multiple Vehicle Accidents According to Involvement Category

<table>
<thead>
<tr>
<th>Sex</th>
<th>Driver Violator</th>
<th>Driver Violator</th>
<th>Pedestrian Violator</th>
<th>Ped.-Pass. Victim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Male</td>
<td>52</td>
<td>77.6</td>
<td>45</td>
<td>84.9</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>22.4</td>
<td>8</td>
<td>15.1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>100.0</td>
<td>53</td>
<td>100.0</td>
<td>1</td>
</tr>
</tbody>
</table>

\[ x^2 = 27.80389 \quad P < .001 \]
Table 16  Sex Distributions of Persons Involved in Pedestrian Accidents According to Involvement Category

<table>
<thead>
<tr>
<th>Sex</th>
<th>Driver Violator</th>
<th>Driver Victim</th>
<th>Pedestrian Violator</th>
<th>Ped.-Pass. Victim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Male</td>
<td>22</td>
<td>81.5</td>
<td>41</td>
<td>74.5</td>
<td>47</td>
</tr>
<tr>
<td>Female</td>
<td>5</td>
<td>18.5</td>
<td>14</td>
<td>25.5</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100.0</td>
<td>55</td>
<td>100.0</td>
<td>66</td>
</tr>
</tbody>
</table>

\[ x^2 = 1.76233 \quad P > .05 \]
Table 17: Sex Distribution According to Involvement Category of Persons Involved in Single Vehicle Accidents

<table>
<thead>
<tr>
<th>Sex</th>
<th>Driver Violator N</th>
<th>Driver Violator %</th>
<th>Driver Victim N</th>
<th>Driver Victim %</th>
<th>Ped.-Pass. Victim N</th>
<th>Ped.-Pass. Victim %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>68</td>
<td>86.1</td>
<td>13</td>
<td>86.7</td>
<td>18</td>
<td>66.7</td>
<td>99</td>
<td>81.8</td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>13.9</td>
<td>2</td>
<td>13.3</td>
<td>9</td>
<td>33.3</td>
<td>22</td>
<td>18.2</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
<td>100.0</td>
<td>15</td>
<td>100.0</td>
<td>27</td>
<td>100.0</td>
<td>121</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = 5.36643 \quad P. > .05 \]
3. Men are significantly overrepresented as negligent drivers in those accidents involving a violation of traffic law.

Race

An analysis by race resulted in a distribution of 74.1 percent (N = 318) white and 25.9 percent (N = 111) black, which differed significantly (P < .001) from expected frequencies based upon the racial composition from which the sample was drawn. Although blacks were somewhat overrepresented among involved persons there existed no significant relationship between race and involvement category, e.g. driver violator, driver victim, etc., nor does one appear when controlling for type of accident.

Thus, while blacks were overinvolved in fatal urban traffic accidents, as they are in conventional law violations, their involvement in any particular category is not statistically significant (see Table 18), although there appeared a slight bias towards involvement in pedestrian accidents as both victims and violators. This slight bias reflects lesser access of urban blacks to automobiles and their greater liability as pedestrians.

Age

The continuous variable of age was collapsed into five categories: under 16 (those unable to hold valid driver's licenses), teenagers (16 to 20), young adults (21 to 35),
Table 18  Racial Distribution According to Involvement Category

<table>
<thead>
<tr>
<th>Race</th>
<th>Driver Violator N</th>
<th>%</th>
<th>Driver Victim N</th>
<th>%</th>
<th>Pedestrian Violator N</th>
<th>%</th>
<th>Ped.-Pass. Victim N</th>
<th>%</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>133</td>
<td>76.9</td>
<td>91</td>
<td>74.0</td>
<td>48</td>
<td>71.6</td>
<td>46</td>
<td>69.7</td>
<td>318</td>
<td>74.1</td>
</tr>
<tr>
<td>Black</td>
<td>40</td>
<td>23.1</td>
<td>32</td>
<td>26.0</td>
<td>19</td>
<td>28.4</td>
<td>20</td>
<td>30.3</td>
<td>111</td>
<td>25.9</td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>100.0</td>
<td>123</td>
<td>100.0</td>
<td>67</td>
<td>100.0</td>
<td>66</td>
<td>100.0</td>
<td>429</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = 1.57535 \quad P. > .05 \]
middle aged (36 to 65), and finally, those 66 and over. For pedestrian involvement expected frequencies were based upon all five categories, but for driver involvement the youngest group, those under 16, were eliminated. Although those under sixteen are not actually part of the population at risk when considering driver involvement, it should be mentioned that the sample studied did include three drivers under the legal minimum age for driving. For pedestrians and passengers the age distribution was: under 16, 22 percent (N = 30); 16 to 20, 11.0 percent (N = 15); 21 to 35, 19.9 percent (N = 27); 36 to 65, 28.7 percent (N = 39) and over 65, 18.4 percent (N = 24). This distribution was statistically significant (P. < .01) based on expected frequencies. Of the five age categories it was the disproportionate involvement of the two oldest categories, particularly the high involvement of those over 65 as pedestrians which accounted for the significance of the age distribution for pedestrians and passengers.

For those involved as drivers the age distribution was: 16 to 20, 16.0 percent (N = 47); 21 to 35, 49.5 percent (N = 145); 36 to 65, 29.7 percent (N = 87), and over 65, 4.8 percent (N = 14). This distribution was also statistically significant (P. < .001) based on expected frequencies. The first three age categories were all overinvolved, with the most significant overinvolvement occurring for the 21 to 35 age group. In direct contrast to pedestrian
involvement, those over 65 were the only age group under-involved as drivers.

When comparing age categories with the four possible types of involvement, the relationship is statistically significant ($P < .001$) as demonstrated in Table 19. The direction of the relationship identifies the 21 to 35 age group as disproportionately involved as driver violators. While the teenage group (16 to 20) were involved frequently in fatal accidents, their involvement as driver victims substantially exceeded their involvement as driver violators. This fact is contrary to the stereotype of young persons as either poor or reckless drivers. Although their frequent use of the automobile for pleasure may increase their general liability, their involvement in negligent driving resulting in a fatal accident was significantly less than that of the 21 to 35 age group.

Among the pedestrians, it is the youngest and the oldest age groups which were most significantly overinvolved as violators, with the majority of these two age groups involved as pedestrian violators.

In summary, age proved to be a relatively discriminating variable producing the following findings:

1. Those over thirty-five and particularly those over sixty-five were overrepresented among the pedestrians involved in fatal traffic mishaps. Young persons under 16 were not overrepresented in the pedestrian group.
Table 19  
Age Distribution According to Involvement Category

<table>
<thead>
<tr>
<th>Age</th>
<th>Driver Violator</th>
<th>Driver Victim</th>
<th>Pedestrian Violator</th>
<th>Ped.-Pass. Victim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>under 16</td>
<td>3</td>
<td>1.7</td>
<td>0</td>
<td>0.0</td>
<td>20</td>
</tr>
<tr>
<td>16 to 20</td>
<td>22</td>
<td>12.7</td>
<td>25</td>
<td>20.3</td>
<td>2</td>
</tr>
<tr>
<td>21 to 35</td>
<td>87</td>
<td>50.3</td>
<td>58</td>
<td>47.2</td>
<td>7</td>
</tr>
<tr>
<td>36 to 65</td>
<td>50</td>
<td>28.9</td>
<td>37</td>
<td>30.1</td>
<td>22</td>
</tr>
<tr>
<td>over 65</td>
<td>11</td>
<td>6.4</td>
<td>3</td>
<td>2.4</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>100.0</td>
<td>123</td>
<td>100.0</td>
<td>67</td>
</tr>
</tbody>
</table>

\[ x^2 = 123.75346 \quad P < .001 \]
2. All three categories between 16 and 65 were overinvolved in fatal accidents, but the 21 to 35 group were the most involved.

3. Those between 21 and 35 were more involved in negligent driving actions, and those between 16 and 20 were less involved than would be predicted from their proportions of the sample.

4. Those under 16 and those over 65 were most significantly overinvolved as negligent pedestrians, with a very limited involvement as such for those in the intermediate age groups.

Marital Status

To be consistent with census data, marital status was identified as single, married, widowed and divorced or separated. For involved persons over the age of 16 the distribution was: single, 31.5 percent \( (N = 120) \); married, 50.5 percent \( (N = 192) \); divorced or separated, 12.6 percent \( (N = 48) \) and widow(er), 5.3 percent \( (N = 20) \). This distribution differed significantly \( (P. < .001) \) from expected frequencies based on population data with the single and divorced or separated overinvolved and the married and widowed underinvolved. This finding is consistent with numerous other accident analyses (see pg. 71) which have also identified the single and divorced as highly liability groups, and is also consistent with insurance ratings.

When controlling for type of accident the relationship between marital status and involvement based on expected
frequencies was different. For multiple vehicle accidents the relationship was not statistically significant (P. < .30); for pedestrian accidents, significant (P. < .02); and for single vehicle accidents significant (P. < .001). Among those groups involved in multiple vehicle collisions, only the "widow" group differed from the expected frequency to any noticeable degree. Widows were underinvolved in multiple vehicle accidents, a fact which can be accounted for by the higher age and less amount of driving done by such persons. Within the pedestrian accident group, single individuals were most clearly overrepresented and married individuals most clearly underrepresented, with a slight overrepresentation for both the widowed and the divorced. In one car accidents single and divorced or separated individuals were clearly overinvolved and married and widowed persons decidedly underinvolved.

When considering involvement as either a victim or a violator there was a statistically significant (P. < .02) relationship between marital status and involvement category (see Table 20). As this table shows, single persons were nearly identically represented in both the victim and the violator categories. Married individuals constituted 49.1 percent of the violators and 58.8 percent of the victims - a slight overrepresentation in the victim category. Divorced and separated persons, however, were 19.5 percent of the violators and only 9.4 percent of the victims.
### Table 20: Distribution of Marital Status for Violators and Victims

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Violator N</th>
<th>Violator %</th>
<th>Victim N</th>
<th>Victim %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>69</td>
<td>31.4</td>
<td>51</td>
<td>31.8</td>
<td>120</td>
<td>31.6</td>
</tr>
<tr>
<td>Married</td>
<td>108</td>
<td>49.1</td>
<td>94</td>
<td>58.8</td>
<td>202</td>
<td>53.2</td>
</tr>
<tr>
<td>Divorced or Separated</td>
<td>43</td>
<td>19.5</td>
<td>15</td>
<td>9.4</td>
<td>58</td>
<td>15.2</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>100.0</td>
<td>160</td>
<td>100.0</td>
<td>380</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 7.911 \quad P < .02 \quad df = 2 \]
Further, when controlling this relationship for sex of the involved person (see Tables 21 and 22) the statistically significant relationship between sex and involvement category disappears for females but remains (P. < .01) for males. Although divorced or separated females are involved as violators slightly less than the other marital categories, the divorced or separated males were negligent participants to an inordinately high degree; 82.6 percent of divorced or separated males were involved as violators while only 56 percent of the single and 55.6 percent of the married men sampled were involved as such.

