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DRUG ABUSE AND DRIVING PERFORMANCE

Dunlap and Associates, Inc.
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16. Abstract

Data on 1562 methadone maintenance patients in New York State were gathered through face-to-face interviews. A control group of 1059 people was constructed by asking the experimentals to volunteer names of non-addicted friends. State driver records for 718 experimentals and 579 controls were obtained and analyzed.

In general, experimental subjects were no worse drivers than the controls for the entire period covered by the driver records. This was so despite the fact that experimentals estimated their mileage to be at or above the national average throughout their abuse of non-narcotic and narcotic drugs and during their methadone treatment. It was also found that drug abusers who drive are likely to drive immediately after using drugs.

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FOREWORD

This report presents the details of a study performed by Dunlap and Associates, Inc. under contract number DOT-HS-099-1-184 with the U. S. Department of Transportation, National Highway Traffic Safety Administration. The project director for the study was Richard D. Blomberg. David F. Preusser, Marlene S. Orban, and Bernard H. Cohen comprised the project staff. Joseph T. Fucigna, executive vice-president, was responsible officer for the corporation. Technical assistance was provided by Muriel G. Adams (questionnaire and report production) and Carolee Fucigna (keypunching).

ACKNOWLEDGMENTS

The authors wish to express their gratitude to those individuals and organizations who assisted in the performance of this research. Dr. Fred B. Benjamin, the Contract Technical Manager, provided guidance and support throughout the study. The New York State Narcotics Addiction Control Commission, particularly Dean V. Babst, yielded background information and invaluable assistance in contacting Methadone Centers. John O. Moore and Barbara Baciewicz of the New York State Department of Motor Vehicles assisted by providing driver abstracts and special data on New York State accidents and violations. Joseph Giannotti, Donna Denyer and Mark Krieger of the Columbia University Computer Center guided the computer usage and offered much help in software development. Norman B. Gordon of the Yeshiva and Rockefeller Universities made his data on methadone patients and driving available to the study and gave the authors the benefit of his vast experience in the field.

Finally, much of the success of this venture was the direct result of the diligence, perseverance and innovation of the numerous interviewers. Similarly, the faith and trust of the many methadone center directors was essential and greatly appreciated.

The assistance provided by the foregoing individuals and organizations was invaluable to the conduct of this study. Nevertheless, it must be emphasized that the findings, conclusions and opinions expressed herein are solely the responsibility of the authors and in no way reflect the official positions of either the Federal government or any other cooperating individual or group.

I. SUMMARY

A. Method

The purpose of this study was to examine the driving characteristics and highway safety of abusers of narcotic drugs and methadone maintenance patients through the performance of interviews at methadone treatment programs and subsequent traffic records searches. Secondary objectives included an examination of the effects of non-narcotic drugs on driving and a determination of the advisability of licensing methadone patients to drive.

Data on 1562 methadone maintenance patients in New York State were collected through face-to-face interviews. These experimental subjects volunteered the names of 1059 people of their peer group who were never heroin addicts or methadone patients. Traffic records for each of these were searched in the files of the New York State Department of Motor Vehicles. This search yielded complete driver records (abstracts) for 718 of the experimentals and 579 of the comparison group (controls).

Data from the interviews were analyzed to develop a description of the driving habits and exposure of the drug abusers (experimentals) during four periods in their lives:

Pre-Drug--Prior to the abuse of any drug except alcohol

Non-Heroin--During the abuse of non-narcotic drugs, e.g., marijuana

Heroin--While addicted to heroin or another opiate

Methadone--While enrolled in a methadone maintenance treatment program.

B. Results

The results of these analyses are summarized in Table I. The major finding was that the experimental group drove at or above the national mileage average during all four time periods, even allowing for the tendency of individuals to overestimate the mileage they drove. Mileage estimates during the heroin period were particularly high, averaging over 18,000 miles per year. By their own admission, much of this mileage during the heroin period was driven in pursuit of drugs and in close proximity to the use of drugs.

Table I

Summary of Driving Characteristic Data for Experimentals

Variable	Period				Comments
	Pre-Drug	Non-Heroin	Heroin	Methadone	
Total available experimental subjects	1562	1114*	1562	1562	*448 subjects abused no drugs prior to heroin
Average period length (years)	16.23*	3.13	7.39 5.51 (median)	1.26	*Age of first illicit drug use
Average age at midpoint of period (years)	16.23*	16.79	22.14	26.4	*Age of first illicit drug use
Average yearly mileage	5704	8910	18,067	12,089	Averages across all subjects
	11,991	12,725	18,814	12,846	Averages across only those who said they drove
Subjects who drove	743	780	1500	1470	
Primary purpose for driving	personal	personal	to get drugs	personal	Work-related driving ranked second except in heroin period when personal ranked second

Table I

Summary of Driving Characteristic Data for Experimentals (Continued)

Variable	Period				Comments
	Pre-Drug	Non-Heroin	Heroin	Methadone	
Percent of drivers who drove several times each day	52%	55%	69%	56%	
Percent of driving done in the daytime	31%	33%	36%	48%	
Percent holding a valid driver's license *	26%	31%	74%	66%	* Percent of all subjects
Median yearly mileage for unlicensed drivers	5760	5945	9200	6000	
Median yearly mileage for licensed drivers	13, 900	14, 000	18, 300	13, 950	
Percent drivers licensed in New York State	85%	90%	91%	94%	
License type held	69% oper. 22% chauf.	76% oper. 15% chauf.	67% oper. 28% chauf	59% oper. 36% chauf.	
Most used vehicle type	Pass. car	Pass. car	Pass. car	Pass. car	Second were trucks in all periods

Table I

Summary of Driving Characteristic Data for Experimentals (Continued)

Variable	Period				Comments
	Pre-Drug	Non-Heroin	Heroin	Methadone	
Owner of most used vehicle	Family	Self or family	Self	Self	
Number and percent of drivers who drove immediately after drug use	-	719 (92%)	1429 (95%) *	-	*973 (65%) did so daily
Percent of all accidents occurring when subjects were "high"	-	34% *	46% *	-	* Interview data
Percent of all tickets received when subjects were high	-	25% *	44% *	-	* Interview data

Traffic records data for the experimentals and controls were compared to ascertain the relative safety of the two groups. Table II summarizes the overall results of these analyses. In general, the accident and violation rates for the experimental group were no worse than those for the controls for all years covered by the driver records. This absence of difference remained when experimentals were segregated on the basis of drug being used, i.e., heroin or methadone.

Interview data for the Non-Heroin Period were examined to ascertain trends in safety as a function of non-narcotic drug abuse. The results, though inconclusive because they were derived from retrospective self-reports, did not highlight any major differences among the various drug types. Furthermore, there is some evidence to indicate that abusers of non-narcotic drugs who drive immediately after drug ingestion do not, in general, display worse accident records than other users of the same drug.

C. Conclusions

The major conclusions of the study are enumerated below. These were substantiated only for methadone maintenance patients in New York State and for their period of narcotic addiction. Further, the sample is comprised primarily of young, male Caucasions. Therefore, care should be exercised when extending these results to other addict or methadone maintenance populations.

- Abusers of narcotic drugs appear to drive (by their estimates) significantly above the national mileage average. Moreover, the vast majority of these individuals drive daily in close proximity to the time of use of the narcotic.

- Self-estimates of annual mileage by methadone maintenance patients indicate that they drive at or above the national average both while in treatment and while abusing non-narcotic drugs.

- Regardless of specific drug of abuse, unlicensed drug abusing drivers drive significant amounts of mileage.

- Experimental subjects were not involved in more accidents of any type while addicted to narcotics than were the controls or the total driver population of New York State of similar age and sex distribution.

- Methadone maintenance patients in the study were not involved in any more accidents of any type than the control group.

Table II

Comparison of Experimental and Control Groups in the 5 year Period - 1967-1971 from Abstract Data

Variable	Effect Observed
Accidents	No significant difference in total or by accident resultant
Moving violations	No significant difference in total or by ticket types
Equipment and document violations	Experimentals show significantly more
License revocations and suspensions	Experimentals show significantly more

- Violation rates for experimentals and controls do not differ significantly with the exception of violations for improper equipment or documents.

- Drug abusers, particularly heroin addicts, appear to be successfully compensating any performance degradation produced by the drug they are taking. This compensation appears to be the result of fear of discovery, accident and/or arrest for a drug charge. Furthermore, the compensation appears sufficiently strong to overcome their large exposure.

- This study does not provide any evidence which would support prohibiting methadone patients or narcotic addicts as a group from driving.

II. INTRODUCTION

This section contains a description of the objectives of this research, a discussion of the background provided by previous efforts and a basic description of the approach used. Succeeding sections of this report detail the methods and procedures employed, the results obtained, and conclusions and recommendations.

A. Objectives

The basic purpose of this research was to obtain data on the relationship between the abusive use of narcotic drugs and driving performance through interviews with patients in Methadone Treatment Centers. The specific objectives of the effort were to:

- Determine the incidence of driving while under the influence of narcotic drugs as well as methadone
- Identify the characteristics of the driving which is done by narcotic abusers and methadone patients
- Determine the incidence of narcotic drug abuse in highway crashes and traffic violations
- Obtain insights on the effects of non-narcotic drugs on driving and the characteristics of the driving which is done under their influence

The pursuit of these objectives necessitated the development of methods and procedures capable of reliably obtaining the required data from the study population.

B. Background

The results of previous studies concerning the effects of drug abuse on driving performance provide both a source of comparative analyses and a guide to successfully utilized research approaches. Unfortunately, these studies are few and their results are often equivocal or contradictory. In their review of existing evidence, Kibrick and Smart conclude that:

> few propositions have been clearly established and no studies have been replicated. [1]

Nevertheless, certain insights concerning the expected results of this study can be found in the literature. Crancer and Quiring, in a study of persons arrested for drug use in the State of Washington, found a significantly higher accident rate among illegal marijuana, dangerous drug , and narcotic users than in a sample of drivers of the same age and sex distribution. [2] The same study found statistically higher violation rates for the same group. The differential uncovered was greater for violations than for accidents.

In another study of drivers convicted for illegal drug use, Waller found that the drug abusers had no more accidents but almost twice as many violations as the comparison group. [3] In fact, the drug users in this study were the only group with a "chronic medical condition" (e.g., epilepsy, diabetes, alcoholism, etc.) who did not have a higher accident rate than the control group.

A more recent study of individuals arrested for serious crimes found that:

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[1] Kibrick, Eleanor & Smart, Reginald G., "Psychotropic Drug Use and Driving Risk: A Review and Analysis," Journal of Safety Research, 2 (2), June 1970, pp. 73-85.

[2] Crancer, Alfred, Jr. and Quiring, Dennis L., Driving Records of Persons Arrested for Illegal Drug Use, State of Washington, Department of Motor Vehicles Report 011, May 1968.

[3] Waller, Julian A., "Chronic Medical Conditions and Traffic Safety," The New England Journal of Medicine, 273 (26), December 23, 1965, pp. 1413-1420.

> In general drug using drivers of this select population have no worse,and in fact usually better, driving histories than nondrug users. This is true when accidents or convictions are used as a criterion.[4]

All of the aforementioned studies drew their sample from individuals who had been arrested for drug use or another serious crime. Other studies utilized subjects selected from drug treatment clinics. Smart, et al, examined the accident rates of 30 psychoactive drug abusers at a clinic in Toronto.