This last finding, that the divorced and separated individuals in the sample are disproportionately involved as negligent drivers suggests that there may be a relationship between driving behavior and "anomia." It may be argued that the negligent driving of many of the divorced or separated individuals may actually reflect attempts at what Durkheim labeled "egoistic suicide." If one grants that divorced or separated individuals' personal experience of anomia is greater than that of others, it may also reflect the relationship between the experiencing of anomie and a tendency toward involvement in deviant behavior discussed by numerous writers (Clinard, 1964). The present evidence is sufficiently compelling to warrant further investigation on this question.

In summary, analyses of the marital status of involved
### Table 21  Distribution of Marital Status for Male Violators and Victims

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Violator N</th>
<th>%</th>
<th>Victim N</th>
<th>%</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>52</td>
<td>30.8</td>
<td>40</td>
<td>36.0</td>
<td>92</td>
<td>32.9</td>
</tr>
<tr>
<td>Married</td>
<td>79</td>
<td>46.7</td>
<td>63</td>
<td>56.8</td>
<td>142</td>
<td>50.7</td>
</tr>
<tr>
<td>Divorced or Separated</td>
<td>38</td>
<td>22.5</td>
<td>8</td>
<td>7.2</td>
<td>46</td>
<td>16.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>169</strong></td>
<td><strong>100.0</strong></td>
<td><strong>111</strong></td>
<td><strong>100.0</strong></td>
<td><strong>280</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

\[ x^2 = 11.408 \quad \text{df} = 2 \quad P. < .01 \]

### Table 22  Distribution of Marital Status Among Female Violators and Victims

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Violator N</th>
<th>%</th>
<th>Victim N</th>
<th>%</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>13</td>
<td>27.7</td>
<td>16</td>
<td>29.6</td>
<td>28</td>
<td>28.0</td>
</tr>
<tr>
<td>Married</td>
<td>29</td>
<td>61.7</td>
<td>31</td>
<td>57.4</td>
<td>60</td>
<td>60.0</td>
</tr>
<tr>
<td>Divorced or Separated</td>
<td>5</td>
<td>10.6</td>
<td>7</td>
<td>13.0</td>
<td>12</td>
<td>12.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
<td><strong>54</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

\[ x^2 = .2263 \quad \text{df} = 2 \quad P. < .05 \]
persons provided the following major findings:

1. Single and divorced or separated individuals were overinvolved in fatal urban traffic accidents.

2. The above relationship does not hold for multiple vehicle accidents, but does remain for both pedestrian and single car accidents.

3. Males either divorced or separated are extensively overinvolved as violators in urban traffic accidents.

**Occupation**

The occupation of involved individuals was identified, and the individual located in one of three categories: laborer (unskilled), blue collar or sales and white collar (see pg. 112). The percentage distribution for these three categories was: laborer, 63.4 percent (N = 243); blue collar and sales, 31.3 percent (N = 120), and white collar, 5.2 percent (N = 20). This distribution differs significantly (P. < .001) from expected frequencies based on census distributions, with both the white collar and blue collar groups underinvolved and the unskilled labor group highly overinvolved. This finding is of particular interest since it demonstrates that involvement in fatal urban traffic accidents follows the same occupational distribution as do conventional crimes of violence.

Further, the relationship between occupation and involvement as either victim or violator is statistically significant (P. < .01) with a larger proportion of the
unskilled laborer group being involved as violators than either the blue collar or white collar groups (see Table 23). If this relationship is expanded to the four-fold involvement categorization, the relationship remains significant at the same statistical level (see Table 24). The direction of this relationship shows the unskilled labor group to be overrepresented among both driver and pedestrian violator groups, while the blue collar and white collar categories are overrepresented only among the driver victim and pedestrian victim groups. This particular finding demonstrates that individuals from lower occupational categories are more likely to be involved in a violation of traffic law when they are involved in a fatal urban traffic accident either as pedestrians or drivers.

When the relationship between occupational status and involvement as a victim or violator was controlled for sex, the relationship disappeared for females, but remained for males (see Table 25). Thus, it would appear that the tendency for lower occupational status individuals to be in violation of traffic law applies only to males, as was the case with marital status and involvement as a violator. Controlling occupational status by race produced no further specification of the relationship between occupational status and involvement category (see Table 26).

Analysis of the occupational status of involved persons produced the following summary findings:
Table 23  Distribution of Occupational Status Among Violators and Victims

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Violators</th>
<th></th>
<th>Victims</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Unskilled Labor</td>
<td>147</td>
<td>70.3</td>
<td>96</td>
<td>55.2</td>
<td>243</td>
<td>63.4</td>
</tr>
<tr>
<td>Craft or Clerical</td>
<td>54</td>
<td>25.8</td>
<td>66</td>
<td>37.9</td>
<td>120</td>
<td>31.3</td>
</tr>
<tr>
<td>White Collar</td>
<td>8</td>
<td>3.8</td>
<td>12</td>
<td>6.9</td>
<td>20</td>
<td>5.2</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>100.0</td>
<td>174</td>
<td>100.0</td>
<td>383</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 9.58531 \quad P. < .01 \]
Table 24  Distribution of Occupational Status Among Selected Involvement Categories

<table>
<thead>
<tr>
<th>Occupational Status</th>
<th>Driver Violator</th>
<th>Driver Victim</th>
<th>Pedestrian Violator</th>
<th>Ped.-Pass. Victim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Unskilled Laborer</td>
<td>106</td>
<td>65.5</td>
<td>65</td>
<td>53.7</td>
<td>41</td>
</tr>
<tr>
<td>Craft or Sales</td>
<td>48</td>
<td>29.6</td>
<td>46</td>
<td>38.0</td>
<td>6</td>
</tr>
<tr>
<td>White Collar</td>
<td>8</td>
<td>4.9</td>
<td>10</td>
<td>8.3</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>162</td>
<td>100.0</td>
<td>121</td>
<td>100.0</td>
<td>47</td>
</tr>
</tbody>
</table>

\[ x^2 = 18.8792 \quad \text{P.} < .01 \]
### Table 25: Distribution of Occupational Status Among Violators and Victims by Sex

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Violators</td>
<td>Victims</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Unskilled Labor</td>
<td>121</td>
<td>73.8</td>
</tr>
<tr>
<td>Craft or Clerical</td>
<td>39</td>
<td>23.8</td>
</tr>
<tr>
<td>White Collar</td>
<td>4</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = 10.64732 \quad P < .01 \]

\[ x^2 = 1.10908 \quad P < .01 \]
Table 26  Occupational Status of Violators and Victims by Race

<table>
<thead>
<tr>
<th>Occupational Status</th>
<th>White</th>
<th></th>
<th></th>
<th></th>
<th>Black</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Violator</td>
<td></td>
<td></td>
<td></td>
<td>Violators</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Unskilled Laborer</td>
<td>106</td>
<td>66.7</td>
<td>63</td>
<td>50.0</td>
<td>169</td>
<td>59.3</td>
<td>41</td>
<td>82.0</td>
</tr>
<tr>
<td>Craft or Sale</td>
<td>47</td>
<td>29.6</td>
<td>52</td>
<td>41.3</td>
<td>99</td>
<td>34.7</td>
<td>7</td>
<td>14.0</td>
</tr>
<tr>
<td>White Collar</td>
<td>6</td>
<td>3.8</td>
<td>11</td>
<td>8.7</td>
<td>17</td>
<td>6.0</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td>159</td>
<td>100.0</td>
<td>126</td>
<td>100.0</td>
<td>285</td>
<td>100.0</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ X^2 = 8.96305 \quad P. < .02 \]
\[ X^2 = 3.49217 \quad P. < .20 \]
1. Lower occupational status individuals were extensively overinvolved in urban traffic fatalities.

2. Lower occupational status individuals were more frequently involved in a violation of traffic law at the time of the fatal accident whether their involvement was as a pedestrian or as a driver.

3. This overinvolvement of lower occupational status individuals in traffic law violation applied significantly only to males.

Residence

The residence of each involved person was identified as either high, middle or low socio-economic status based on the census tract rankings discussed in Chapter 2. The percentage distribution was: from high SES tracts, 22.7 percent ($N = 87$); from middle SES tracts, 28.6 percent ($N = 110$) and from low SES tracts, 48.7 percent ($N = 187$). This distribution differs significantly ($P < .001$) from expected frequencies based on the population residing in each of these SES tract categories. This finding corresponds to the status distribution by occupation, and is also consistent with what is known about the socio-economic distribution of individuals involved in crimes of violence. Furthermore, this overrepresentation of individuals residing in lower socio-economic status tracts corresponds to the ecological distribution previously discussed, which identified lower SES tracts as overrepresented as accident sites.
Although SES of residence demonstrated the significantly greater proportion of involved persons residing in lower ranked tracts, it was not significantly related to the distribution of victims and violators (see Table 27) or the four-fold involvement categorization (see Table 28). Further, controlling for the variables of race, age, and marital status produced no additional specification on the relationship between SES of residence and involvement category. The implication of this finding is that fatal urban traffic accidents tend to be an intra-class phenomenon with roughly similar proportions of victims and violators being drawn from the same SES categories. This contention is given further credibility by the fact that there existed a statistically significant ($P < .001$) relationship between the occupational status of the violator and that of the victim when considering the dyadic victim-violator relationship (see Table 29). The intra-class nature of this phenomenon parallels that of crimes of violence, and suggests that the same social and ecological patterns of participant selection operative for violent crimes are also operative in the fatal urban traffic accident.

In summary, the SES of involved persons based on residence area demonstrated that:

1. Individuals from lower socio-economic status areas are far more frequently involved in fatal traffic accidents than would be predicted from their proportion in the population at risk.
Table 27  Residence Characteristics of Violators and Victims

<table>
<thead>
<tr>
<th>SES Residence</th>
<th>Violators N</th>
<th>Violators %</th>
<th>Victims N</th>
<th>Victims %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>48</td>
<td>22.0</td>
<td>39</td>
<td>23.5</td>
<td>87</td>
<td>22.7</td>
</tr>
<tr>
<td>Middle</td>
<td>63</td>
<td>28.9</td>
<td>47</td>
<td>28.3</td>
<td>110</td>
<td>28.6</td>
</tr>
<tr>
<td>Low</td>
<td>107</td>
<td>49.1</td>
<td>80</td>
<td>48.2</td>
<td>187</td>
<td>43.7</td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100.0</td>
<td>166</td>
<td>100.0</td>
<td>384</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = .1172 \quad P. > .05 \]
Table 28  Residence Characteristics of Various Involvement Categories

<table>
<thead>
<tr>
<th>SES Residence</th>
<th>Driver Violator N</th>
<th>Driver Violator %</th>
<th>Driver Victim N</th>
<th>Driver Victim %</th>
<th>Pedestrian Violator N</th>
<th>Pedestrian Violator %</th>
<th>Ped.-Pass. Victim N</th>
<th>Ped.-Pass. Victim %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>38 24.8</td>
<td>28 26.7</td>
<td>10 15.4</td>
<td>11 18.0</td>
<td>87</td>
<td>22.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>50 32.7</td>
<td>32 30.5</td>
<td>13 20.0</td>
<td>15 24.6</td>
<td>110</td>
<td>28.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>65 42.5</td>
<td>45 42.9</td>
<td>42 64.6</td>
<td>35 57.4</td>
<td>187</td>
<td>48.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>153 100.0</td>
<td>105 100.0</td>
<td>65 100.0</td>
<td>61 100.0</td>
<td>384</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ x^2 = 12.47154 \quad P > .05 \]
Table 29  
Comparison of Occupational Status for the Dyadic Violator-Victim Relationship

<table>
<thead>
<tr>
<th>Occupation of Victim</th>
<th>Unskilled Laborer</th>
<th>Craft or Sales</th>
<th>White Collar</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Unskilled Laborer</td>
<td>73</td>
<td>68.2</td>
<td>26</td>
<td>52.0</td>
</tr>
<tr>
<td>Craft or Sales</td>
<td>30</td>
<td>28.0</td>
<td>21</td>
<td>42.0</td>
</tr>
<tr>
<td>White Collar</td>
<td>4</td>
<td>3.7</td>
<td>3</td>
<td>6.0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100.0</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = 21.16705 \quad P < .001 \]
2. The urban traffic fatality is essentially intra-class phenomenon.

**Interaction Variables**

In addition to the demographic characteristics of involved persons, information was obtained on the contributing behavior of involved persons, the physical conditions at the time of the accident and the injury sustained. These variables were analyzed in relationship to the demographic variables and to each other to get a clearer picture of factors and processes influencing urban traffic fatalities.

**Contributing Behavior**

Contributing behavior refers specifically to actions by the driver of a vehicle in violation of traffic law at the time of the accident in question. The possible contributing behaviors taken from the accident investigation form (see Appendix A) were collapsed into five categories: excessive speed, a speed violation in conjunction with some other violation, a failure to yield violation, an error of judgment, e.g. left of center, following too closely, etc., and no traffic law violation. An individual was assigned to one of these categories only where a clear determination of contributing behavior was possible. As a result, 19 of the 296 drivers in the sample were listed as unknown because the circumstances surrounding the accident made it impossible
to determine if or what contributing behavior was involved.

Of those drivers for whom determinations were made, 24.6 percent (N = 68) committed a speed violation; 6.1 percent (N = 17) were involved in at least one violation in addition to a violation of speed law, 14.8 percent (N = 41) committed a failure to yield violation and 11.9 percent (N = 33), violated the law through some error of judgment. The remaining 42.6 percent (N = 118), were involved in no violation of traffic law. Thus, 57.4 percent of all those drivers involved in fatal urban traffic accidents were violating some traffic regulation at the time of involvement and, of these 53.5 percent were violating speed regulations.

Furthermore, of the 223 fatal accidents studied, only 7 (3.0 percent) occurred in such a manner or under such conditions that they could be identified as essentially unrelated to human error constituting a violation of traffic law. Conversely, in 97 percent of all the fatal urban traffic accidents the human error of at least one of the participants was such that the absence of it would have most likely prevented the accident from occurring. Certainly strong arguments can be made for improvement of roads, automobiles, and traffic control devices as means of reducing traffic accidents. Still the failure of some individuals to effectively negotiate these potentially dangerous situations must also be considered in addition to the defect itself. The traffic accident results from an interaction between individuals and
their environment and it must be asked what factors account for the differential ability to successfully negotiate the environment, in addition to asking what problems exist in the environment.

Although a large proportion of individuals involved in fatal accidents were engaged in some violation of traffic law at the time of the accident, the type of violation (speed, failure to yield, judgment error, etc.) was not found to correlate significantly with the demographic variables of race, sex, age, occupation or residence. Nor did any relationship appear when controlling for type of accident. Thus, although some of these variables were significant in their relationship to whether an individual was a traffic law violator or not, as previously discussed, they seem to have limited bearing upon the type of violation involved. The variable of marital status, however, did produce a significant \( P < .001 \) relationship when compared with type of violation (see Table 30). Again, it was those who are divorced or separated who were overrepresented among those with violations of speed and underrepresented among those with no violations. Further, single drivers were slightly overinvolved in speed violations while married individuals were overrepresented in the failure to yield and the error judgment groups. If one accepts that speeding is a somewhat more deliberate violation than judgment or failure to yield, it would appear that both divorced-separated
Table 30 Contributing Behavior By Marital Status

<table>
<thead>
<tr>
<th>Contributing Behavior</th>
<th>Single</th>
<th>Married</th>
<th>Div.-Sep.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Speed</td>
<td>34</td>
<td>27</td>
<td>20</td>
<td>81</td>
</tr>
<tr>
<td>Failure to Yield</td>
<td>7</td>
<td>25</td>
<td>7</td>
<td>39</td>
</tr>
<tr>
<td>Judgment Error</td>
<td>9</td>
<td>21</td>
<td>3</td>
<td>33</td>
</tr>
<tr>
<td>None</td>
<td>39</td>
<td>72</td>
<td>6</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>145</td>
<td>36</td>
<td>270</td>
</tr>
</tbody>
</table>

\[ x^2 = 28.7928 \quad P. < .001 \]
and single persons violate traffic law in a more conscious and serious manner than married drivers involved in traffic accidents.

**Physical Condition**

The variable of physical condition refers to alcohol usage by an involved person. Individuals were identified as either intoxicated, drinking or normal (see pg. 115 for explanation), and alcohol consumption was not included among the categories of contributing behavior. That is, although operation of a vehicle while intoxicated is a violation of traffic law, for purposes of analysis this variable was separated from violations involving actual operation of a vehicle or specific pedestrian actions in violation of the law. An individual who was intoxicated or drinking was identified as a driver victim or a pedestrian victim if his behavior violated traffic law in no other manner. When the categories of victim and violator were contaminated with the variable of physical condition it was impossible to determine the effect of alcohol consumption upon both driving and pedestrian behavior.

Of those individuals for whom a clear judgment of alcohol consumption was made (total N = 419), 20.5 (N = 86) percent were intoxicated, 13.4 (N = 56) percent had been drinking and 66.1 percent (N = 277), had not consumed any recordable amount of alcohol prior to the accident. Although
data are not available for the amount of alcohol consumption among the driving population in general, Haddon (1962) using a control sample of individuals passing the site of a fatal accident at the same time and day of the week of the accident found that 76 percent of the non-accident group had not consumed alcohol. On the basis of these data it appears that the accident involved-group's consumption of alcohol was somewhat greater than the population at risk.

There was a statistically significant (P. .001) relationship between involvement category and alcohol consumption (see Table 31). It is among the drivers that the difference is most notable, 31.7 percent of the driver violators versus 1.6 percent of the driver victims were intoxicated. An additional 16.5 percent of the driver violators had been drinking while only 8.9 percent of the driver victims had consumed alcohol prior to the fatal accident. The difference between pedestrian violators and pedestrian and passenger victims is nil. This is in part an artifact of combining the two categories of passenger victim and pedestrian victim which was necessitated by the small number (N = 10) of pedestrian victims. It is clear, however, that pedestrian violators are intoxicated far more frequently than driver victims, strengthening the relationship between involvement as a victim or violator and the consumption of alcohol. Combining the various involvement categories into two groups, victims and violators, produced a statistically
Table 31  
**Distribution of Physical Condition Among Selected Involvement Categories**

<table>
<thead>
<tr>
<th>Physical Condition</th>
<th>Driver Violator</th>
<th>Driver Victim</th>
<th>Pedestrian Violator</th>
<th>Ped.-Pass. Victim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Intoxicated</td>
<td>52</td>
<td>31.7</td>
<td>2</td>
<td>1.6</td>
<td>17</td>
</tr>
<tr>
<td>Drinking</td>
<td>27</td>
<td>15.5</td>
<td>11</td>
<td>8.9</td>
<td>9</td>
</tr>
<tr>
<td>Normal</td>
<td>85</td>
<td>51.8</td>
<td>110</td>
<td>89.5</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>100.0</td>
<td>123</td>
<td>100.0</td>
<td>67</td>
</tr>
</tbody>
</table>

\[ X^2 = 50.8713 \quad P. < .001 \]
significant \((P < .001)\) relationship (see Table 32). Among the victims, 80.3 percent had not consumed any detectable alcohol prior to the accident, while only 54.5 percent of the violators fell into this category.

When controlling for type of accident the statistically significant relationship between involvement as a violator or victim remained. However, comparison among accident types provides several interesting findings. For moving accidents (see Table 33) a slightly higher proportion of the violators and a slightly lower proportion of the driver victims were either intoxicated or had consumed alcohol, than for the overall statistic based on all accidents. Furthermore, 76.9 percent of the passenger victims \((N = 20)\) had not consumed alcohol, and case analysis of the data showed that those passenger victims who were intoxicated or had consumed alcohol were in every case riding with an intoxicated or drinking driver (three of these who had not consumed alcohol were also riding with drinking drivers).

For pedestrian accidents the statistically significant \((P < .001)\) relationship remains (see Table 34), and neither of the non-violator categories, driver or pedestrian, recorded a single person who was intoxicated. Further, while 9.9 percent \((N = 5)\), of the non-violating drivers had been drinking, none of the pedestrian victims had consumed alcohol prior to the accident. All of the pedestrian victims were alcohol-free while only 59.9 percent of the pedestrian
Table 32  Distribution of Physical Condition Among Violators and Victims

<table>
<thead>
<tr>
<th>Physical Condition</th>
<th>Violators</th>
<th>Victims</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Intoxicated</td>
<td>69</td>
<td>29.9</td>
<td>17</td>
</tr>
<tr>
<td>Drinking</td>
<td>36</td>
<td>15.6</td>
<td>20</td>
</tr>
<tr>
<td>Normal</td>
<td>126</td>
<td>54.5</td>
<td>151</td>
</tr>
<tr>
<td>Total</td>
<td>231</td>
<td>100.0</td>
<td>188</td>
</tr>
</tbody>
</table>

\[ X^2 = 34.21704 \quad P. < .001 \]
Table 33  Distribution of Physical Condition Among Selected Involvement Categories for Multiple Vehicle Accidents

<table>
<thead>
<tr>
<th>Physical Condition</th>
<th>Driver Violator</th>
<th>Driver Victim</th>
<th>Ped.-Pass. Victim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Intoxicated</td>
<td>16</td>
<td>25.4</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Drinking</td>
<td>9</td>
<td>14.3</td>
<td>4</td>
<td>7.5</td>
</tr>
<tr>
<td>Normal</td>
<td>38</td>
<td>60.3</td>
<td>48</td>
<td>90.6</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>100.0</td>
<td>43</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 34  Distribution of Physical Condition Among Selected Involvement Categories for Pedestrian Accidents

<table>
<thead>
<tr>
<th>Physical Condition</th>
<th>Driver Violator N</th>
<th>Driver Violator %</th>
<th>Driver Victim N</th>
<th>Driver Victim %</th>
<th>Pedestrian Violator N</th>
<th>Pedestrian Violator %</th>
<th>Ped.-Pass. Victim N</th>
<th>Ped.-Pass. Victim %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intoxicated</td>
<td>6 23.0</td>
<td>0 0.0</td>
<td>16 24.2</td>
<td>2 16.7</td>
<td>24 15.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking</td>
<td>5 19.3</td>
<td>5 9.1</td>
<td>9 13.6</td>
<td>0 0.0</td>
<td>19 11.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>15 57.7</td>
<td>50 90.9</td>
<td>41 62.2</td>
<td>10 83.3</td>
<td>116 73.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26 100.0</td>
<td>55 100.0</td>
<td>66 100.0</td>
<td>12 100.0</td>
<td>159 100.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
violators fell into the alcohol-free category.