> The psychoactive drug abusers had accident rates about twice as high as expected for their age, sex, and driving exposure. Most of the excess was contributed by those addicted to amphetamines (alone or in combination), whereas those addicted to alcohol and barbiturates, barbiturates only or tranquilizers only had lower rates than expected.[5]

The Toronto study did not include abusers of narcotic drugs. A 1971 study by Babst et al (unpublished) drew its sample from methadone maintenance programs in New York City. Driving records of patients both during methadone maintenance and while they were still on heroin were examined.

> When a comparison was made within specific age groups, it was learned that the accident and conviction rates were about the same for clients as it was for a sample of New York City male drivers also of the same period. The accident and conviction rates were about the same before being placed in the program as it was while in the program.[6]

This study did not interview the subjects and therefore could not ascertain mileage driven or any other measure of exposure.

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[4] Moser, B.A., Bressler, L.D. and Williams, R.B., Collection Analysis and Interpretation of Data on Relationship Between Drugs and Driving, Research Triangle Institute, Durham, North Carolina, February, 1972.

[5] Smart, Reginald, G., Schmidt, Wolfgang and Bateman, Carol, "Psychoactive Drugs and Traffic Accidents," Journal of Safety Research, 1 (2), June, 1969, pp. 67-183.

[6] Babst, Dean V., Gordon, Norman B., and Warner Alan, Driving Records of Methadone Maintenance Patients in New York State, New York State Narcotic Addiction Control Commission, 1971. (Working Draft - Unpublished)

C. Approach

The foregoing discussion of background highlights some of the motivating factors behind the approach to this study. In particular, the need to interview the subjects to obtain mileage estimates is clear. Without these estimates, it is impossible to know whether the higher accident rates observed by Crancer and Quiring, for example, were the result of unsafe behavior or greater than average exposure. Evidence that drug abusers drive significant amounts was provided by Waller who found an average annual rate of 12,000 miles among the drug abusers in his study.[7]

The results of Moser et. al. and Smart et. al. suggested the desirability of examining the driving behavior of the methadone patients in this study during the time when they were abusing non-narcotic drugs. Since this was generally sufficiently far in the past to negate the use of New York State driver records, reliance had to be placed on the subjects' self-admission of accidents and violations. Support for the feasibility of this approach was provided by Smart et. al. who found good agreement between their interview data on accidents and official records.[8]

The need for a matched control group is indicated by all previous studies. Drug abusers differ from the general population with respect to age, sex and socio-economic status. Since each of these variables may be related to traffic safety, matching of control subjects on these variables was essential. Unfortunately, the actual method of control subject selection employed in this study (asking experimentals to name controls), had not been previously employed in a similar effort. However, it proved to be the most reasonable way to proceed and, hence, was adopted.

D. Methadone Maintenance

In the detailed discussions of method and results which follow, it will be useful for the reader to understand the function of methadone maintenance. Methadone Maintenance Treatment Programs (MMTPs) are one of the major treatment modalities for heroin users currently in use. The majority of patients are volunteers and generally:

- Are 21 years old or over

[7] Waller, Op. Cit.

[8] Smart, Schmidt, and Bateman, Op. Cit.

- Have been primarily addicted to heroin or another opiate drug
- Have used heroin for four or more years
- Have unsuccessfully attempted alternate treatment
- Are free of clinically evident symptoms of serious disease or mental illness

Upon entry into an MMTP, they are detoxified from heroin and stabilized on an average daily dose of 100 mg. of oral methadone, a synthetic narcotic.

The average patient spends about 6 weeks in the stabilization process. He then enters a phase in which he must report to an out-patient clinic on a daily basis to receive his methadone and leave a urine sample. Finally, as their ability to function productively in society is proved, the patients are allowed to reduce their number of visits to the clinic. At each of these visits, they take one dose of methadone in the presence of MMTP personnel, leave a urine sample and receive enough methadone to carry them until their next visit. Patients who have completed stabilization form the experimental sample for this study and will be referred to throughout as "experimentals." The comparison group or "controls" are non-addicts who were never methadone patients. Their method of selection together with the other details of the procedures of this study will be presented in the next section.

III. METHODS AND PROCEDURES

An understanding of the methods employed in this study is important to the reader when interpreting its results. The potential biases in the data and the reliability of the analyses are both dependent on methodological considerations. Therefore, this section will discuss the way in which the study was conducted. Topics will be presented in chronological order as they were addressed during the project.

A. Selection of the Geographic Sample

At the outset, it was planned to obtain the experimental sample for the study from the roles of methadone maintenance patients in four states--California, Connecticut, Kansas and New York. The use of multiple states with geographic dispersion was thought to provide a suitable representation of the conditions of drug use and driving in the United States. However, it quickly became apparent that the use of states with differing vehicle and traffic laws and diverse recordkeeping systems was frought with problems. These included:

- Difficulty in comparing property damage accidents because of varying reporting limits
- Differing storage intervals for driver records, i.e., the records collected would not all cover the same time period
- The expense involved in accessing multiple systems and converting the data to comparable format.

It was therefore decided to examine the feasibility of utilizing less than four states as the source of experimental subjects. Connecticut and Kansas were quickly eliminated because of insufficient numbers of methadone maintenance patients and the relative homogeneity of climatological and demographic conditions within each State. Either California or New York appeared suitable as both had a sufficient number of potential subjects and displayed widely varying internal conditions. Moreover, both were centers of the U.S. drug problem.

On July 7, 1971, the California State Senate passed an Act [1] amending the State's Vehicle Code to:

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[1] Assembly Bill No. 497 - State of California

- Make it lawful for a methadone patient to receive a license and drive

- Make it unlawful for any person under the influence of "narcotic drugs or amphetamine or any derivative thereof" to drive

- Make it "unlawful for any person who is addicted to the use of narcotic drugs" except an approved methadone maintenance patient to drive.

Because of the potentially biasing effects of this Act, California was rejected and New York was chosen as the sole state from which data would be collected. At the start of the study there were over 15,000 methadone maintenance patients in local programs funded by the New York State Narcotic Addiction Control Commission (NACC). In addition, there were thousands of additional patients in private programs and clinics run directly by the State.

B. Selection of Methadone Centers

The initial step in the selection of the individual methadone treatment centers from which data would be collected was to obtain a complete list of centers funded by NACC. Since this group of centers handles the majority of New York State methadone patients, it was decided that it should form the basis of a sampling plan. Each center on the list was classified by location. Classifications were:

- New York City--within the five boroughs

- Other city--outside New York City but in a large, urbanized area, e.g., Buffalo

- Non-city --basically rural and suburban areas with relatively low population densities.

Census data were then accumulated to determine the total population in each of the three location categories. Finally, the target sample size for the study (initially 2000 interviews) was apportioned among the groups on the basis of population. This resulted in target sample sizes of 988 for New York City, 580 for the other city category, and 432 for the non-city group.

Within each sampling category, methadone program directors were contacted and asked to permit interviewing at the center or centers they maintained.

In addition, several private and State-run clinics which were mentioned by some of the individuals contacted were also approached. Interviewing proceeded sequentially in those centers which were willing to grant access to the project staff.

In all, interviews were conducted in 44 centers throughout the State. Most center directors requested anonymity, and many centers used were the only ones operating in a particular town. Therefore, the names of the individual centers cannot be revealed. However, they were situated in the following counties:

- Albany
- Bronx
- Dutchess
- Erie
- Kings
- Nassau
- New York
- Orange
- Queens
- Suffolk
- Westchester

C. Control Group Selection Scheme

To complete the experimental design, it was necessary to establish one or more control groups against which the methadone patients could be compared. Several methods for selecting controls were evaluated. These included:

- Use of published New York State accident data
- Randomly selecting controls from the New York driver abstract files to match the age, sex and zip code of the experimental subjects
- Identifying and interviewing controls through schools and social organizations
- Asking each experimental subject to provide the name of a friend or relative of his age and sex who has never been a heroin addict or methadone patient.

Published statewide data were rejected as the primary control because they are too gross a measure. It was anticipated that the methadone patients would

not be typical of the New York driver in terms of many of the key socio-economic variables, e.g., race and income. Therefore, complete reliance on statewide data would not provide the best matched control group.

Selecting controls from the abstract files on the basis of age, sex and zip code would provide better matching with the experimentals. However, not all county motor vehicle offices in New York State recorded zip code during the study period (this practice should become universal soon). Therefore, some experimentals could not have been matched using this procedure. Furthermore, it was estimated that a control group selected in this manner would contain an unacceptably high percentage of heroin addicts and methadone patients. Estimates of addicted people in the population at large varied from one percent (1%) on a statewide basis to ten percent (10%) in certain inner city zip codes.

Identifying and interviewing controls would have been the best method of control selection. In addition to providing comparability with the experimentals, this procedure would also have permitted the collection of data on driving habits and exposure from the control group. Unfortunately, it had to be rejected on economic grounds. The cost of implementing this procedure, even by a mass-mailed survey, could not be supported by the available funds.

In light of the problems inherent in using the other approaches, it was decided to ask each experimental subject to provide the names of one or more controls. They were specifically requested to name people of their own sex and approximately their own age who had never been heroin addicts or methadone patients. It was assumed that the associates of the experimental subjects would match them fairly closely in terms of race, ethnicity, economic level and place of residence. Further, anecdotal reports indicated that a drug abuser would know with considerable reliability the drug use habits of his relatives and friends, particularly with respect to heroin. Therefore, the control group would be as free as possible of opiate addicts or methadone patients. Consideration was also given to requesting controls who were non-users of any illegal drug. This notion proved unworkable in initial trials because virtually everyone in the peer group of a methadone patient had experimented with some drug other than alcohol (primarily marijuana).

The amount of information requested about each control was limited to the items needed to obtain a driver abstract. These were full name and address, sex, and approximate age. While only specific date of birth can be used for a records search, approximate age was useful when individuals with the same name were found in the motor vehicle files. In all cases, the experimental subject was promised complete anonymity both for himself and for the controls he provided. This proved to be essential in collecting control subjects because the experimentals would generally not provide names of controls without

ADDENDUM

BACKGROUND

The purpose of this study was to examine the driving characteristics and records of abusers of narcotic drugs and methadone patients.

Data on 1562 methadone maintenance patients in New York State were collected through face-to-face interviews. In order to obtain a comparison (control) group, these experimental subjects volunteered the names of 1059 people of their peers who were never heroin addicts or methadone patients. Traffic records for each of these were searched in the files of the New York State Department of Motor Vehicles. This search yielded complete driver records (abstracts) for 718 of the experimentals and 579 of the comparison group.

STUDY CONCLUSIONS

The major conclusions of the study are enumerated below. These were derived from methadone maintenance patients in New York State. Therefore, care should be exercised when extending these results to other groups.

- Based on their own estimates of the number of miles driven, abusers of narcotic drugs appear to drive significantly above the national mileage average. Moreover, the vast majority of these individuals reported driving daily close to the time of use of the narcotic.

- Similarly, methadone patients reported driving at or above the national average mileage.

- Regardless of specific drug of abuse, drug abusing drivers who did not possess a valid license reported driving significant amounts of mileage.

- Experimental subjects, (while addicted to narcotics), were not involved in more accidents of any type than were (1) the comparison (control) group, or (2) the total driver population of New York State of similar age and sex distribution.

- Methadone maintenance patients in the study had essentially the same number and type of accidents as the control group.

- Moving violation rates for experimental and control groups did not differ significantly; but violations for improper equipment or documents were significantly higher for drug users.