For single vehicle accidents (see Table 35), it is clear that the greatest proportion of violating drivers were either intoxicated or drinking before the accident. In comparison with other types of accidents the single car mishap represents the greatest correspondence between intoxication and traffic law violation. In these accidents 40.8 percent of the law violators were intoxicated in comparison with 24.1 percent for multiple vehicle accidents and 26.3 for pedestrian accidents.

The alcohol state of the involved persons was not found to be significantly related to the variables of sex, age, or race. It was, on the other hand, correlated with both marital status and occupation. There was a significant (P. < .001) relationship between physical condition and marital status (see Table 36) with the category of divorced and separated persons overrepresented among those intoxicated and underrepresented among the alcohol-free.

There was also a statistically significant (P. < .001) relationship between physical condition and occupational status (see Table 37) when comparing the unskilled laborer group with all others. The small number of white collar workers in the sample, and the fact that all of those for whom determinations regarding physical condition could be made were alcohol-free, necessitated combining this group with that of blue-collar and sales workers. On this basis,
Table 35  Distribution of Physical Condition Among Selected Involvement Categories for Single Vehicle Accidents

<table>
<thead>
<tr>
<th>Physical Condition</th>
<th>Driver Violator</th>
<th>Driver Victim</th>
<th>Ped.-Pass. Victim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Intoxicated</td>
<td>31</td>
<td>40.8</td>
<td>1</td>
<td>6.7</td>
</tr>
<tr>
<td>Drinking</td>
<td>13</td>
<td>17.1</td>
<td>2</td>
<td>13.3</td>
</tr>
<tr>
<td>Normal</td>
<td>32</td>
<td>42.1</td>
<td>12</td>
<td>80.0</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100.0</td>
<td>15</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 36  Physical Condition by Marital Status of Involved Persons

<table>
<thead>
<tr>
<th>Physical Condition</th>
<th>Single</th>
<th>Married</th>
<th>Divorced or Separated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Intoxicated</td>
<td>29</td>
<td>19.1</td>
<td>35</td>
<td>15.7</td>
</tr>
<tr>
<td>Drinking</td>
<td>19</td>
<td>12.5</td>
<td>28</td>
<td>13.7</td>
</tr>
<tr>
<td>Normal</td>
<td>104</td>
<td>68.4</td>
<td>144</td>
<td>70.6</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>100.0</td>
<td>204</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = 31.4262 \quad P < .001 \]
Table 37  Physical Condition by Occupational Status of Involved Persons

<table>
<thead>
<tr>
<th>Physical Condition</th>
<th>Unskilled Laborer</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Intoxicated</td>
<td>60</td>
<td>25.6</td>
<td>15</td>
</tr>
<tr>
<td>Drinking</td>
<td>36</td>
<td>15.4</td>
<td>17</td>
</tr>
<tr>
<td>Normal</td>
<td>138</td>
<td>59.0</td>
<td>105</td>
</tr>
<tr>
<td>Total</td>
<td>234</td>
<td>100.0</td>
<td>137</td>
</tr>
</tbody>
</table>

\[ x^2 = 13.8805 \quad P. < .001 \]
the laborer group recorded observed frequencies of both intoxication and drinking considerably greater than would be expected, and the blue collar/white collar group considerably less.

In summary, analysis of the alcohol involvement of accident subjects produced the following findings:

1. The incidence of alcohol usage among individuals involved in fatal urban traffic accidents was somewhat higher than that for the general urban driving population.

2. Alcohol usage was far more common among drivers violating the law at the time of the accident than for those drivers not violating the law.

3. Alcohol usage was far more common among pedestrians violating the law at the time of the accident than for pedestrians not violating the law.

4. Divorced or separated individuals involved in fatal traffic accidents had a statistically greater propensity for alcohol involvement than either married or single individuals.

5. The unskilled laborer group had a statistically greater propensity for alcohol involvement than all other involved persons taken together.

**Injury**

Involved individuals were identified as either fatally injured or surviving. It is notable that there is a statistically significant ($P < .001$) relationship between involvement as a law violator and fatal injury. Using the dichotomous category of victim-violator (see Table 38) it
Table 38  Distribution of Fatal Injuries among Violators and Victims

<table>
<thead>
<tr>
<th>Injury Sustained</th>
<th>Violators N</th>
<th>Violators %</th>
<th>Victims N</th>
<th>Victims %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>160</td>
<td>66.7</td>
<td>82</td>
<td>43.4</td>
<td>242</td>
<td>56.4</td>
</tr>
<tr>
<td>Other</td>
<td>80</td>
<td>33.3</td>
<td>107</td>
<td>56.6</td>
<td>187</td>
<td>43.6</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
<td>100.0</td>
<td>189</td>
<td>100.0</td>
<td>429</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = 22.3618 \quad P. < .001 \]
was apparent that law-violators die significantly more often than involved persons not violating the law at the time of the accident. This particular relationship although important is somewhat weakened by the inclusion of pedestrians who would not be included in the sample if they had survived since the accident would have been a non-fatal one.

More significant is the victim-violator comparison for injury among drivers of involved vehicles. Drivers in violation of the law at the time of the accident die significantly (P. < .001) more often than non-violating drivers (see Table 39). The reason for this is two-fold. First, since it is the secondary impact of the individual with the interior of the vehicle which kills, and the most common law-violation is excessive speed, the liability of such violators is greater than for those traveling slower. Second, for the violator, the accident is nearly always a head-on one, with the front of his vehicle striking another car or some fixed object. The non-violating driver, on the other hand, is just as likely to be struck from behind or from the side as he is to be struck head-on. Such side or rear-end collisions do not propel him against the front of his own vehicle with the same force as would a head on collision. Thus, the driver in violation of the law significantly increases his liability to be fatally injured if he should have an accident.

In summary, analysis of injury sustained demonstrated
Table 39 Distribution of Fatal Injuries Among Driver Violators and Driver Victims

<table>
<thead>
<tr>
<th>Injury Sustained</th>
<th>Driver Violator</th>
<th>Driver Victim</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Fatal</td>
<td>93</td>
<td>53.8</td>
<td>23</td>
</tr>
<tr>
<td>Other</td>
<td>80</td>
<td>46.2</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>100.0</td>
<td>123</td>
</tr>
</tbody>
</table>

$x^2 = 35.61902 \quad P. < .001$
that violators, in general and driver violators in particular, have a statistically greater propensity to be killed in fatal traffic accidents than persons not violating the law at the time of the accident.
CHAPTER V

CRIMINAL HISTORY AND ACCIDENT INVOLVEMENT

This chapter focuses on two aspects of the urban accident problem. First, it is concerned with the prior criminal and traffic histories of both victims and violators. Second, it contains a typology of urban traffic accidents in an attempt to demonstrate the various types of circumstantial and personal factors which combine to cause fatal urban traffic accidents.

Criminal Histories of Victims and Violators

As Table 40 shows, 46.2 percent of the violators (\( N = 102 \)) had no prior record for either criminal or traffic offenses; 14.9 percent (\( N = 33 \)) had prior records for traffic violations only; and 38.9 percent (\( N = 96 \)) had prior police records including criminal as well as traffic violations. In contrast, 73.7 percent of the victims (\( N = 123 \)) had no prior police records; 10.8 percent (\( N = 18 \)) had traffic-only prior records; and 15.6 (\( N = 26 \)) had prior records which included criminal as well as traffic violations.

Thus, there is a statistically significant difference
<table>
<thead>
<tr>
<th>Prior Record</th>
<th>Violators</th>
<th></th>
<th>Victims</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>102</td>
<td>46.2</td>
<td>123</td>
<td>73.7</td>
<td>225</td>
<td>58.0</td>
</tr>
<tr>
<td>Traffic Only</td>
<td>33</td>
<td>14.9</td>
<td>18</td>
<td>10.3</td>
<td>51</td>
<td>13.1</td>
</tr>
<tr>
<td>Traffic and Criminal</td>
<td>96</td>
<td>38.9</td>
<td>26</td>
<td>15.6</td>
<td>112</td>
<td>28.9</td>
</tr>
<tr>
<td>Total</td>
<td>221</td>
<td>100.0</td>
<td>167</td>
<td>100.0</td>
<td>388</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = 32.50720 \quad P. < .001 \]
in the distribution of prior criminal records between victims and violators. Most important is the fact that while 38.9 percent of the violators had records involving criminal violations only 15.6 percent of the victims had such criminal histories. Given the fact, as previously noted, that individuals involved in fatal urban accidents tend to be of lower social status, the 15.6 percent of the victims with criminal histories probably reflects the distribution of criminal records in this general lower-class population. However, the 38.9 percent of the violators with prior records for criminal violations grossly exceeds the expected frequencies for any social status category. These data strongly suggest that individuals with prior criminal records constitute an inordinately large proportion of individuals engaged in negligent actions at the time of a fatal urban traffic accident.

Combining both criminal and traffic records revealed that while 53.8 percent (N = 129) of all violators had some prior record of law violation, only 26.4 percent (N = 44) of the victims had previously violated the law. This 2 to 1 ratio in favor of violators with prior records for either traffic or criminal law violations strongly supports the notion that for a significant proportion of individuals responsible for fatal traffic accidents such negligence is not a random occurrence, but rather part of a normative behavior pattern.
As a corollary of the finding that violators tend far more frequently to have had prior criminal and traffic records than auto accident victims, it can also be asked to what extent an individual's prior criminal and traffic history act as an effective predictor of whether he will be a victim or a violator if involved in a fatal urban traffic accident. As Table 41 shows, 45.3 percent (N = 102) of those with no record were violators; 64.7 percent (N = 33) of those with traffic records only; and 78.7 percent of those with records including criminal violations (N = 122) were negligent accident participants.

A comparison of auto accident violators with no previous record (45.3 percent) and with a prior criminal record (78.7 percent) clearly indicates the greater likelihood that those with prior histories of criminal involvement, in comparison with those with no criminal background, will be guilty of negligent behavior when involved in a fatal traffic accident.

These findings, shown in Tables 40 and 41, highlight an important aspect of the urban traffic fatality problem. While it is clear that a proportion of accidents are situational it is also clear that (1) a significant proportion of the violators in fatal urban traffic accidents have a prior record of both criminal and traffic law violation, and that (2) for a significant proportion of individuals, involvement as a violator in a fatal urban traffic accident is
Table 41  Nature of Involvement According to Prior Record

<table>
<thead>
<tr>
<th>Involvement</th>
<th>No Record</th>
<th>Traffic Only</th>
<th>Traffic and/or Criminal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Violators</td>
<td>102</td>
<td>45.3</td>
<td>33</td>
<td>64.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>96</td>
<td>78.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>221</td>
<td>57.0</td>
</tr>
<tr>
<td>Victims</td>
<td>123</td>
<td>54.7</td>
<td>18</td>
<td>35.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>26</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>167</td>
<td>43.0</td>
</tr>
<tr>
<td>Total</td>
<td>225</td>
<td>100.0</td>
<td>51</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>122</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>388</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 32.5072 \quad P < .001 \]
predictable from the individual's prior record.