- One hypothesis that has been suggested to account for the lack of differences between the experimental and control groups, in terms of accidents and violations is: "Drug abusers, particularly heroin addicts, appear to compensate in their driving for any performance degradation produced by the drug."

ADDITIONAL COMMENT

The attached report by Dunlap and Associates has certain limitations that are inherent in this kind of epidemiological study and they are fully recognized by the authors. The following statement combines the findings of this study as well as a number of other studies by the Department of Transportation and the National Institutes of Health; which should help in interpretation of the results reported.

The addict whose requirements for opiates are satisfied may not show any significant psychomotor deficiency. However, during periods of abstinence, performance impairment is likely to be marked. This differentiates the opiate (including Methadone) user from the user of stimulants, depressants, and hallucinogens. The performance of the latter may be fairly normal when not under the influence of the drug, but is likely to be severly impaired when under the influence of the drug.

F. B. Benjamin
Contract Technical Manager

complete assurance that the latter would not be contacted in any way. Unfortunately, making this commitment ruled out any possibility of sending a follow-up questionnaire to any controls. Thus, specific information on the driving habits of the control group could not be obtained.

D. Questionnaire Development

The questionnaire (see Appendix A) used to structure the interviews with methadone patients was the primary data collection instrument in the study. It was designed to be pre-coded and basically ready for keypunching because of the massive amounts of data which would be handled. Information was sought in three broad categories in order to address the hypotheses of the study. These were:

- Driving behavior
- Drug use
- Classification and general background

1. Driving Behavior

The research objectives of the study dictated a strong focus on the driving behavior of the experimental subjects. To be sure, information on accidents, violations, etc. would be available from the driver abstracts. However, these only cover a period of roughly five years and could not generally address a subject's driving record throughout his drug use. It was also anticipated that some subjects would either refuse to give their name (needed for the records search) or supply a fictitious name. In addition, through the interview it was possible to determine which accidents and violations occurred in New York and hence could be expected to appear on a driver abstract. Therefore, questions were addressed to accidents and violations.

To address the highway safety of a group of subjects completely, exposure data are also needed. Subjects were therefore questioned about the mileage they had driven and the frequency of their use of a motor vehicle. In order to place these data in the proper perspective, questions were included on the type and status of driver's license held, type of vehicle most used, ownership of most used vehicle, reason for which most mileage was driven, and time period of most driving.

It was recognized that self-estimates of these variables, mileage in particular, are often inaccurate. This is especially true for retrospective estimates. However, a recent study conducted at the Highway Safety Research Center (HSRC) in North Carolina showed that these estimates, while varying in accuracy

as a function of the respondent's sex and the actual mileage driven, are not off by orders of magnitude. Males tend to overestimate their mileage, while females tend to underestimate.[2] Therefore, lacking the ability to obtain odometer readings, self-estimates of mileage were accepted as a reliable indicator of the magnitude of a subject's exposure.

2. Drug Use

The second major category of information requested from the experimental subjects concerned their drug use. The contract requested a detailed examination of three time periods for each subject--before and during addiction to a narcotic drug and while on methadone. However, it was considered beneficial to examine, in addition, the period of time during which the subject was using non-narcotic illegal drugs. Therefore, four time periods were addressed in the questionnaire, and are referred to frequently in this report. These were termed:

- Pre-Drug--before the abusive use of any drugs other than alcohol
- Non-Heroin--during the abuse of non-opiate drugs
- Heroin--while using heroin, morphine or opium
- Methadone--time of enrollment in a methadone maintenance treatment program (MMTP)

At the start of the interview, the dates signifying the start and end of each period were determined. In practice, the interviewers were instructed to make sure these data were available and to do everything possible to record them accurately. The start of the heroin period was taken as the date heroin was first used regardless of the simultaneous use of other drugs. The dates of attendance at the MMTP obtained by the interview could not be verified from program records because the centers would generally not make them available.

Data on the extent and type of drug abuse were also requested. These included amount of heroin used at the start and end of addiction and the types of other drugs used. Subjects were not asked if they were using other drugs

[2] "The Revealing Odometer," Highway Safety Highlights, 5 (2), October, 1971, The Highway Safety Research Center, p. 4.

while in the methadone program. Questions of this nature proved too sensitive and tended to destroy the credibility of the interviewer.

Questions about driving were repeated for each of the four periods. In the non-heroin and heroin drug use periods, inquiries were added concerning driving immediately after using drugs. An attempt was also made to determine which accidents and violations occurred when the subject considered himself "high" on non-opiates or after he had just used heroin.

3. Classification Information

The final category of data included in the questionnaire helped classify the respondent. Date of birth, sex, race, marital status, and similar items of information were collected. The last pieces of information requested were the subject's name and address and the names of potential control subjects. These questions were deferred until the end of the interview to avoid alarming the subject and help maximize the possibility that he would volunteer them. Preliminary tests had shown the methadone patient to be quite cooperative if he trusted the interviewer. Invariably, this sense of trust was greater at the close of the interview than it was at the outset.

Several types of interesting classification data had to be eliminated from the questionnaire in an effort to keep its length manageable. These included questions on military service, mobility (e.g., places lived in the last 10 years), place of first drug use, way of introduction to drug use, education, etc. Other types of data, notably questions on criminal arrests and convictions, were excluded as too sensitive.

E. Interviewer Selection

As work on the questionnaire proceeded and contacts with centers were made, it became clear that suitable interviewers who were "part of the scene" would be needed. They aroused far less suspicion than Dunlap personnel and hence obtained better responses. At first it was thought that staff members at the MMTPs might be available to serve as interviewers in their off-duty hours. When this did not prove feasible, interviewers were recruited from hotlines and other drug abuse prevention programs. The majority of these individuals were college educated and somewhat familiar with survey research. Several had acted as interviewers on other studies. All were knowledgeable about drug abuse and utilized terminology appropriate to the respondents. Finally, the interviewers naturally dressed in the manner of their subjects. Dungarees and fringed vests were typical and far more effective than business suits or fancy dresses.

Interviewers were compensated on the basis of completed interviews. In addition to keeping expenditures within budget, this method of payment served as a strong incentive. Many of the methadone centers had peak traffic in the very early morning hours. The interviewers knew they could maximize the number of interviews they conducted if they made the effort to be at the center early (sometimes before 7 a.m.).

Each interviewer was given an intensive training session. The questionnaire was thoroughly discussed to insure that the interviewer understood both the meaning and intent of each question. This was essential to maximize the quality of response and avoid producing an aura of secrecy around the interview. Interviewers were instructed to explain the need for a particular piece of data if questioned by the subject. This was particularly important when asking for the subject's name and names to be used as controls.

F. Pre-Test of Questionnaire

The questionnaire was given three separate pre-tests to insure its viability and validty. First, it was tested for basic flow and comprehension by administering it to Dunlap staff members who were instructed to play the role of a methadone patient. This test provided basic information on the soundness of the instrument's organization and indicated that it was ready for a trial with actual subjects.

The second pre-test was performed at a methadone maintenance program using Dunlap staff members as interviewers. This allowed the designers of the questionnaire to obtain first-hand observations on its performance. It also provided insights on the degree and type of training which the regular interviewers would require.

The final pre-test was performed by regular interviewers without the intervention of members of the project staff. This tested the overall utility of the questionnaire as well as the basic interviewing procedures. The results of all three pre-tests were combined into the final instrument (presented in Appendix A) and the methods for conduct of the interview described below.

G. Conduct of the Interview

Two basic approaches to the respondent were employed depending on the preference and physical layout of the individual methadone centers. Interviewers were either stationed in the clinic waiting room or situated in a separate office. In the first case, they approached prospective subjects directly, explained the purposes of the study, and solicited cooperation. In the second, members of the center staff were supplied with a brief printed

handout describing the study and directing the subject to the location of the interview. Both techniques worked well, although the direct contact of the first tended to elicit a slightly larger response from the total clinic population.

Subjects were accepted for the interview if they had ever driven a motor vehicle regardless of their license status, and if they had been on methadone maintenance for a reasonable period. In most centers, six months was the minimum duration acceptable. However, some of the MMTPs in the State were relatively new, thereby making a six month cutoff unrealistic. For those centers, the interviewers were told to relax the residency requirement to four months.

At the start of the interview each subject was told the purposes of the study. The structure of the interview was also explained, particularly the definition of the four time periods of interest. Complete anonymity was assured. Subjects were instructed not to guess on any question. However, they were strongly encouraged to provide their best estimates for all mileage and date questions as values for these were essential if the subject were to be included in the analyses.

Initial questions dealt with the dates and degree of use of the various drugs. Thereafter, the driving questions for each period were presented. Three response cards were employed to aid the subject in selecting an answer to those questions with the greatest number of response choices. In all cases, the subjects were permitted to read the questions from the questionnaire if they so desired. This not only aided their comprehension, but also decreased their feelings of suspicion.

The final part of the interview asked for classification data, including the subject's name and the names of potential controls. To gain the respondent's confidence and facilitate obtaining names, each interviewer was provided with a sample driver abstract to display. Often it was possible to obtain the interviewer's own abstract. It was always stressed that the abstracts were public information, and, further, that the process of obtaining an abstract in no way threatened the anonymity of the interview. Security was also maintained by providing envelopes in which each day's interviews could be mailed back to Dunlap and Associates, Inc.

H. Traffic Records Search Procedures

After receipt of questionnaires, the names and unit numbers (pre-printed on the interview form) were transferred to an abstract request. These were then submitted to the New York State Department of Motor Vehicles (DMV) in 14 batches of approximately 150 names each. The first batch was sent to Albany on November 18, 1971 and the final group was received back on June 22, 1972.

In Albany, a DMV operator entered the information supplied (generally name, address, date of birth and sex) into the computer from a console. Potential matches were displayed on the screen. If the operator found a sufficiently complete correspondence, e.g., name, date of birth and sex, the abstract was accepted and directed to the line printer for hard copy. Since control subjects were assigned unit numbers similar to the experimentals who supplied them, the DMV operators could not distinguish experimentals from controls, thereby further protecting the anonymity of the subjects.

I. Data Management

The product of the data collection efforts was a set of raw data consisting of:

- Completed questionnaires without subject names
- Completed questionnaires with subject names
- Driver abstracts on a subset of experimentals and controls

Names of potential control subjects who did not produce an abstract from DMV files could not be further utilized. Questionnaires without names or with names which did not yield an abstract could, however, be used in the derivation of descriptive data on driving behavior.

Each driver abstract contains the following information on the licensee:

- Name
- Address
- Date of birth
- Sex
- License number
- Type of license
- Type of event or action, e.g., conviction, accident, suspension, etc.
- Date of event or action
- Date of conviction or case number
- County in which event or action took place
- Description of event
- Number of points issued
- Fine paid

These were the basic data available for control subjects. In addition, each control was assigned the same location code (New York City, other city, or non-city) as the experimental who offered his name.

Abstract data for all subjects were coded as a string of events together with the date on which they occurred. Event codes were developed by examining a large number of abstracts and making a list of the events which appeared on them. This method of coding abstract data provided maximum flexibility for sorting and later analyses.

Although the questionnaires were almost completely pre-coded, each was carefully reviewed prior to inclusion in the data base. During this procedure, questionnaires with incomplete data were removed from further consideration. Marginal comments on the circumstances of the interview, or the interviewer's perception of the subject, were also noted.

Upon completion of questionnaire and abstract coding, all data were keypunched and separately verified. Data from the questionnaire produced data sets consisting of three cards for each interview. Abstract data were coded using a variable length format depending on the number of events on the abstract. Control subjects received one card in addition to their abstract data. This record carried the descriptors (date of birth, sex, geographic location) found on the abstracts.