It has previously been shown that individuals involved in fatal accidents, particularly those involved in negligent behavior, exhibit demographic characteristics similar to individuals involved in criminal law violations (see Chapter 4). The findings presented here show that violations of traffic laws are closely related to violations of criminal laws, and that for a sizable proportion of the violators, negligent traffic behavior is part of a behavior pattern and is not a random, circumstantially induced, event. These data lend further weight to the hypothesis that the socially derived perceptions conducive to involvement in criminal activity extend to traffic law violations as well.

Types of Criminal Violations

As shown in Table 42, 9.3 percent \((N = 8)\) of the violators with criminal records were guilty of property crimes; 29.1 percent \((N = 25)\) had criminal records including both personal and property crimes; and 61.6 percent \((N = 53)\) had prior records involving personal crimes only. The victims with criminal records showed 3.8 percent \((N = 1)\) with property crimes only; 11.5 percent \((N = 3)\) with personal and property crimes, and 84.6 percent \((N = 22)\) with prior records for both personal and property crimes.

The importance of these data is clearly self-evident. Among involved persons with criminal records there is an
Table 42  Types of Prior Records For Victims and Violators with Criminal Histories

<table>
<thead>
<tr>
<th>Criminal Record</th>
<th>Violators N</th>
<th>%</th>
<th>Victims N</th>
<th>%</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Only</td>
<td>8</td>
<td>9.3</td>
<td>1</td>
<td>3.8</td>
<td>9</td>
<td>8.0</td>
</tr>
<tr>
<td>Property and Personal</td>
<td>25</td>
<td>29.1</td>
<td>3</td>
<td>11.5</td>
<td>28</td>
<td>25.0</td>
</tr>
<tr>
<td>Personal Only</td>
<td>53</td>
<td>61.6</td>
<td>22</td>
<td>84.6</td>
<td>75</td>
<td>67.0</td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td>100.0</td>
<td>26</td>
<td>100.0</td>
<td>112</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\[ x^2 = 28.7146 \quad \text{P. < .001} \]
inordinately high percentage of records for crimes against the person. Among the violators with criminal records, 61.6 percent had previous records for personal crimes only. Adding to this those violators with records including both personal and property crimes brings to 90.7 the percent of violators with criminal records who had committed a prior personal crime. Among the victims, 84.6 percent of those with criminal records had histories of personal crimes only, and 96.1 percent of the victims with criminal records had committed personal crimes. (It must be remembered, however, that victims with criminal records constitute only 15.8 percent of the victim group, while 38.9 percent of the violators had histories of criminal involvement.) This finding indicates that not only are individuals with criminal records overrepresented among the violators, but that if a violator in a fatal urban traffic accident has a criminal record, it will most likely include personal crime(s). Furthermore, there is a very great likelihood that this record will include only personal crimes.

Previously, we have suggested that for a significant proportion of violators, negligent involvement in a fatal urban traffic accident is not a random event, but an extension of a life style which includes a tendency toward law violation. This fact has been noted by other researchers (see Chapter 2). The findings presented here, corroborated this observation, and clearly specify that it is those
individuals with a tendency to commit personal crimes who have the greatest propensity for negligent traffic involvement. Thus, among violators with criminal records, it is not simply the tendency to violate the law which correlates with negligent traffic involvement, but the tendency to commit crimes of violence which is most strongly related to negligent traffic behavior. The tendency to behave aggressively in face-to-face interaction appears to extend to motor vehicle usage as well.

To further investigate the relationship between involvement as a violator and a prior history of personal crimes, individual criminal histories were evaluated for misdemeanor and felony violations according to type of crime, and for gross number of offenses committed. Table 43 presents the distribution of felony and misdemeanor offenses for violators, and Table 44 presents the same distribution for victims.

Due to the small observed frequencies in many of the cells in these tables, they are presented for their informational, rather than statistical utility. It is interesting to note that the violators had committed serious violations of criminal law less frequently than the victims. Among the violators, 17.5 percent had felony arrests only, and 10.5 percent had arrests for both felony and misdemeanor offenses, for a total of 28 percent of the violators who had committed a felony. The victims, on the other hand,
### Table 43 Distribution of Offenses by Type and Seriousness for Violators with Criminal Records

<table>
<thead>
<tr>
<th>Offense Type</th>
<th>Felony N</th>
<th>Felony %</th>
<th>Misdemeanor N</th>
<th>Misdemeanor %</th>
<th>Both N</th>
<th>Both %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Only</td>
<td>3 3.5</td>
<td>4 4.7</td>
<td>1 1.2</td>
<td>8 9.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property and Personal</td>
<td>6 7.0</td>
<td>14 16.2</td>
<td>5 5.8</td>
<td>25 29.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Only</td>
<td>6 7.0</td>
<td>44 51.1</td>
<td>3 3.5</td>
<td>53 61.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15 17.5</td>
<td>62 72.0</td>
<td>9 10.5</td>
<td>86 100.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 44 Distribution of Offenses by Type and Seriousness for Victims with Criminal Records

<table>
<thead>
<tr>
<th>Offense Type</th>
<th>Felony N</th>
<th>Felony %</th>
<th>Misdemeanor N</th>
<th>Misdemeanor %</th>
<th>Both N</th>
<th>Both %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Only</td>
<td>1 3.9</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>1 3.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property and Personal</td>
<td>2 7.7</td>
<td>0 0.0</td>
<td>1 3.9</td>
<td>3 11.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Only</td>
<td>9 34.6</td>
<td>9 34.6</td>
<td>4 15.3</td>
<td>22 84.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12 46.2</td>
<td>9 34.6</td>
<td>5 19.2</td>
<td>26 100.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
recorded 46.2 percent with felony records only and 19.2 percent with both felony and misdemeanor records - a total of 65.4 percent with felony involvement. However, what is critical is the fact that over half (51.1 percent) of the violators had records including personal misdemeanors, while only 34.6 percent of the victims fell into this category. These personal misdemeanors included simple assaults, assault and battery against a female, and carrying concealed weapons. The large number of violators with records for such offenses indicates that it is primarily the situationally aggressive individual, and not the hard-core property offender, who accounts for the positive relationship between negligent driving and personal crimes. It is those individuals prone to momentary violent eruptions, as indicated by the types of crimes most strongly represented among the violators, who are most prone to negligent traffic involvement.

While these findings strengthen the hypothesis that for some individuals the traffic situation represents merely another forum for the expression of violent tendencies, it is important to also show the frequency of various types of crimes for violators and victims. Table 45 presents the gross number of offenses of various types, the number of individuals responsible for that number of offenses, and the rate per offense for both victim and violator groups.

As Table 45 shows the violator group constitutes a far more criminal population than the victims. As a group,
Table 45
Number of Offenses and Rates for Violators and Victims with Criminal Records

<table>
<thead>
<tr>
<th>Offenses</th>
<th>Violators No. of Persons</th>
<th>Rate %</th>
<th>Violators No. of Persons</th>
<th>Rate %</th>
<th>Victims No. of Persons</th>
<th>Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prop. Fel.</td>
<td>39</td>
<td>15</td>
<td>2.6</td>
<td>7.8</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>Prop. Mis.</td>
<td>50</td>
<td>24</td>
<td>2.1</td>
<td>10.0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Pers. Fel.</td>
<td>55</td>
<td>20</td>
<td>2.8</td>
<td>11.0</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>Pers. Mis.</td>
<td>219</td>
<td>64</td>
<td>3.4</td>
<td>43.6</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Intox (non-traffic)</td>
<td>139</td>
<td>41</td>
<td>3.4</td>
<td>27.6</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>504</td>
<td>164</td>
<td>3.1</td>
<td>100.0</td>
<td>66</td>
<td>41</td>
</tr>
</tbody>
</table>
violators with criminal records tend to commit more crimes per person than do the victims. When considering specific categories of crimes it is interesting to note that for property crimes (both felony and misdemeanor) the rates for the victim group exceed that of the violator group. However, for personal crimes, the violator rates (for both felony and misdemeanors) greatly exceed those in the victim category. Of all the crimes accounted for by the violator group, 43.6 percent were for personal misdemeanors, while only 22.7 percent of the crimes accounted for by the victims were for such crimes.

While the personal-property distribution of offense types among the victims is more nearly even, it is clear from these data that the violators with criminal records seem to have been drawn from the subculture of violence. Among the victims, 30.3 percent of all the crimes committed were property crimes, while among the violators, property crimes accounted for only 17.8 percent. This fact, combined with the overrepresentation of personal misdemeanors in the violator group, clearly substantiates the hypothesis that many individuals responsible for fatal urban traffic accidents have histories of repeated violent eruptions. For these individuals the automobile is not merely a means of transportation, it is a weapon - a tool with which to release hostility.

Another fact which strengthens the link between
violators with criminal records and the subculture of violence is the pattern of alcohol usage represented by the two groups. The violator group had a much higher frequency of repeated arrests for public intoxication than the victim group (3.4 per person versus 2.3 per person). It has long been known that violent crimes, particularly those not associated with monetary gain (simple assault, assault resulting from domestic quarrels, Saturday night tavern brawls, etc.) are frequently preceded by drinking. Thus, among the violators with criminal records there is a history of both minor personal crimes and intoxication, a pattern associated with the subculture of violence.

In summary, these data suggest that:

1. Persons with criminal records are significantly over-represented among those responsible for fatal urban traffic accidents.

2. Those with no criminal or traffic histories have the lowest statistical propensity to be violators in fatal urban traffic accidents.

3. Those with prior records for traffic violations only are overrepresented among the violators in fatal urban traffic accidents, but their representation is not as disproportionate as those whose prior records include criminal as well as traffic violations.

4. An individual involved in a fatal urban traffic accident who has a criminal record will in all probability have committed and been recorded for a personal crime at some time in the past.

5. Of those with criminal records, a substantially larger proportion of violators have prior records including personal misdemeanors than do victims.

6. Violators with criminal records account for a larger
gross number of crimes than do victims with criminal records.

7. Violators with criminal records commit more personal crimes per individual than do victims.

8. Violators with criminal records are arrested for public intoxication more frequently per individual than are victims.

9. Violators with criminal records, as a group, represent a more criminal population than victims with criminal records.

10. Violators with criminal records exhibit criminal patterns similar to persons identified with a subculture of violence.

A Typology of Fatal Urban Traffic Accidents

Our analysis of fatal urban traffic accidents up to this point has been strictly statistical in nature. While such empirical data are essential for a sociological portrait of the problem, they do not provide a comprehensive understanding of the interactive, dynamic components of the traffic accidents quantified.

In addition to the statistical analyses, each accident event, and the circumstances surrounding it, was closely studied to derive an overall understanding of the complex interaction of variables culminating in the fatal traffic accident. In this qualitative context, there began to emerge four distinct types of urban traffic accidents: the simple error judgment accident, the simple alcohol accident, the violent eruption, and the subcultural accident, or, more graphically, the "Saturday night special."
While this typology categorized types of accidents, the classification of accident types is critically related to the behaviors of involved persons. For this reason, each category derives its label from the behavior of the driver responsible for the accident. By focusing upon the accident rather than the driver alone, however, it becomes possible to view the entire set of variables contributing to the particular accident.