The quantity of data which had to be handled made it impractical to utilize punched cards as the ultimate data medium. Therefore, appropriate software was prepared to make a standard magnetic tape from the cards. During this input process, several other checks and computations were carried out. These included:

- Sorting abstract data by calendar year for all experimental and control subjects
- Sorting abstract data by time period (methadone, heroin, etc.) for the experimentals
- Calculation of the lengths of each period and the subject's age at various points, e.g., start of methadone
- A further check of consistency and accuracy, e.g., missing dates

The data set for each subject was passed through the input program twice. First, as each batch of abstracts was received and coded, all data from that batch were operated upon. This accomplished error checking and provided data sets for preliminary analyses. Finally, after all data had been keypunched and screened, the entire set of information was processed and the tape to be used for final analyses created.

J. Data Analysis

Data collection and management resulted in well over 300 basic variables or measures. These included simple responses to interview questions and data categories from the driver abstract. Interview variables were applicable to all experimental subjects who answered the question which produced them. Some questions were not completed because of the reluctance of a particular respondent or an oversight by the interviewer. Abstract data were applicable to all controls (by definition) and the experimentals who produced a match in DMV files. Date of birth was required of all subjects in the data base.

In addition to the basic variables (e.g., a yes-no response to the question did you ever use marijuana?) many hybrid variables were computed. These were either combinations of questions or abstract data, e.g., number of non-opiate drugs used, or constrained basic variables, e.g., total accidents in 1971 for methadone patients who were under treatment for the entire year. A total of over 500 basic and hybrid variables were examined.

The first analytical step was to obtain the distribution of scores for all variables and verify the internal consistency of the data base. This was accomplished by cross-tabulating each with a basic descriptor variable such as subject sex or driver's license status. All cross-tabulations for this and succeeding stages of the analyses were accomplished using a specially prepared computer program and the facilities of the Columbia University Computer Center.

The second set of analyses produced cross-tabulations of those variables most closely related to the hypotheses of the study. These included all the safety measures, e.g., accidents, convictions, accidents per million miles driven, subject status (experimental or control), age, sex, etc. Cross-tabulations of more than two variables were performed at this stage, e.g., location of program versus age versus sex.

Interpretation of initial findings led to the generation of a third set of cross-tabulations. These were used to verify the findings of earlier analyses and to help identify the reasons for the significant interactions observed. Tests of significance such as the Chi-squared were utilized where appropriate after the distribution of results had been described.

Three types of comparisons were made using driver record data on experimentals. First, the driving records of the experimental group were examined with respect to possible influencing factors as identified by the interviews. These analyses produced a picture of driving behavior as a function of such items as drugs of abuse, use of methadone, sex, license status, driving

habits, etc. The second set of analyses compared each type of accident and ticket between the experimental and control groups. These comparisons were repeated for each year (1967-1971) for which abstract data were available.

The final group of analyses related the records of both the experimental and control groups to published data on traffic convictions and accidents for all of New York State. These provided an additional comparison for the experimental group and helped verify the need for the separate control group of peers which was utilized in the study.

K. Interviewing Debriefing

At the conclusion of data collection, each interviewer was asked to complete a debriefing form for each MMTP he worked that yielded experimental subjects. A copy of this form is included in Appendix A. Questions were asked about the center itself, the staff of the center, the subjects encountered, and the performance of the questionnaire. These data served several purposes. First, they helped identify the circumstances under which interviewing was conducted. Second, they described the way in which subjects were approached and interviewed. Finally, they provided further clarification of the quality of data obtained.

The outcome of this debriefing is presented in the next section together with the results of the study.

IV. RESULTS

This section describes and discusses the findings of the study. Appendices B through F contain the tabular data from which these results were derived. The letter designations of the appendices correspond to those of the subsections of this chapter. Hence, tables supporting subsection E may be found in Appendix E.

A. Interviewer Debriefing

The impressions of the interviewers are presented here to help the reader place numeric results in perspective. Answers to questions about the centers, their staffs, the subjects, and the questionnaire will be discussed. Statistical tests were not run on these data and the reader is cautioned against drawing conclusions about the total New York State Methadone program from these results.

1. The Centers

The majority of centers (73%) at which interviewing took place were rated "good" overall by the interviewers. Less than 19% of the centers were considered bad, and slightly over 8% were given an equivocal rating. A difference among centers was reported as a function of location. Centers located in the "other city" category, i.e., urban areas outside New York City, were rated worse in total than those in New York City or in non-city areas.

The overwhelming majority of centers (83%) were judged clean. A slightly smaller percentage (73%) were considered small with regard to their physical facilities. Overall, 81% of the centers were considered well run or very well run with the remaining 19% termed fair or poor. Unlike the general impression variable, center operations were considered better in the "other city" category than they were in either the New York City or non-city groups. It appears that centers in cities other than New York may be trying to compensate for their lack of facilities through better organization and superior operations.

In 62% of the centers, interviewing was conducted in the waiting room or similar place of general congregation. At 24% of the programs, a special office was provided for the interviewers. In the remaining 14%, interviews were conducted in a hallway or some other improvised location.

2. The Center Staffs

The degree of cooperation of the MMTP staff was an important factor in the success of interviewing. This was particularly true in 75% of the centers at which all or some of the initial approaches to respondents were made by center personnel. Also, staff assistance was essential at those centers where the staff distributed printed hand-outs explaining the purpose of the study and directing the subject to the place of the interview. Therefore, interviewers were asked to rate the cooperation of the center personnel they encountered. Center staffs deemed very helpful or helpful represented 73% of the centers. Staffs at 11% of the clinics were termed fairly helpful and only 16% of the centers had personnel who were either not helpful or only provided minimum assistance. These figures indicate that interviewing was generally facilitated by the staffs of the center. Furthermore, anecdotal comments provided by the interviewers indicated that the center personnel, many of whom were methadone patients or ex-addicts, were very interested in the study and hoped its results would be beneficial to their programs.

3. The Subjects

Only 10% of the subjects approached were considered uncooperative by the interviewers. The remainder exhibited good or moderate amounts of cooperation. Subjects outside New York City were judged slightly more cooperative than those within the City. It was the opinion of the interviewers that the overwhelming majority of subjects were truthful. Truthfulness did not appear to vary with interview site.

The primary reason given by patients for refusal to be interviewed was that they did not have enough time (48%). This is consistent with statements made by center personnel concerning the habits of the patients. Those who are employed generally stop for their methadone on the way to work and, consequently, are almost always in a hurry. Only about 6% refused because they never drove. No interest in the study and fear of discovery were each cited about 15% of the time.

The interviewers encountered relatively few women among the center populations. Their estimates, based on discussions with center directors, were that women comprised about 20% of center enrollments. Even with this small expected value, females were underrepresented in the experimental population (about 11%). This difference seems to be accounted for by the attitudes of the female patients. Both sexes were approached without bias in the centers, but females tended to refuse more often. They were generally more afraid than males, and, if anything, in an even greater hurry. Fewer

of them worked and therefore they were less likely to appear at the centers during the peak morning and evening hours when most interviewing took place. Finally, many of the women brought their children with them to the center and were reluctant either to be interviewed in front of them or leave them unattended for the interview period.

The majority of subjects (over 80%) expressed strong interest in the study. Many even requested copies of the results. This reflects a general interest in methadone maintenance which was perceived in the experimental population. Women, particularly those with addicted husbands or boy friends, generally expressed very strong approval of the treatment.

4. The Questionnaire

The average length of the interview was 14 minutes. It was somewhat higher (20 minutes) when language difficulties were encountered and slightly shorter (13 minutes) if the subject would not provide his name or the names of controls. In 58% of the centers, the interviewers encountered no difficulties with the questionnaire. When trouble was encountered, obtaining names was most often mentioned as the specific difficulty. Language difficulties ranked next, followed by time pressures.

The hardest data for subjects to remember were the dates on which various events, particularly the beginning and end of drug use, occurred. Driving events and mileage estimates did not seem to pose a major memory problem. In almost all cases, the interviewers were able to complete all applicable questions for each subject. Questions which were refused by the respondent were specifically coded as "no answer" while inadvertent omissions were treated as "not applicable." On this basis, a perusal of the data presented in the body of this report and in the appendices will show that the incidence of refusal to answer questions was very small.

In summary, the interviewers encountered few difficulties while collecting data. Subjects were generally interested, cooperative, and, apparently truthful. Center staffs were supportive, which, no doubt, helped instill confidence in the subjects. The questionnaire seemed to serve its purpose adequately, and it was easily understood by most subjects. These specific factors plus the anecdotal comments of the interviewers leads to the conclusion that both the data collection instrument and the procedures used to implement it were valid.

B. The Data Base

Table III summarizes the results of interviewing activities. In all, 1622 questionnaires were completed. Of these, 60 had to be excluded from analytical consideration because data essential to the study had not been recorded. The remaining 1562 interviews form the basis of all drug use and characteristic data on experimental subjects presented herein. These interviews also yielded 1239 names of experimental subjects and 1059 names of controls. These were sent to Albany for matching with DMV files. Table IV shows that 718 experimental and 579 control names matched for a total "hit rate" of 56%. A slightly higher percentage of experimentals than controls produced abstracts (Table IV). This was expected because experimentals were interviewed directly and therefore accurate spellings of their names and complete dates of birth and addresses were available for the search. Control names, as provided by the experimentals during the interview, might have had inaccurate spellings or addresses,and age was only approximate.

The relatively high return rate on the abstracts is one indication of the validity of the data base. The fact that over 78% of those interviewed volunteered their names is another. Still further verification of the strength of the data is its general internal consistency. This is displayed in the presentation of results in succeeding sections, e.g., people who said they drove frequently also gave the highest estimates of the mileage they had driven. It is also evident in the tabulations contained in Appendix B, which were prepared specifically to highlight the consistency of the data.

The cross-tabulation of the subject's personal perception of non-heroin drug use and the actual numbers of drugs he used (Table B-1 in Appendix B) is one example of consistent findings. The relationship is significant ($\chi^2 = 50.25$, $p < .001$ with 12 d.f.'s) and confirms that people using more drugs consider themselves heavier users.

Tabulations of various accident and ticket measures from the interview and from the abstract (Tables B-2 to B-9) also display this consistency. Since abstract data only covered approximately five years, the methadone period is the only time completely covered by abstract data for virtually all subjects. However, enough of the heroin period was encompassed by the abstracts to warrant its inclusion in these analyses. All of the tabulations show a strong relationship between data reported in the interview and those obtained from DMV files with the exception of the property damage and injury accident categories (Tables B-3, B-4, B-6, B-7). Since total accidents for each period as measured by the two files are significantly related ($\chi^2 = 120.4$, $p < .001$ for the Methadone Period and $\chi^2 = 56.16$ $p < .001$ for the Heroin Period), it

Table III

Summary of Interviewing Activities

(A) Questionnaires With Name of Experimentals Only	(B) Questionnaires With Experimental and Control Names	(C) Total Control Names From (B)	(D) Questionnaires With Control Names Only	(E) Number of Control Names From (D)	(F) Total Control Names (C) + (D)	(G) Total Experimental Names (A) + (B)	(H) Questionnaires With No Names	(I) Total Interviews (A) + (B) + (D) + (H)
			Total Performed:					
591	681	1006	59	94	1100	1272	291	1622
			Total Omitted for Incomplete Data:					
15	18	29	7	12	41	33	20	60
			Net Entering Analyses:					
576	663	977	52	82	1059	1239	271	1562

Table IV

Summary of Traffic Records Search Activities

Type of Name	Total Names Sent to Albany	Abstracts Received	Percent Match
Experimental	1239	718	58
Control	1059	579	55
Total	2298	1297	56

is assumed that the differences by type of accident are the result of varying definitions. New York State will generally classify an accident as resulting in an injury if any party filing a report (police or involved driver) claims an injury, no matter how minor. In the interview, minor accidents in which the respondent was uninjured and no other persons were visibly injured were generally classified as resulting in property damage.

The foregoing examples of consistency together with the impressions of the interviewer and anecdotal reports by center staffs provide strong indication that the interview data collected during this study represent an honest attempt by the subjects to relate their driving and drug history. Therefore, it is concluded that the veracity of the subjects may be accepted by the reader. This is not to say that biases do not exist in these data or that the subjects exhibited total recall. It merely indicates that the results presented below may be considered essentially free of deliberate falsehood or widespread misinterpretation by the subjects.

C. The Subjects

The data for the 1562 experimental subjects included in this research were analyzed with respect to age, sex, patterns of drug usage and other demographic characteristics. All of these data were obtained from the questionnaire. The following paragraphs outline first those characteristics which are common to all time Periods and then those characteristics applicable to only one of the Periods.

The typical subject in the sample was a male Caucasian. Fully 89% of the sample were males. As already noted, anecdotal evidence from the interviewers suggests that the preponderance of males was partially due to the circumstances surrounding female attendance at the Methadone Center. Many females came with their children or were in a hurry to return to their children. Further, many females were simply reluctant to be interviewed even though the majority of the interviewers were female. The racial breakdown of the sample was 61% "white," 23% black, 15% Latin American with less than 1% classified as "other." Surprisingly, the proportion of male vs. female was not consistent across racial groups. Females constituted 13% of the "white" group, 10% of the "black" group and only 4% of the Latin American group. This difference was statistically significant ($\chi^2 = 15.4$, $p < .001$ with 2 d.f.'s).

The average age of the subjects at the time of the interview was 27.06 years. The average age of first illicit drug use (other than alcohol) was 16.23 years. Thus, these subjects were involved in drugs or drug treatment for an average of more than 10 years by the time of the interview.

For 29% of the subjects the first drug of abuse was heroin. In other words, for these subjects there was no Non-Heroin Period. This result is somewhat surprising since it is commonly believed that heroin abuse is nearly always preceded by the abuse of "softer" substances. It should be remembered, however, that the subjects in this research began their drug experience, on the average, more than 10 years ago and drug patterns could have changed significantly in that time period. It should also be noted that 16.23 years is relatively old by today's standards for first instance of drug abuse.

The remaining 71% of the subjects began their drug abuse with a substance other than heroin (i.e., had a Non-Heroin Period). Table V shows the percent using each type of non-opiate drug before heroin. Multiple drug use prior to heroin was common, with 71% (N=787) of those who used any drug using two or more drugs. Marijuana was by far the most popular non-opiate followed by barbiturates and amphetamines. The deliriants (e.g., glue sniffing) were the least widely used. Alcohol usage was not tested in this research, but is assumed to be reasonably high both prior to and during the abuse of other drugs. The average length of the Non-Heroin Period (for those who had a Non-Heroin Period) was 3.13 years.

By definition, all of the subjects had a period of opiate addiction (i.e., Heroin Period). The mean age at which this period was begun was 18.4 years. The period lasted for an average of 7.39 years. However, the distribution of length of period was highly skewed. The modal length was only 3-4 years (13%) with 29% of the subjects reporting period lengths of 9 or more years. The median length was 5.51 years.

The opiate of choice was heroin. Less than 1% of the subjects reported being addicted to morphine (N=10) or another opiate (N=2). All subjects were asked to state the number of "bags" (street value $5) of heroin they used per day, both at the start of addiction and just prior to methadone maintenance. Numbers of "bags," however unreliable, is the only available measure of level of addiction. The majority of subjects (82%) reported using only one bag per day or less at the start of addiction. However, by the end of the Heroin Period median bags per day was 13.85 with 23% of the subjects reporting rates of more than 25 bags. All things considered, these rates must be interpreted as being indicative of strong heroin addiction. Therefore, at least for the latter stages of the Heroin Period, the subjects in this sample were hard-core addicts.

The average age of the subjects when beginning methadone maintenance (i.e., Methadone Period) was 25.8 years. By the time of the interview the subjects had been on methadone for an average of 1.26 years. Certain pieces

Table V

Use of Other Drugs Prior to Heroin

	Percent	N
Used any drug before Heroin -	71	1114
Marijuana -	67*	1047
Barbiturates -	41	633
Amphetamines -	36	562
Cocaine -	31	490
Hallucinogens -	31	478
Deliriants -	16	251
Other and Non-specified -	7	108
Did not use any drug before Heroin	29	448
Total	100	1562

*Percents do not total 100 because many subjects used more than one drug.

of biographical information current as of the time of the interview were also collected. It was found that only 34% of the sample were currently married, 49% were single and 16% reported being widowed, separated or divorced. Most subjects (72%) reported no children living with them with 13% reporting one child, 9% reporting two children and 7% reporting three or more. The reported median yearly family income for males in the sample was $6,819, and for females it was $5,047. However, the sample was not confined to the lower economic strata since 8% of the subjects reported having yearly family incomes in excess of $15,000.

Since comparable socio-economic data were not available for the control subjects or the total population of New York State methadone centers, it was not possible to determine the representativeness of the experimentals with respect to these factors. However, it is believed that a sufficient cross-section of methadone programs was sampled to provide a reasonable representation of statewide characteristics. Moreover, the method of selecting control subjects was designed to match experimentals on the basis of socio-economic and geographic variables. Therefore, it is not unreasonable to assume that the experimentals are indicative of the population of methadone treatment programs in New York State and that the controls are similar to the experimentals.

D. Driving Characteristics

There has been a popular belief that drug abusers do not drive, or at least not while under the influence of drugs. This subsection will present results which show that they do, in fact, drive significant amounts of mileage. The following subsection will present results which show that much of this driving is coincident with experiencing drug effects.

Each subject was asked to estimate the mileage he drove per year for each of the four time periods. These estimates as a function of program location (i.e., New York City, other city, non-city) are presented in Table VI. Self-reported mileage estimates are only partially reliable and, as discussed in Section III, males (89% of this sample) tend to overestimate actual mileage. Nevertheless, the figures shown in Table VI clearly indicate that the subjects in this research drive at or above the national average (approximately 10,000 mi/yr.) for both the Heroin and Methadone Periods. In fact, during the Heroin Period the subjects reported average mileage per year of 18,067 miles. Subjects from New York City invariably reported less mileage than subjects from other parts of the State. However, even these subjects drove a great deal, especially in the Heroin Period.

Table VI

Average Miles/Year by Area and Period

Period	Area of Methadone Program			
	New York City	Other City	Non-City	Total
Pre-drug	5272*	6710	6267	5704
Non-Heroin Drug	7278	12639	11045	8910
Heroin	17422	18985	19311	18067
Methadone	11087	13547	14001	12089

*All entries are averages across all subjects (N=1562) of reported per year mileage from the questionnaire, except for the Non-Heroin Period for which averages are based on an N=1114.

The mileage estimates in Table VI are based on all subjects. Many subjects, however, particularly for the Pre-Drug and Non-Heroin periods, did not drive and hence, reported zero mileage. In most cases the non-drivers were under age. Recalculating the averages using only those subjects who said they drove yields average per-year mileage rates of:

		N(who drove)
Pre-Drug	11,991 mi/yr.	743
Non-Heroin	12,725	780
Heroin	18,814	1500
Methadone	12,846	1470

Average mileage appears highly regular and close to the national average except for the Heroin Period.

The excessive amount of driving during the Heroin Period appears to involve the need to travel in order to maintain a continuous supply of drugs. Subjects were asked to state the purpose which necessitated most of the miles they drove. The results, separaged by Period, are shown in Table VII. For the Pre-Drug, Non-Heroin and Methadone Periods, the primary purpose for driving was personal, followed by work-related driving (to and from work plus for work). The Heroin Period, however, showed a marked deviation from this pattern. Here, the subjects reported that they did most of their driving in pursuit of drugs, with personal and work-related driving second and third in that order. Apparently a considerable amount of travel is required to maintain a heroin habit either as part of the life style or to find the best supply of drugs at the lowest price.

Further evidence on the change in driving behavior during the Heroin Period came from two questions concerning when most of the driving was done. The first question asked the frequency of driving. The answers were recorded in seven pre-coded categories ranging from several times a day to less than once a month. The several times a day category was chosen 52%, 55%, and 56% of the time for the Pre-Drug, Non-Heroin and Methadone Periods. It was chosen 69% of the time during the Heroin Period. The second question asked whether most driving was done on weekdays, weekends, or about the same for each. "About the same" was chosen 36%, 39% and 35% of the time for Pre-Drug, Non-Heroin and Methadone Periods. It was chosen 64% of the time for the Heroin Period. Thus, the increase in driving for the Heroin Period appears to go across all days of the week reinforcing the concept that heroin addiction is full-time.

Subjects were also asked, for each Period, to state the time of day when most of their driving was done. Responses were categorized into morning, daytime, evening, etc. The results showed an increase in daytime driving

Table VII

Primary Purpose for Driving for Each Period

	Period			
Primary Purpose	Pre-Drug	Non-Heroin	Heroin	Methadone
To and from work	21%	21%	15%	21%
For work	12%	9%	15%	14%
Personal	62%	63%	32%	56%
To get drugs	N/A	4%	36%	N/A
Other	5%	4%	2%	3%

during the Methadone Period (48% versus 31%, 33% and 36% for the other three periods respectively), possibly reflecting the increase in work related driving. These data, as well as the data for driving frequency and day of week are shown in Table VIII.

Miles per year reports were also examined as a function of age and sex. These data are shown in Tables D-17 - D-23 of Appendix D. Not unexpectedly, males tended to drive more than females, and older drivers (i.e., drivers in their mid-20s, and 30s) drove more than younger drivers. No differential effects of age or sex with respect to Period were found.

There are no reliable estimates on the extent of unlicensed motor vehicle operation among all New York State drivers. It is clear, however, that the subjects in this research did a considerable amount of driving without a valid driver's license. Only 400 subjects (26%) reported having a valid license at any time during the Pre-Drug Period. Yet, 743 subjects (48%) said they drove a motor vehicle. For the Non-Heroin Period, 31% reported being licensed and 50% drove. The comparable figures for the Heroin Period were 74% licensed, 96% driving, and for the Methadone Period it was 66% licensed and 94% driving. The unlicensed drivers did, however, drive significantly fewer miles per year in all four Periods ($p < .001$ by χ^2 test for all). The typical (modal) unlicensed driver drove between 1,000 and 4,999 miles per year during the Pre-Drug and Non-Heroin Periods and between 5,000 and 9,999 miles per year during the Heroin and Methadone Periods. Licensed drivers, on the other hand, typically reported mileage of 20,000 or more miles per year in the Pre-Drug, Heroin and Methadone Periods and between 10,000 and 14,999 miles per year during the Non-Heroin Period. These data are shown in Tables D-28 - D-31 of the Appendix D.