Presented below is a description of the critical components of each accident type followed by an illustrative case. The cases presented are actual accident events in the sample studied. They were chosen as being representative of each of the four types rather than as a composite of all the characteristics of a particular type. The utility of this typology and the illustrative cases lies not in the exact correspondence between the accident categories and the actual accident events, but in the sensitizing value of a typology based on "ideal types." Such a presentation can provide a more comprehensive appreciation of the dynamic factors which influence fatal urban traffic accidents.

The Simple Error Judgment Accident

These accidents are distinguished by (1) a clear lack of contributing motivational factors on the part of the violating driver, and (2) the relatively chance or "accidental" concurrence of several accident-related factors. Although
such accidents frequently occur because of some unwise or negligent act on the part of the driver, this behavior is essentially unrelated to individual psychological or subcultural factors. The simple error judgment accident is the type of accident which, given a moment of inattention, could happen to almost any driver.

Case #1

The Simple Error Judgment Accident

Description

Driver #1 was proceeding, within the posted speed limits, on a two lane, undivided road in a sparsely settled portion of town. Draped across the seat on the passenger's side was a suit, just picked up at the cleaners. The weather was warm and the car windows open. A strong gust of wind blew the newly cleaned suit from the front seat-back onto the floor in the back seat section of the car. The driver leaned back and attempted to reach behind the seat to pick up the suit from the floor. In so doing he took his eyes off the road causing his car to drift left of center. He failed to see a car approaching in the opposite direction and a head-on collision followed killing the driver of the approaching car and injuring the negligent driver. The violating driver was cited for being left-of-center and also charged with homicide by vehicle in the second degree. He
was found guilty on the homicide charge and sentenced to 30 days in jail (suspended) and a $200 fine ($100 suspended).

The negligent driver in this accident was a white male, 27 years of age and married. He was employed as a sales representative for an oil firm and had no prior record, with the exception of a traffic citation for having an improper taillight.

The victim was a white male, age 35, married, and employed as a carpenter. He had no prior record for either traffic or criminal violations.

The Simple Alcohol Accident Type

The critical components of simple alcohol accidents are (1) impaired judgment and driving ability following the excessive consumption of alcohol, (2) the volitional decision to drive after drinking, and (3) a failure to compensate for the impaired driving skill. In these cases it is not the mere consumption of alcohol which is responsible for the accident, but the alcohol-induced tendency to drive in a more careless manner, and generally at a somewhat higher speed than would normally be the case. Thus, the majority of these accidents involve a violation of one or more traffic laws in addition to driving while intoxicated. Additionally, in many cases the tendency toward intoxication is the result of other antecedent variables such as personality and
life-situation problems.

Case # 2

The Simple Alcohol Accident

Description

Driver #2 had spent the majority of a Thursday evening in a bowling alley drinking, socializing and attempting to locate a woman willing to spend the night with him. At about 1:00 in the morning (noticeably intoxicated), he left the bowling alley. Approximately one mile from the bowling alley he lost control of his car and sideswiped a telephone pole. However, he did not stop his car and continued on toward home. A half mile beyond this first accident he rounded a curve on the wrong side of the road. An older Volkswagen was approaching from the opposite direction. The driver of this second car swerved to miss the vehicle on his side of the road, but was stuck in the left front fender. The impact sent the smaller car off the road and into a tree, killing the innocent driver. The drunken driver, either failing to be fully aware of the accident or fearing the consequences, continued homeward.

The negligent driver was a white male, age 30 and divorced. At the time of the accident he was employed as an unskilled factory laborer. His prior record, although having no criminal violations, included two convictions for
operating a motor vehicle while intoxicated and three other moving violations, two for excessive speed and one for failure to yield at a stop sign.

The victim was a white male, age 45, married and employed as a truck driver. He had no prior record, either traffic or criminal at the time of the accident.

After a rather lengthy investigation using a paid female decoy, sufficient information was obtained to charge the negligent driver with operating a motor vehicle while intoxicated and vehicular homicide in the first degree. He was found guilty by a judge after pleading "nolo contendere." He was sentenced to one year of probation and a $75 fine.

**The Violent Eruption Accident.**

These incidents (1) follow shortly after a hostile and aggression-provoking personal interaction episode which (2) transforms the automobile into a means for releasing or expressing this aggression. Alcohol usage may or may not be involved prior to the accident, and the specific hostile interaction frequently stems from some other antecedent condition making the individual prone to such eruptions. These accidents have the additional characteristic that in some cases they may be related to suicidal motivations. Although fully intended and conscious suicide does not appear to characterize these accidents, the "I don't really care what happens to me," or "Won't she(he) be sorry then" attitude
associated with many of the antecedent hostile interactions may induce the driver to take risks greater than normal.

Case # 3

The Violent Eruption Accident

Description

Driver #3 had recently been fired from his position as a machine operator in a factory. On the night of the accident his wife returned home from her job as a waitress to find her husband watching television and drinking a beer. A violent argument ensued centering around their lack of money, and his present lack of employment. After about 20 minutes of violent argumentation the husband left the house saying that he was "going for a ride to cool off." Since it was winter, it can be assumed that "to cool off" was a reference to his emotional rather than physical state. He drove away from the house abruptly leaving tire marks (rubber) caused by excessive acceleration. Approximately a half mile from his home, he failed to negotiate a left hand turn at a cross street and first struck a telephone pole and then several trees. Tire marks at the scene of the accident indicated that the automobile had been traveling at a high rate of speed, and that this was the reason for his failure to negotiate the turn. The tire marks further indicated that the driver attempted to avoid the accident.
The driver was a white male, aged 37 and married by common-law. He was unemployed at the time of the accident, but had previously been an unskilled machine operator. His prior record included two convictions for assault and battery on a female, one arrest for investigation in connection with an aggravated assault, and three moving violations, all for excessive speed.

Since the negligent operator in this accident was killed, no charges were filed.

The "Saturday Night Special"

These accidents are distinguished by (1) their correspondence to subcultural patterns of behavior, (2) their similarity to situational circumstances surrounding conventional crimes of violence and (3) the similarity of individuals involved with those persons prone to commit conventional crimes of violence. These accidents generally involve alcohol use and occur in the context of weekend-evening entertainment. While these accidents do not constitute the majority of urban traffic accidents, incidents of this type accounted for approximately 15% of the accidents studied. Because of their subcultural aspects, they provide a particularly interesting focus for the criminologist concerned with the auto accident phenomenon.
Case # 4

The Saturday Night Special

Description

On the night of the accident (Saturday) two men in separate cars along with several passengers (1 male and 3 females) began barhopping in a lower socio-economic status, inner-city area. After several stops at taverns and one private party, they stopped for gasoline at a service station in an industrial and warehouse area near the section where they had been bar-hopping. While at the station an argument erupted between the two drivers, apparently concerning in whose car one of the female passengers would ride. The two cars left the filling station at a high rate of speed with all of the passengers in the lead car with the other driver by himself. It appeared to the filling station attendant that the latter was chasing the former's car. Approximately one and a half miles from the filling station the first car failed to negotiate a left-hand turn leading into a concrete railroad underpass. His vehicle struck the bridge abutment killing the driver and one female passenger. The driver in the second car, following close behind, managed to avoid the first car, but in doing so also struck the bridge abutment. However, although his car was damaged, he was unhurt, and the car remained drivable. Seeing that the
accident to the first car was very serious, he became frightened and left the scene of the accident and returned home.

It was later learned that he feared the consequences of carrying a concealed weapon and returned home to hide the unlicensed pistol which he had been carrying during the evening. Also, not wanting to be implicated in the accident, he hid his own car in the garage and returned to the scene of the accident in his mother's automobile. Once at the scene of the accident he posed as the husband of one of the injured females. It was not until several days after the accident that the investigating officers were able to determine that the supposed husband of one of the injured victims was in actuality the driver of the mysterious second car known to have been at the scene of the accident.

The first driver, the one who died, was a black male, age 32. At the time of the accident he was separated from his wife and employed as a construction laborer. His prior record included two convictions for assault and battery (neither of which resulted in incarceration), one weapons charge, and three disorderly conduct convictions. His traffic record included four moving violations (one for operating a vehicle while intoxicated).

The surviving driver was a black male, aged 29. At the time of the accident he was unmarried and was employed as a laborer. His prior record included several unspecified juvenile violations, and two arrests for disorderly conduct.
as an adult. His traffic record included one citation for failure to yield at a stop signal, and one citation for failure to display proper license tags - both citations being given at the same time.

The passengers included one black male, aged 17, and three black females aged 17, 20, and 21.

Survivor's statements indicated that all those involved had been drinking heavily prior to the accident though only the fatally injured driver and one female passenger were of legal drinking age. The deceased was legally intoxicated (blood alcohol in excess of 0.10%) at the time of the accident. Since he was killed, and the other driver had not struck the first vehicle, no charge for manslaughter by vehicle could be made against either driver.

Discussion

The typology presented here is ideal typical in nature. Although no particular traffic accident will necessarily demonstrate all of the components of any single category, sufficiently strong similarities will exist to warrant its location in one of the four accident categories.

The first category, the simple error-judgment accident, corresponds most closely to the term "accident" and accounts for approximately 30 percent of the accidents studied. The second category, the simple alcohol accident, accounts for approximately 35 percent of the accidents studied, and is a
type given considerable attention by those concerned with the accident problem. The last two categories, the violent eruption, and the "Saturday night special" account for approximately 20 percent and 15 percent respectively. These two categories, clearly important elements of the overall traffic picture, have received far less research attention.

It is hoped that this typology will stimulate further research focused upon those traffic accidents which are clearly influenced, in part, by subculturally learned patterns of behavior.
CHAPTER VI

CONCLUSION

The Research

This dissertation presents the results of an exploratory study of the ecological and demographic patterns of fatal motor vehicle accidents in an urban community. We have attempted through the use of a sociological and criminological perspective, to determine if the fatal urban traffic accident exhibits ecological and demographic patterns similar to other urban social problems, and if the characteristics of involved persons are similar to those of individuals involved in conventional personal crimes.

While traffic accidents and fatalities are perceived as a problem in our society, they are of relatively low priority in comparison with other forms of violent death, despite the fact that traffic fatalities constitute the most extensive and common form of violent deaths in America. This general perception of traffic fatalities as a low priority problem has had its effect upon the direction of research. While some engineering and human factors research has been
devoted to traffic accidents, little of it has been socio­logical. Although sociologists have devoted extensive energy to a number of social problems and to violence as a social phenomenon, fatal traffic accidents have been largely ignored. Our research attempted to rectify this oversight and to demonstrate that urban traffic fatalities exhibit patterns of distribution and victimization not dissimilar to other urban social problems. As such, fatal traffic accidents provide a valid focus for sociological and criminological research.

The study itself encompassed the universe of fatal accidents occurring during a three year period in Columbus, Ohio. During this period, 1969-1971, inclusive, there were 223 fatal accidents involving 429 persons. Data were gathered concerning both the accident event and the persons involved. While these data, unfortunately, could not provide any control for exposure to risk - and interpretation of the findings should take this factor into account - because of the specific focus of this study, this fact (as explained in Chapter 2) does not dramatically weaken the strength of the findings.