Licensed drivers reported a greater "frequency" of driving than unlicensed drivers for all four Periods ($p < .001$ by χ^2 test for all Periods). Not unexpectedly, this effect was weakest for the Heroin Period where 39% of the 347 unlicensed drivers reported driving at least daily. For the other Periods the percentages of unlicensed drivers who reported driving at least daily were: Pre-Drug 35%, Non-Heroin 30%, and Methadone 25%. Also for all four periods, drivers whose primary purpose for driving was work related tended to be licensed ($p < .001$ by χ^2 for all Periods).

To a large extent, the licensed drivers held a New York State operators license. Licensed drivers were asked in the questionnaire to name the state which issued their license. New York was named 85%, 90%, 91% and 94% of the time for the Pre-Drug, Non-Heroin, Heroin and Methadone Periods respectively. The license classification was reported as Operator and Junior Operator 69%, 76%, 67% and 59% of the time again for the four Periods

Table VIII

Summary of Driving Frequency and Time Data

	Period			
Frequency of Driving	Pre-Drug	Non-Heroin	Heroin	Methadone
Several times a day	52%	55%	69%	56%
Once a day	9%	9%	7%	6%
Several times a week	22%	22%	15%	17%
Once a week or less	17%	14%	9%	21%
Days of Most Driving				
Weekday	28%	27%	22%	39%
Weekend	36%	34%	13%	25%
About the same	36%	39%	64%	34%
Time Period of Most Driving				
Morning	1%	1%	1%	1%
Daytime	36%	33%	31%	48%
Evening	7%	5%	4%	4%
Morning and evening	10%	8%	12%	11%
Night	25%	28%	19%	14%
Other	21%	24%	32%	20%

N. B. Percents in this and similar tables do not necessarily add to 100 due to rounding.

respectively. The percentages of chauffer's licenses for the four Periods were, in order, 22%, 15%, 28% and 36%. The remaining license types were listed as Learner's Permits or "other," where "other" generally referred to motorcycle or other special category of license. These data are presented in more detail in Tables D-40 - D-43 of Appendix D.

The overwhelming number of New York State licenses in all four Periods as opposed to other States is of more than passing interest. It means that these subjects have accumulated most of their driving history in New York. It is therefore safe to assume that New York DMV files should be able to provide reasonably complete records on these individuals. In other words, the driver abstract data to be presented in a later section of this report should be reasonably complete for each driver. As a further check, subjects were asked to provide the location of each accident they reported in the interview. New York State was cited for 83% of the reported Pre-Drug Period accidents, 89% of Non-Heroin accidents, 92% of Heroin accidents and 97% of Methadone accidents. These data clearly suggest that there was no need to access driver records from any state other than New York in order to obtain a complete history on the subjects.

License status (i.e., holding a valid driver's license) was also examined with respect to age at the midpoint of each Period and sex. Through the Heroin Period, the older the driver the higher the probability of holding a valid driver's license ($p < .001$ by χ^2 test for Non-Heroin and Heroin Periods; Pre-Drug not calculated since age at midpoint is meaningless). In the Methadone Period there was also a significant age at midpoint by license status relationship ($\chi^2 = 36.5$, $p < .001$ with 8 d.f.'s). Once again, the very young subjects tended not to be licensed. Subjects in the intermediate age ranges (late teens to mid-20s) were generally licensed. However, the older subjects on methadone were relatively <u>not</u> licensed. Fully 43% of all subjects 30 years and older did not hold a valid driver's license during the Methadone Period as compared with only 17% for the Heroin Period. This result supports data to be reported later showing significantly high numbers of license suspensions and revocations during the Methadone Period. The relationship between sex and license status was significant only for the Heroin Period ($\chi^2 = 12.8$, $p < .001$ with 1 d.f.). The nature of the effect was that males tended to be licensed more than females. This effect was also evident in the Methadone Period, however it was statistically significant at only the .05 level. The fact that males are over-represented among licensed drivers is consistent with New York State and national data.

All of the data reported thus far in this section have been addressed to the characteristics of the driver, when he drives, his purpose for driving, mileage, etc. Additional data were also collected on the vehicle he drove.

These data are shown in Table IX. They show that the most used vehicle type was a passenger car for all four periods (92% - 93%). Second and third were truck (5% - 7%) and motorcycle (1%) in that order. Most used vehicle type did not vary with Period. However, ownership of the most used vehicle did vary as a function of Period. The percentage of self- or spouse-owned vehicles tended to increase from the Pre-Drug Period through the Heroin Period with a slight drop during the Methadone Period. Conversely, use of the family car decreased through the Heroin Period with a slight increase during the Methadone Period. During no Period did more than half the subjects report driving primarily their own car.

In summary, this section has dealt with the characteristics of the driving done by the subjects sampled in this research. All of the numeric results discussed here are presented in detail in Appendix D. The results showed that these subjects did drive considerably during their Pre-Drug, Non-Heroin and Methadone Periods. They drove even more during their period of Heroin addiction. Further, several other driving characteristics varied as a function of time Periods as defined for this study. The principal findings are summarized below:

- Subjects reported yearly exposures of 18,000 miles while addicted to heroin, and only 12,000 miles for the other periods of their life
- The excessive driving during the Heroin Period appeared largely due to the need to get drugs
- The Methadone Period is characterized by a return to more moderate mileage rates and an increase in work-related driving
- The subjects in this sample accumulated most of their driving history in New York State
- Unlicensed motor vehicle operation was common
- The typical subject drove a passenger car not owned by himself

Table IX

Vehicle Type and Ownership as Reported by Drivers

	Period			
Most Used Vehicle Type	Pre-Drug	Non-Heroin	Heroin	Methadone
Car	92%	93%	92%	93%
Bus	*	*	*	*
Truck	6%	5%	7%	6%
Motorcycle	1%	1%	1%	1%
Other	1%	1%	*	*
Ownership of Most Used Vehicle				
Self or spouse	32%	36%	47%	42%
Family	38%	36%	23%	25%
Friend	17%	19%	16%	22%
Employer	6%	5%	11%	10%
Other	7%	5%	3%	1%

*Less than 1%

E. Drugs and Driving

The two parts of this subsection address the relationship between drugs and driving during the Non-Heroin and Heroin Periods respectively.

Questions about drugs and driving addressed:

- Frequency of driving while under the influence of drugs
- Type of drug used before driving
- The role of drugs in tickets and accidents
- The subject's perception of the drug-driving experience

The one overriding result discerned from these data was that the subjects did drive while experiencing drug effects.

1. Non-Heroin Period

There were 1114 subjects who reported having a Non-Heroin Drug Period, i.e., abused some drug prior to the use of heroin. Of these, 780 stated that they drove a motor vehicle during this time. These 780 subjects were then asked if they had ever driven immediately after using each of the drug classes under consideration. Subjects answered "yes" for at least one of the drugs 92% of the time. In other words, 719 of the 780 subjects who drove reported driving at least once immediately after using some non-opiate drug. Table X shows the number of subjects who reported using each non-opiate drug and those who stated they used it immediately before driving. Well over 50% of the subjects using a particular drug also used it before driving. The only exception was for deliriants, which are generally abused at a young age. Particularly surprising in these data is the fact that 64% of those subjects who used the hallucinogens (other than marijuana) used them immediately before driving. If each of these subjects used hallucinogens only once, the result is still startling because of the severe perceptual motor effects of these drugs. The same can be said to a lesser degree for cocaine (79%) and barbiturates (79%). The amphetamine results (85%) is hard to interpret, but it seems reasonable to assume that some of this driving was done while under the influence of "speed" and not just pep pills.

Further evidence that these people drove while under the influence of drugs comes from the accidents and tickets reported in the interviews. For each accident and ticket during the Non-Heroin Period, the subject was asked

Table X

Use of Non-Opiate Drugs At Least Once Immediately Before Driving

Drug	Number of Drivers Using Drug Before Heroin	Number Using Drug Immediately Before Driving	Percent Using Drug Before Driving
All Drugs	780	719	92
Marijuana	738	671	91
Hallucinogens	385	245	64
Amphetamines	438	373	85
Barbiturates	468	370	79
Cocaine	370	291	79
Deliriants	182	64	35
Other (unspecified)	89	51	57

whether or not he was "high" at the time of the event. The results showed that of the 193 Non-Heroin Period reported accidents, 65 or 34% occurred when the subject was "high." Of the 333 reported tickets, 84 or 25% occurred when the subject was "high." Thus, it seems reasonable to conclude that driving under the influence of non-opiate drugs was a relatively frequent occurrence.

The data were then examined to determine if the use of these drugs led to changes in accident and violation rates for these subjects. Unfortunately, driver abstract data could not be used for this purpose since the abstracts only cover the last five years, and the Non-Heroin Period ended for these subjects, on the average, nearly nine years ago. Therefore, the interview data had to be used and any conclusions could only be considered as tentative. Hence, only the relative effects observed will be discussed and not the particular magnitudes uncovered.

The first comparisons to be done involved the subjects' personal perception of degree of non-heroin drug use. Each subject was asked in the questionnaire whether he perceived his non-heroin drug use as being heavy, medium or light. Accident rates for the heavy vs. medium vs. light user were then compared. The results showed a tendency for the heavy user to be involved in more accidents than the medium, followed by the light user. However, the results also showed that the heavy user drove more than the medium, followed by the light user. Therefore, the appropriate measure was not total accidents but accidents per unit of exposure. The appropriate comparisons for accidents per million miles were then conducted and the effect was non-significant. Similar results were obtained for violations.

Each drug was then examined individually. The accident rates of users of each type of drug were roughly comparable. Likewise, no marked relationship between accidents or violations and the use of a specific drug immediately before driving were derived. Drivers who drove immediately after using a drug were, in general, no worse than other users of the same drug. The trend in the data, however, was for those subjects who did not use <u>any</u> drugs before driving to have the best driving records followed by marijuana users followed by users of the harder drugs. But again, the data are all self-report on events which occurred years ago and statistical tests were generally not significant. Moreover, drug usage was not pure, ie., most subjects used more than one drug.

2. <u>Heroin Period</u>

By definition, all of the 1562 experimental subjects in this research had a period of opiate addiction. Of these, 1500 drove a motor vehicle at some time during the Period, and 1429 or 95% reported driving at least once within

one hour of heroin use. The unexpected result, however, is not simply that they drove after heroin use but how often they drove. Only 28 subjects (2%) reported that this behavior occurred only once or twice, whereas, 973 subjects (65% of those who drove at all) reported driving daily within one hour of heroin use. For the remaining subjects the percentages were: several times a week - 18%, several times a month - 8%, and once a month - 3%.

As in the Non-Heroin Period, subjects were asked to indicate for each reported ticket and accident whether or not that ticket or accident occurred after they had just used heroin (i.e., were "high"). Again these data parallel the frequency data. There were 582 total accidents reported by the subjects for the Heroin Period. Of these, 269 or 46% occurred when the subject was "high." Concerning tickets, the total number reported was 1,003 with 441 or 44% while "high." Clearly, these people drove while under the influence of heroin and did so much of the time, possibly as much as 40 or 50 percent of their driving.

This result is surprising, but does coincide with what we know of the heroin addict and the mileage results presented earlier. The heroin addict has heroin in his system almost constantly. Median heroin usage for these subjects was 13 bags per day prior to starting methadone maintenance. The mileage data showed that the heroin addict drove over 18,000 miles per year. Combining these two facts, it is reasonable to assume that the addict is often on the road while still experiencing drug effects.

The next series of questions in the questionnaire looked into the subject's perception of driving while under heroin's influence. The first question asked the subjects to describe the major "difference" they noticed in the way they drove, i.e., the physical act of driving. The results for this question are outlined in Table XI. They show that 40% of the subjects observed no difference at all in their driving performance. This result probably reflects the fact that the normal state for the heroin addict is to have heroin in his system. After "no difference," the most frequent response was "nodding out - excessively drowsy" (22%). The remaining answers were spread across a variety of response categories. The "lack of concentration" category (7%) and the "driving less of a hassle" category (6%) both appear to be consistent with "nodding out."

The subjects were then asked what the main thing on their mind was when they were driving immediately after heroin use. The distribution of responses to this question proved to be exceedingly interesting and may have a bearing on the accident and violation data to be reported later. The most common response, 36%, was "driving well enough to avoid being stopped by the police." In other words, the main thing on the mind of 36% of the subjects

Table XI

Major Difference Noticed in Driving After Heroin Usage

Difference	Percent Citing as Major Difference
Noticed no difference	40
Lack of concentration	7
Driving less of a hassle	6
Ability to judge speed impaired	1
Ability to judge distance impaired	1
Ability to judge time impaired	1
Vision problems (including hallucinations)	1
Turned on by driving	2
Nodding out--excessively drowsy	22
Drove better	9
Weaving, reckless driving	-
Confusion or indecisiveness in reacting to emergency situations	1
Nervous, defensive	3
Lack of physical coordination	1
Other	4
No answer	1

while driving under the influence of heroin was to avoid accidents and overt actions which would lead to violations. An analagous situation might be that of a driver leaving the scene of a crime. The last thing he wants is to be stopped for a speeding or red light ticket since, for him, that ticket could lead to a felony conviction. Closely associated with this response were "fear of getting stopped" - 7% and "fear of accident" - 7%. Adding these three responses together yields 51% of the drivers as being primarily concerned with how well they were driving. Only 18% of the subjects thought primarily about "enjoying the high" and 11% reported "not caring about anything." These results are presented in Table XII.

Accident and violation data for the Heroin user from the driver abstracts (i.e., New York State traffic records) will be presented in the next section of this report. Driver abstract data cover approximately the last half of the Heroin Period for the typical subject. The interview or reported accident and violation data for this Period appear in Appendix E of this report. Several analyses were conducted on these interview data relating heroin user characteristics to reported accident and violation rates. The results were largely ambiguous. This is not surprising since overall accident and violation rates from the driver abstracts for these people as compared with the control group generally show no difference.

The analysis of these data paints a clear picture of the heroin addict as a driver. Since ingestion of the drug is part of his everyday life, it is not surprising to discover that he often drives immediately after using the drug. Furthermore, withdrawal symptoms are generally more marked for these individuals than the direct effects of the drug. Therefore, it is not shocking to find that the typical user does not perceive a change in his psychomotor or perceptual abilities immediately after use. Finally, mere possession of heroin or the implements used to take it is a serious crime. Hence, the addict on the road is concerned about being stopped. For him, a simple traffic violation can result in a felony arrest.

F. Safety

The results in this section of the report are based on New York State traffic records and thus do not depend on interview data. The interviews are involved only to the extent that the name, date of birth, sex and addresses supplied in the interview provided the basis for the traffic records search. This search yielded a total of 718 driver abstracts for the experimental group (methadone patients) and 579 abstracts for the control group (non-addicted peers of the experimentals). This section will first outline the characteristics of these groups, experimental and control, and then compare their driving histories. The results will show that the experimental group as a whole does not present

Table XII

Main Thing on Mind of Heroin User While Driving
Immediately After Using Heroin

Main Thing on Mind	Percent
Driving well enough to avoid being stopped by the police	36
Enjoying the high	18
Not caring about anything	11
Fear of accident	7
Fear of getting stopped	7
Not driving well	2
Physical discomfort	1
Other	12
No response	5

any unusual highway safety problems. However, certain differences between the groups were observed,and these are reported below.

1. Experimental and Control Group Characteristics

There were 718 experimental subjects for which driver abstracts were obtained. These subjects were all interviewed and are a subset of the original 1562 experimental subjects. As part of the interview, all subjects were asked to give the names of some of their friends or peers that they knew were never heroin addicts or methadone patients. These names produced 579 driver abstracts for use as control data. Experimental and control groups were then compared to determine if any systematic biases existed between the groups.

The first comparison conducted checked for differences based on sex. The results showed that only 6% of the experimental group were females while 21% of the control group were females. This result is statistically significant ($Z = 8.33$, $p < .001$) and, thus, there was a definite bias in the control group toward females. The effect of this bias would be to lower overall accident and violation rates for the control group when compared to the experimental group since females generally have less accident and violation involvement.

The second characteristic examined was age. The distribution of subject ages for the experimental group was significantly different than the distribution of ages for the control group ($\chi^2 = 23.62$, $p < .001$ with 3 d.f.'s). The experimental group was more homogeneous, clustering heavily in the 20-24 and 25-29 age ranges while the control group spread much more evenly. The age ranges and frequencies within each range are shown below:

	Age (as of 2/72)			
	Under 20	20-24	25-29	Over 29
Experimental Group	51	321	197	149
Control Group	53	206	139	181

While the distribution of ages varied, the median ages for the two groups were quite close. For experimentals, the median age was 24.75 years and for controls the median age was 26.05 years. Therefore, the effect of this possible source of bias on overall accident and violation rates is probably quite small. In any event, the direction of the bias would be to lower overall accident and violation rates of the control group since older drivers (within these age ranges) tend to have lower accident and violation involvement.

The next characteristic examined was area of the State. Each control subject was assigned to the same area of the State as the experimental subject who provided his (or her) name. For the purpose of this research the areas of the State were: New York City, other city, and non-city. The results showed that control names with driver abstracts were generated significantly more often from the other city and non-city categories ($\chi^2 = 53.68$, $p < .001$ with 2 d.f.'s). These results are shown below:

	Area of State		
	New York City	Other City	Non-City
Percent of experimental subjects	63%	15%	22%
Percent of control subjects	46%	24%	30%

The probable effect of this factor is to raise the accident and violation rates of the controls with respect to the experimentals since drivers outside of New York City tend to drive more miles. As a check, total accidents and total violations for all subjects (experimental and control) were compared with area of the State for each of the last five years. For accidents, there were no significant effects,although there was a tendency for New York City drivers to have lower accident rates. For violations, New York City drivers were significantly better in 1967, 1968, and 1969 and tended to be better in 1970 and 1971.

In summary, the control group is similar to but not the same as the experimental group with respect to age, sex and location (i.e., area of State). With respect to age and sex, any biases in the accident and violation data would favor the controls over the experimentals (i.e., produce lower accident and violation rates for controls). With respect to location any bias would favor the experimentals. Therefore, there is reason to believe that these possible biasing factors probably cancel each other out in the overall data. In any event, the largest single biasing factor must be the inordinate mileage reported by the experimentals, particularly during the Heroin Period. There is no way to actually measure this bias since mileage estimates are not available for control subjects. The effect of this bias would be to inflate overall accident and violation rates for the experimental group. Therefore, if no difference is found in overall accident and violation rates between the experimentals and controls, it appears reasonable to conclude that the experimentals are at least equal to the controls in terms of safety.

2. Year by Year Comparisons

The driver record data obtained in this study can be broken down in several different ways. The first and most obvious way is to examine results

on a year by year and total of several years basis. This method allows for direct experimental vs. control comparisons. However, yearly comparisons do not show any effects due to Period, since for any given year some experimental subjects could have been using Heroin while others may already have been on methadone maintenance. Nevertheless, year by year comparisons are a necessary starting point. The next section will break the data by Period. This allows for the examination of Heroin Period and Methadone Period driving history, but does not allow for control group comparisons. The last section will break the data by Period and by year in order to make control comparisons as a function of drug use possible.

The New York State driver abstracts contained five years of driving history. For each year, the following tabulations were made for both experimentals and controls and appear in Appendix F. (Convictions were sorted by the date of the offense, not the date of conviction.)

- Total accidents
- Total convictions (tickets)
- Property damage accidents
- Injury accidents
- Fatal accidents
- Red light or other traffic control device convictions
- Speeding convictions
- Reckless driving convictions
- Wrong turn convictions
- Equipment or documentation convictions
- DWI (driving while intoxicated on alcohol) convictions
- Drug driving convictions (i.e., driving under the influence of drugs)
- Other convictions
- License suspensions
- License revocations
- Administrative actions (e.g., warning letters)

This yields a total of 16 event types for each year. Four of these concerned accidents, nine concerned convictions, and three concerned administrative actions, suspension and revocations.

No consistent findings with regard to accidents emerged. Table XIII summarizes the five year accident history for these subjects. There is no significant difference between the two distributions.

One possible explanation for no difference between the groups is that the experimental subjects would have a much greater tendency not to report accidents. This explanation seemed plausible because of the experimental's demonstrated deviant behavior with respect to drugs. This was tested by examining the distribution of injury and fatal accidents, since it was felt that it would be much more difficult for the experimentals to avoid the reporting (or police investigation) of injuries and fatals as compared with accidents that resulted only in minor property damage. The results again showed no difference between the experimental and control groups. Hence, the absence of difference between experimentals and controls is accepted as a true effect rather than the result of incomplete reporting.

The accident data did, however, produce one interesting finding. Females in the experimental group had more injury and fatal accidents than females in the control group ($x^2 = 7.11$, $p < .05$ with 2 d.f.'s). The five-year injury and fatal accident rate per driver for females was .55 in the experimental group (N=42) and only .19 in the control group (N=124). The rate for males was .46 in both groups.

Nine of the event types tabulated were concerned with traffic convictions. The results showed that the experimental subjects were consistently involved in more convictions for improper equipment and documentation than the controls. This effect was sufficiently strong to produce a difference in the distribution of total convictions between the two groups for the five-year composite ($x^2 = 15.91$ p, $< .02$ with 6 d.f.'s.) Many equipment and document convictions were for unlicensed motor vehicle operation. Thus, the number of equipment and documentation convictions for the experimentals was greatest during 1968 (65 experimental convictions vs. 8 control convictions) and 1969 (53 vs. 20) which roughly correspond to the peak of the Heroin Period. As discussed earlier, the greatest amount of mileage for unlicensed drivers occurred at this time.

It is also likely that many of these equipment and documentation convictions were an effort by the police officer to insure grounds for stopping the motor vehicle. When an officer stops a car and finds evidence of illegal drugs or the implements used to take them, he is primarily concerned with obtaining a conviction on the drug charge, commonly a felony. Hence, he will attempt to issue a motor vehicle citation on which he is reasonably sure of obtaining a conviction in order to establish his original grounds for stopping the vehicle. A good police officer can generally find an equipment or document violation on virtually any vehicle.

Table XIII

Distribution of Total Accidents 1967 - 1971 for Experimental and Control Groups

Groups	Number of Accidents						
	0	1	2	3	4	5 or more	N
Experimental	399*	187	78	34	14	6	718
	56%	26%	11%	5%	2%	1%	
Control	328	159	67	17	5	3	579
	57%	27%	12%	3%	1%		

*Entry is number of subjects.

No consistent findings with regard to any traffic conviction event type other than equipment and documentation emerged. This was true for both moving violations and others. Table XIV shows the five-year composite for all violations excluding equipment and documentation. There is no significant difference between the two distributions.

Females in the experimental group had a five year conviction rate per driver (excluding equipment and documentation) of .67. In the control group the female rate was only .34. For males the rate was 1.14 and 1.15 in the experimental and control groups respectively.