These were data analyzed in demographic, ecological and criminological terms. Additionally, a typology based upon "ideal types" of accidents were constructed to provide a basis for the development of sensitizing concepts regarding urban traffic fatalities.
Predictions

After reviewing the available literature concerning both traffic accidents and urban crime, several predictions were made regarding the fatal urban traffic accident. These predictions were based on two assumptions regarding urban traffic accidents. If the predictions could be substantiated by the data, it would increase the validity of the assumptions and provide a strong basis for further research devoted to urban traffic accidents as a social problem. The assumptions utilized and the predictions made from them were as follows:

Assumption I: The fatal urban traffic accident represents a social problem not dissimilar in distribution and in the population at risk from other urban social problems.

Predictions:

1. Fatal urban traffic accidents will not distribute themselves in an ecologically random fashion. Instead, certain areas will have higher, and other areas lower, accident rates than would be predicted from the distribution of the population.

2. Higher rates for fatal accidents will be found in the more densely populated areas surrounding the central business district.

3. Areas of low socio-economic status will tend to have fatal accident rates higher than those for higher status areas.

4. A disproportionate number of involved persons will be of lower socio-economic status.
5. A disproportionate number of involved persons will be black.

Assumption II: For a considerable number of individuals, involvement in a fatal urban traffic accident is not a random occurrence, but part of a general behavior pattern related to subcultural patterns and criminal aggressivity.

Predictions:

1. A relatively high percentage of involved persons will have prior police records for criminal offenses.

2. Those with prior records will have a greater propensity to be violators when involved in fatal urban traffic accidents than those without prior records. The latter will more likely be victims.

3. Those with prior criminal records will be characterized by a disproportionate number of individuals with records for crimes against the person.

4. Those with prior records for traffic violations only will tend to be violators somewhat more frequently than those with no records, and somewhat less frequently than those whose prior records also include criminal violations.

5. Those with prior records for crimes against the person will have a greater frequency of alcohol consumption when involved in a fatal urban traffic accident than those with prior records for property crimes.

The Findings

The data were analyzed to ascertain the ecological, the demographic and criminal patterns of fatal urban traffic accidents. Some of the ecological and demographic findings reported here, have been previously shown by other
researchers. However, when these findings were combined with the criminological findings of this research, an important characteristic of the fatal urban traffic accident emerged. The fatal urban traffic accident represents but another facet of urban violence, and is, in many respects, sociologically and criminologically similar to conventional crimes against the person. This statement is based on the following major findings:

1. The ecological distribution of fatal urban traffic accidents was characterized by a gradient, decreasing with distance from the center of the city, and featured a disproportionate number of accidents occurring in areas of low socio-economic status.

2. The ecological distribution of involved persons was characterized by a gradient, decreasing with distance from the center of the city, and revealed that the majority of involved persons lived in lower socio-economic status areas.

3. The ecological and demographic distribution of victims and violators showed that the relationship between offender and victim for fatal urban traffic accidents was essentially intra-class.

4. Nearly half of all violators had prior police records for either criminal or traffic offenses, while a significantly smaller proportion of the victims had prior police records.

5. Over one-third of all violators had prior police records for criminal offenses - twice the proportion of criminal offenders among the victims.

6. The violators with criminal records were disproportionately characterized by persons having committed personal crimes.
Victims with criminal records reflected a more random distribution of criminal offenses.

7. Violators with criminal records represented a far more criminal population than victims with criminal records. Violators with criminal records accounted for nearly eight times as many separate offenses as do victims with criminal records.

8. Violators with criminal records represented a subculture of violence. Over half of all the criminal offenses attributable to this group were personal crimes.

Discussion

A comparison of the predictions made and the findings obtained demonstrate strong support for the two major assumptions that fatal urban traffic accidents represent a social problem not dissimilar from other urban social problems, and that for some individuals involvement in a fatal urban traffic accident is part of a general behavior pattern related to subcultural patterns and criminal aggressivity.

The ecological distribution of fatal urban traffic accidents was not random but described the same distribution pattern as conventional urban crimes. The distribution of both the accident events and involved persons was found to be largely concentrated in the lower socio-economic census tracts, and to feature a decreasing gradient with distance from the center of the city. Additionally, there was also a strong positive correspondence between the percentage of
blacks residing in a census tract and that tract's liability as a location for fatal urban traffic accidents. These findings parallel what is known about the distribution of conventional urban crime.

Accident participants were disproportionately males, blacks and persons of lower socio-economic status. Furthermore, males, persons between the ages of 18 and 35, and single or divorced individuals had a statistically significant propensity to be involved as negligent participants. These findings further strengthen the similarity between urban traffic fatalities and urban crimes as social problems.

In addition a specific relationship between a history of criminal law violations and involvement in a fatal traffic accident existed. A disproportionate number of involved persons had criminal histories, and those with criminal records had the highest probability of being negligent participants. Furthermore, those with criminal records were disproportionately characterized by individuals having committed crimes against the person.

All of these findings confirm the predictions and support the assumptions made regarding the phenomenon of fatal urban traffic accidents. Given the empirical regularities in the distribution of urban traffic fatalities and urban crime, one must begin to look beyond the data presented here for an explanation of these similarities.
Sporadically, various researchers have suggested that culturally learned perceptions may play an important role in influencing an individual's liability for both accident involvement and traffic law violation. Over 30 years ago DeSilva said:

Although our present roads have not been designed from the safety point of view, they can be driven on with impunity. The automobile also, in most respects a safe piece of machinery, can be used with a minimum of danger. It is the driver to whom we must impute responsibility for the hazards presented in these instruments.

In an attempt to identify those individuals factors which would account for the varying accident liability among individuals, DeSilva identified a factor called safety-mindedness which he described as:

...a complex state of mind involving a recognition of inherent hazards of driving and their relation to the lives of those who use the roads. Among its basic constituents are caution and consideration for the lives, property and comfort of others...

Implicit in DeSilva's description of the components of "safety-mindedness" is the fact that many of the perceptions related to it are socially learned perceptions.

In 1949, twenty-four years ago, Tillman and Hobbs concluded from their comparison study of high and low risk accident drivers that "a man tends to drive as he lives."

This statement, although often quoted by accident
researchers, has not led to the development of any theoretical explanation of the relationship between the way one learns to live and the way one drives.

In 1960, Porterfield stated:

Drivers who have little regard for their own lives or the lives of others, or both (other things being equal) will have higher rates of accidents than drivers who place a high value on human life. As a corollary, if the populations of some areas have a higher ratio of persons who do not value life than have other areas, it may be predicted that the former populations will experience more motor vehicle fatalities.

Porterfield's finding that those areas with a lower regard for human life (as measured by homicide and suicide rates) strongly suggests the influence of cultural factors upon the rate of fatal motor vehicle accidents. This relationship is further strengthened by the fact that both, at the time of Porterfield's study, and now, the highest auto fatality rates, when controlling for exposure, are found in the southern states (Reese, 1970).

Although the research conclusions presented above strongly indicate that (1) socially learned perceptions influence an individual's accident liability and (2) the nature of these socially learned perceptions is influenced by the subcultural context in which the learning takes place, little has been done to integrate these two factors to develop a useful socio-cultural explanation of traffic
accidents. Although some attention has been given to the effect of individual personality traits on accident liability, there has been almost no work devoted to the sociological and social psychological factors influencing accident involvement.

Sociologists, and particularly criminologists, should give greater attention to the socio-cultural factors which effect an individual's driving behavior, and thereby increase his liability for negligent involvement in a traffic accident. Of the fatal urban accidents examined in this study, 97 percent involved some human error constituting a violation of traffic law. While, admittedly, a proportion of these violations represent essentially circumstantial factors, the majority of the accidents studied involved clear violations of law such as driving while intoxicated or speeding. Furthermore, proportionally twice as many negligent persons, as compared with victims, had prior records involving violations of criminal law. These two factors suggest that there exists a positive relationship between violation of traffic law and violation of criminal law. Insofar as repeated violation of traffic law has been shown by other researchers to increase an individual's liability to being responsible for traffic accidents, it is reasonable to conclude that the problem of fatal urban traffic accidents is caused, in part, by the behavior of individuals with criminal propensities.
Further criminological research should seek to identify and explain more fully the relationship between criminogenic factors and negligent traffic behavior. As this research has shown, criminal violators responsible for fatal traffic accidents are best characterized by the violent personal offender associated with a subculture of violence. Given this fact, there is strong support for future research more specifically designed to determine to what extent exposure to a subculture of violence plays an important role in increasing an individual's liability for both violations of traffic law and involvement in traffic accidents.
APPENDIX
APPENDIX A

Standard Forms Found in Accident Packets
COLUMBUS DIVISION OF POLICE  Traffic Collision Report

**VEHICLE NO. 1**

<table>
<thead>
<tr>
<th>Driver (Last Name)</th>
<th>(First)</th>
<th>Sex</th>
<th>Race</th>
<th>O.R.B.</th>
<th>Carrier License Plate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Driver's License Number</th>
<th>State</th>
<th>Vehicle Make</th>
<th>Color</th>
<th>Year</th>
</tr>
</thead>
</table>

**VEHICLE NO. 2**

<table>
<thead>
<tr>
<th>Driver (Last Name)</th>
<th>(First)</th>
<th>Sex</th>
<th>Race</th>
<th>O.R.B.</th>
<th>Carrier License Plate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Driver's License Number</th>
<th>State</th>
<th>Vehicle Make</th>
<th>Color</th>
<th>Year</th>
</tr>
</thead>
</table>

**INCIDENT**

**DATE OF COLLISION**

- **TIME OF COLLISION**
- **DATE OF OCCURRENCE**

**DESCRIPTION**

- **VEHICLE NO. 1**
  - Description of Damage
  - Damage to Vehicle

- **VEHICLE NO. 2**
  - Description of Damage
  - Damage to Vehicle

**LOCATION OF COLLISION**

- **DATE AND TIME OCCURRED**
- **COLLISION SITE**

**ENFORCEMENT OFFICER**

- **DATE AND TIME RECEIVED**
- **COLLISION DIVISION**

FORM TO BE BLOCK LETTERED IN BLACK INK
ALCOHOLIC INFLUENCE REPORT FORM

<table>
<thead>
<tr>
<th>[Check]</th>
<th>[Check]</th>
<th>Police Dept.</th>
<th>Arrest No.</th>
<th>Accident No.</th>
<th>Arresting Officer</th>
</tr>
</thead>
</table>

Name: ____________________________ Address: ____________________________

Age: ______ Sex: _____ Race: __ Approx. Wt.: ______ Operator Lic. No.: ______ State: ______

OBSERVATIONS:

<table>
<thead>
<tr>
<th>CLOTHES</th>
<th>Description</th>
<th>Hat or Cap</th>
<th>Jacket or Coat</th>
<th>Shirt or Dress</th>
<th>Pants or Skirt</th>
</tr>
</thead>
</table>

| Condition | Disheveled | Disarranged | Spilled | Messed | Ordered |

| BREATH | Oder of Alcoholic Beverage: | Strong | Moderate | None |

| ATTITUDE | Describe: | Inebriated | Drunk | Stumbling | Sleeping | Unconscious |

| UNUSUAL ACTIONS | Describe: | Dizziness | Nausea | Fighting | Crying | Laughing |

| SPEECH | Describe: | Inarticulate | Drunken | Slurred | Rude | Mumbled |

| Ability to understand Instructions: | Poor | Fair | Good |

<table>
<thead>
<tr>
<th>PERFORMANCE TESTS:</th>
<th>Check appropriate square before word describing condition observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ BALANCE</td>
<td>Falling</td>
</tr>
<tr>
<td>☐ WALKING</td>
<td>Falling</td>
</tr>
<tr>
<td>☐ TURNING</td>
<td>Falling</td>
</tr>
<tr>
<td>☐ FINGER-TO-NOSE</td>
<td>Right</td>
</tr>
<tr>
<td>☐ LEFT</td>
<td>Completely Misused</td>
</tr>
</tbody>
</table>

| ☐ COINS | Unable | Tumbling | Slow | Sure | (Dialing during call test) |

| Ability to understand Instructions: | Poor | Fair | Good |

| OBSERVER'S OPINION: | Describe: | Inebriated | Drunk | Stumbling | Sleeping | Unconscious |

| Effects of alcohol: | Describe: | Inebriated | Drunk | Stumbling | Sleeping | Unconscious |

| If Install, what instrument? | Describe: | Inebriated | Drunk | Stumbling | Sleeping | Unconscious |

<table>
<thead>
<tr>
<th>CHEMICAL TEST DATA:</th>
<th>Check appropriate square before word describing condition observed</th>
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</thead>
<tbody>
<tr>
<td>☐ Breath:</td>
<td>Blown</td>
</tr>
<tr>
<td>☐ If Denied</td>
<td>Unable</td>
</tr>
</tbody>
</table>

| Analysis results: | Describe: | Inebriated | Drunk | Stumbling | Sleeping | Unconscious |

| If refused, why? | Describe: | Inebriated | Drunk | Stumbling | Sleeping | Unconscious |

| ☐ Yes | ☐ No |

---
INTERVIEW:

Were you operating a vehicle? —-------- Where were you going? —--------

What street or highway were you on? —-------- Direction of travel? —--------

Where did you start from? —-------- What time did you start? —--------

What time is it now? —-------- What city (county) are you in now? —--------

What is the date? —-------- What day of the week is it? —--------

INTERVIEWER TO FILL IN ACTUAL: —-------- Time —-------- Day —-------- Date —-------- Interviewer's Name

When did you last eat? —-------- What did you eat? —--------

What were you doing during the last three hours? —--------

Have you been drinking? —-------- What? —-------- How much? —--------

Where? —-------- Started? —-------- am/pm —-------- Stopped? —-------- am/pm

Are you under the influence of an alcoholic beverage now? —--------

What is your occupation? —-------- When did you last work? —--------

Do you have any physical defects? —-------- If so, what? —--------

Are you ill? —-------- If so, what's wrong? —--------

Do you limp? —-------- Have you been injured lately? —-------- If so, what's wrong? —--------

Did you get a bump on the head? —-------- Were you involved in an accident today? —--------

Have you had any alcoholic beverage since the accident? —-------- If so, what? —--------


Have you seen a doctor or dentist lately? —-------- If so, what? —-------- What? —--------

What kind? —-------- Are you taking prescription, pills or medicines of any kind? —--------

If so, what kind? (Get sample) —-------- Last dose? —-------- am/pm —-------- Do you have epilepsy? —--------

Diabetes? —-------- Do you take insulin? —-------- If so, last dose? —-------- am/pm —--------

Have you had any injections or any other drugs recently? —-------- If so, what kind? —--------

What kind of drug? —-------- Last dose? —-------- am/pm —-------- When did you last sleep? —--------

How much sleep did you have? —-------- Are you wearing false teeth? —-------- Do you have a glass eye? —--------

HANDWRITING SPECIMEN

Signature and/or writing to confirm.

REMARKS:

SUPPLEMENTARY DATA:

(Note—Get witnesses, including officers who observed, to prove driving)

<table>
<thead>
<tr>
<th>WITNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>---------</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Passengers in Suspect's Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>#</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

**Description of Clothing**: (Code)

- A. Arresting Off. Badge
- B. Arrested

<table>
<thead>
<tr>
<th>#</th>
<th>SWEAT No.</th>
<th>SEX</th>
<th>EYE COLOR</th>
<th>HAIR</th>
<th>HEIGHT</th>
<th>WEIGHT</th>
<th>COLOR</th>
<th>HEIGHT</th>
<th>WEIGHT</th>
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<tbody>
<tr>
<td>4.</td>
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<tr>
<td>5.</td>
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<tr>
<td>6.</td>
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<td></td>
</tr>
</tbody>
</table>

**Description of Clothing**: (Code)

- A. Arresting Off. Badge
- B. Arrested

**Identification of Juvenile Arrested**: (Code)

- A. Juvenile Bureau Process
- B. Additional Process

**Cash Value of Rec. Property**: (Code)

- A. Cash
- B. J. D. of Scene Photos Taken
- C. J. D. of Scene Photos Viewed
- D. Released to Owner
- E. Auto
- F. Other

**Evidence Re: Weapons**: (Code)

- A. Cash
- B. J. D. of Scene Photos Taken
- C. J. D. of Scene Photos Viewed
- D. Released to Owner
- E. Auto
- F. Other

**Additional Remarks**: (Code)

- A. Cash
- B. J. D. of Scene Photos Taken
- C. J. D. of Scene Photos Viewed
- D. Released to Owner
- E. Auto
- F. Other

**Investigator**: (Code)

- A. Cash
- B. J. D. of Scene Photos Taken
- C. J. D. of Scene Photos Viewed
- D. Released to Owner
- E. Auto
- F. Other
<table>
<thead>
<tr>
<th>Unit #1</th>
<th>Year</th>
<th>Make</th>
<th>Type</th>
<th>Lic</th>
<th>Unit #2</th>
<th>Year</th>
<th>Make</th>
<th>Type</th>
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</table>

**Accident Skid**

<table>
<thead>
<tr>
<th></th>
<th>Before Acc</th>
<th>After Acc</th>
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<tbody>
<tr>
<td>Light Front</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light Rear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Right</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Left</td>
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<td></td>
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<tr>
<td>Total</td>
<td></td>
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</tr>
<tr>
<td>Average</td>
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**Test Skid**

<table>
<thead>
<tr>
<th></th>
<th>Test 1</th>
<th>Test 2</th>
</tr>
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<tbody>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Light Rear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Right</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Left</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

**Driver(s) and Pedestrian(s) Condition:**

**Pedestrian:**
- Race
- Sex
- Age
- Color of Hair
- Blood Type

**Describe Clothing:**

**Physical Defects:**

**Unit #1 Driver:**

**Unit #2 Driver:**

**Pedestrian:**

**Statement Taken:**
- Victim(s)
- Driver(s)
- Witness(es)

**Statement Taken By:**

**Signed By Investigating Officer(s):**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

C.P.D.  A.I.S.
APPENDIX B

Data Checklist
Card I - Event Information

Event Identification Number

Accident Report Number ______________________

Card Number

Nature of Involvement

1. Fatality
2. Injury only

Subject Identification

1. event
2. driver #1 - violator
3. driver #2 - non-violator
4. pedestrian #1 - victim
5. pedestrian #2 - violator
6. passenger #1
7. driver #2 - violator
8. driver #2 - non-violator
9. pedestrian #2 - victim
10. pedestrian #2 - violator
11. passenger #2

Type of Accident:

1. ran off roadway
2. overturned
3. pedestrian
4. moving motor vehicle
5. parked motor vehicle
6. train
7. bicyclist
8. animal
9. fixed object
10. other object
11. motorcycle
12. other

Type of accident (recoded from cols. 10-11)

1. multiple auto (two or more)
2. single auto
3. auto-pedestrian
4. auto-two wheeled vehicle

Location of accident; enter census tract.

SES of above census tract:

1. High
2. Middle
3. Low

Date of accident
Season:

1. Spring - 3/20 to 6/20
2. Summer - 6/21 to 9/21
3. Autumn - 9/22 to 12/21
4. Winter - 12/22 to 3/1

Time of accident (suffix 1 for AM and 2 for PM)

Day of week (1-7 / Mon. - Sun.)

Day of week (recorded from col. 28)

1. weekday A.M. - 12:01 A.M. to 12:00 noon M - F
2. weekday P.M. - 12:01 P.M. to 12:00 midnight M. - Th
and 12:01 P.M. to 5:00 P.M. Fri.
3. weekend A.M. - 12:01 A.M. to 12:00 noon Sat. - Sun.
4. weekend P.M. - 12:01 P.M. to 12:00 midnight Sat. -
and 5:01 P.M. to 12:00 midnight Fri.

Number of vehicles

Number of persons involved ( 9 = 9 or more)

Weather conditions

Light conditions

Road conditions

Type of area

Traffic control

Total number of lanes

Manner of collision

Type of road surface

Contributing Behavior involved:

1. yes - on part of driver
2. no
3. yes - on part of pedestrian
4. yes - both driver and pedestrian

Subsequent citation:

1. yes - to driver
2. yes - to pedestrian
3. no

Roadway defects: ________________________________
Individual Information

(1-4) Event Identification Number

Subject's Name __________________________ / dob ______

(5-6) Card Number

(7) Nature of Involvement:
1. Fatality
2. Injury only

(8-9) Subject Identification:
1. event
2. driver #1 - violator
3. driver #1 - non-violator
4. pedestrian #1 - victim
5. pedestrian #1 - violator
6. passenger #1
7. driver #2 - violator
8. driver #2 - non-violator
9. pedestrian #2 - victim
10. pedestrian #2 - violator
11. passenger #2

(10) Sex:
1. male
2. female

(11) Race:
1. white
2. non-white

(12-13) Age:

(14-17) Address; enter census tract number

(18) SES of above census tract:
1. High
2. Middle
3. Low
Marital status:
1. single
2. married
3. divorced
4. separated
5. widow/widower
6. common law/cohabitation
7. other
8. unknown

Place of employment:

Subject's last known occupation:

Driver's license number:

State license issued:

Vehicle make:

Vehicle model year:

Vehicle (recoded from cols. 24-27):
1. full sized American
2. mid-sized American
3. compact American
4. super-car
5. sports car
6. imported economy

Ownership of vehicle:
1. same as driver
2. other related; give name
3. other not related; give name

Vehicle insurance:
1. yes; by whom
2. no

Vehicle condition:
1. Good
2. Fair
3. Poor

Contributing driver behavior:
13. no violation
14. hit-skip
Pedestrian action

Physical condition

Injuries sustained: 5. for none

Cited for violation?:
1. yes
2. no

If yes; what violation

Disposition of citation:
1. never indicted
2. indicted; charges dropped
3. indicted and tried
9. unknown

If #3 above; what plea:
1. guilty
2. not guilty
3. no contest

Sentence:
1. suspended (no probation) (add suffix "1" if fine is included as part of sentence; otherwise col. 45 is "0")
2. probation
3. confinement (workhouse, jail)
4. institutionalization

Number of months sentence term.

Sentencing judge
<table>
<thead>
<tr>
<th>Case</th>
<th># Arrests</th>
<th># Convictions</th>
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<tbody>
<tr>
<td>Personal homicide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rape</td>
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<td>Battery</td>
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<td>Burglary</td>
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<td>Assaults</td>
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<td>Molestation</td>
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<td>Burglary in stolen prop.</td>
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