There were only two convictions for driving while under the influence of drugs. Both involved experimental subjects. There were 18 alcohol-related convictions, ten involving experimentals and eight involving controls.

The remaining categories of events examined were administrative actions, license suspensions and revocations. The results consistently showed that the experimental subjects had their licenses revoked and suspended much more frequently than the control subjects. In fact, the experimental subjects had their licenses revoked or suspended at more than double the rate for control subjects. These results are shown in Table XV. They are consistent with the extent of unlicensed motor vehicle operation reported by the subjects in the interview. Further these results are consistent with the large number of equipment and documentation convictions. Subjects said they drove unlicensed, although at reduced mileage, and these results imply that more of them had their licenses suspended or revoked.

The results presented in this section have been largely based on the five-year composite of the two groups. Figure 1 has been included in this section to provide an indication of the year by year trends. Statewide data are also shown. These data have been interpolated to be consistent with the age and sex breakdown of the experimental group. For the earlier years it must be assumed that experimental and control data are slightly lower than actual since some subjects (see Section E) were not yet New York State residents. The New York State data are based on the population of licensed drivers and total accidents. Thus, the rates are inflated to the extent that unlicensed drivers have accidents (these drivers do not enter the denominator) and deflated to the extent that licensed drivers don't drive (many valid licenses are held by people who do not drive, others were issued to individuals who died prior to the date of license expiration). It can be seen from this figure that neither the experimental nor the control group varies markedly from statewide data.

Table XIV

Distribution of Total Traffic Convictions 1967 - 1971 for Experimental and Control Groups

Group	Number of Convictions*							
	0	1	2	3	4	5	6 or more	N
Experimental	370**	146	81	56	31	21	13	718
	52%	20%	11%	8%	4%	3%	2%	
Control	287	147	74	38	16	10	7	579
	50%	25%	13%	7%	3%	2%	1%	

*Excludes equipment and documentation convictions.

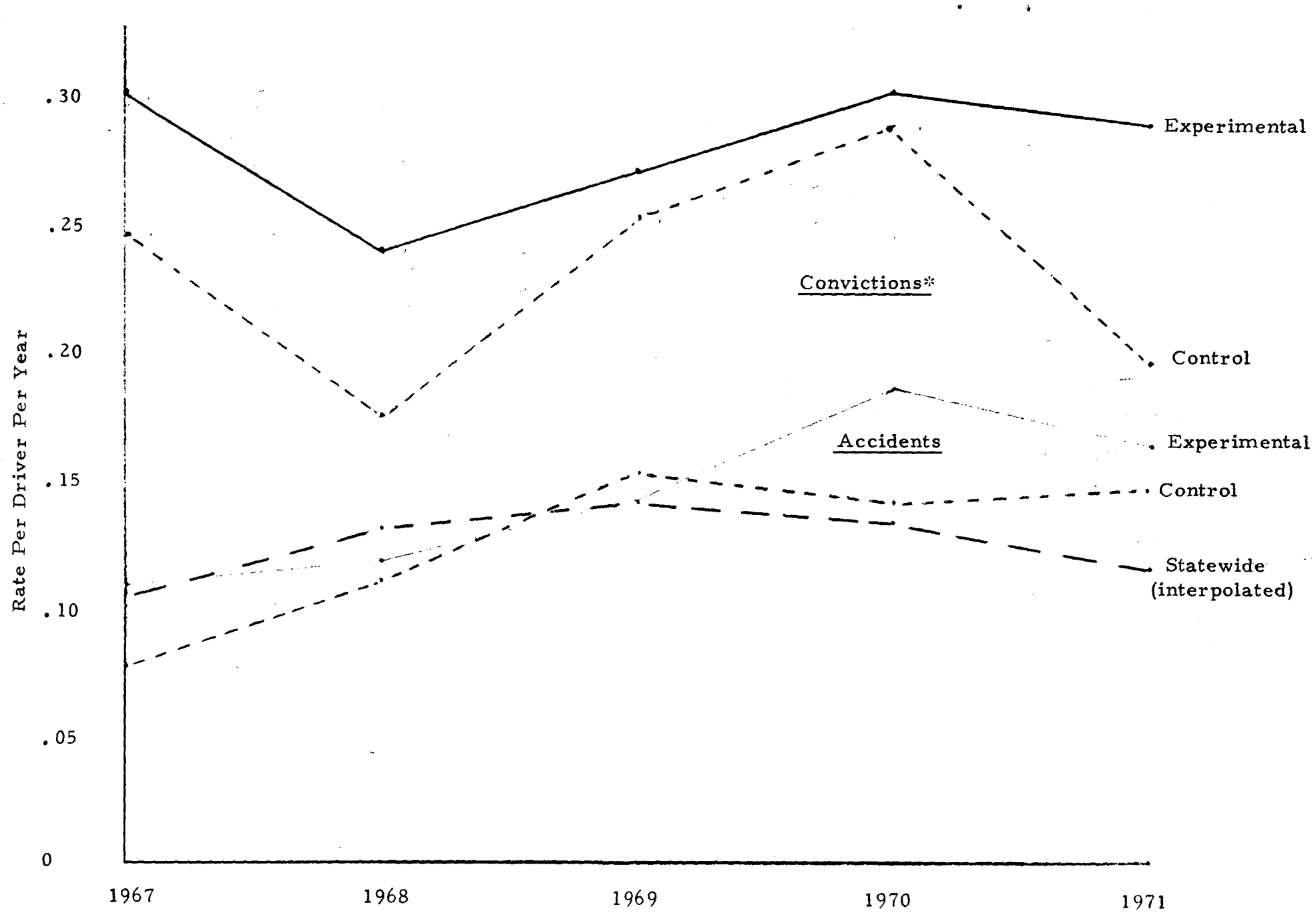
**Entry is number of subjects.

Table XV

Rate Per Driver of Revocations, Suspensions and Administrative Actions for Experimental and Control Groups 1967 - 1971

	Experimental (N=718) Rate Per Driver	Control (N=579) Rate Per Driver
License Revocations	.11 *	.05
License Suspensions	.49	.20
Administrative Actions	1.19	.60

*Entries are rate per driver summed across five-year period.



*Includes equipment and documentation

Five-year accident and conviction rates per driver

3. Period Comparisons

A second approach to examining the abstract or driver record data is to separate it by drug Period (i.e., Pre-Drug, Non-Heroin, Heroin and Methadone). This approach does not allow for direct comparisons with the control group since any similar breakdown of their data would be largely artificial, and probably unnecessary in light of the results just presented. Nevertheless, it is important to examine the Periods individually. The driver record data are complete for approximately five years. Only certain serious events such as DWIs are held on the abstracts for much longer periods of time. In general, there were no abstract data applicable to the Pre-Drug Period and very little data applicable to the Non-Heroin Period. Even the Heroin Period must be considered as only roughly 50% complete since it began, on average, over 8 years ago. The Methadone Period, however, is virtually complete for all event types. Appendix F, Part III, shows the raw data for the Heroin and Methadone Periods. Table XVI summarizes total accidents and total traffic convictions. The reader is cautioned against drawing any conclusions from this Table since the data in this form are generally not suitable for any systematic comparisons.

The most meaningful comparison that can be made with these data is based on accidents per million miles for the Methadone Period. New York State has compiled yearly estimated total mileage on a statewide basis and maintains a record of the number of accident involved drivers per year. From these two numbers one can calculate the number of accident involved drivers per million miles driven. These rates for the last five years are listed below:

1971	9.34	
1970	10.81	- (mid-year increase in property damage
1969	11.59	accident reporting limits)
1968	11.23	
1967	10.97	

Accident involved drivers per million miles can also be calculated for the Methadone Period using accident data from the abstract and mileage estimates from the interview (for only those 718 subjects with abstracts). The result is 10.25 accident involved drivers per million miles. This rate is only .91 higher than the 1971 statewide figure and less than the figure for previous years. While it is true that mileage estimates from males (95% of experimentals) tend to be slightly inflated, it is also true that the statewide figures include all drivers regardless of age and sex, and not just the high-risk young male group which constitutes the majority of the experimental subjects. Therefore, it appears reasonable to conclude that methadone patients as a group on

Table XVI

Distribution of Total Accidents and Convictions for Experimental Subjects During Their Heroin and Methadone Periods

Period	Event Category	Number of Accidents - Convictions					
		0	1	2	3	4	5 or more
Methadone	Accidents	602***	94	15	6	-	1
Avg. Period Length=1.26 yrs.	Convictions*	563	96	34	16	4	5
Heroin**	Accidents	489	140	55	26	8	1
Avg. Period Length=7.39 yrs.	Convictions*	360	142	84	31	30	51

*Includes equipment and documentation

**Complete only to 1967

***Entries are number of subjects

N. B. All enteries are from abstract data.

a mile for mile basis are not involved in a disproportionate number of accidents.

4. Comparisons by Year and Period

A third way of looking at the abstract data is to separate it by year and examine only those subjects who spent the entire year in one of their drug Periods. This procedure was used for subjects in their Heroin Period during all of 1968, 1969, and 1970 and subjects in their Methadone Period for all of 1971. Below are presented the complete analysis procedures for these data since they represent a direct test of the hypotheses of this research.

The data for each year were first broken into total accidents and total convictions (excluding equipment and documentation). The data were further broken by the age of the subject on July 1 of the year in question. The categories were; under 20, 20-24, 25-29, and over 29 with a fifth category summing all ages. The data for the control subjects were broken down in the same way so that direct comparisons were possible. Thus, a total of 40 control vs. experimental comparisons were generated; four years x two event types (i.e., total accidents and total convictions) x five age categories. Each of these comparisons is shown in Part IV of Appendix F. For each comparison, a χ^2 was calculated testing the distribution of control accidents (or convictions against experimental accidents (or convictions).

The results showed no difference for 35 of the 40 control vs. experimental comparisons. Five comparisons were significant, two at the .01 level and three at the .05 level. The first significant comparison ($\chi^2 = 5.5$ $p < .05$ with 1 d.f.) showed that experimentals on heroin aged 20-24 had a different accident distribution than controls (aged 20-24) during 1968. The second significant comparison was highly related to the first. Experimentals for all ages on Heroin for all of 1968 had a different accident distribution from all controls for 1968 ($\chi^2 = 8.39$, $p < .05$ with 2 d.f.'s). The nature of this difference was purely distributional. Overall accidents for the two groups were virtually identical. Simply, a very few experimentals had a lot of accidents, whereas several controls had only one accident.

The third and fourth significant comparisons virtually replicated the first two using total convictions. Experimentals on heroin for all of 1968 aged 25-29 and for the summed ages had a different distribution of convictions from controls for 1968 ($\chi^2 = 7.18$, $p < .01$ with 1 d.f. for 25-29 group, $\chi^2 = 6.72$, $p < .05$ with 2 d.f.'s for summed ages). Again, overall conviction rates were virtually identical. The difference was caused by a few

experimentals being involved in several convictions, while several controls were involved in only one conviction.*

The fifth significant comparison involved subjects on methadone for all of 1971. It showed that experimental subjects aged 20-24 were involved in more accidents than control subjects of the same age ($x^2 = 10.75$, $p < .01$ with 2 d.f.'s). The 209 control subjects falling into this age category accumulated 36 accidents for .17 accidents per driver per year. The 110 experimental subjects (aged 20-24 and on methadone for all of 1971) accumulated 35 accidents for .32 accidents per driver per year. The summed ages comparison for all subjects on methadone for all of 1971 vs. all controls for 1971 was not significant.

While this finding was statistically significant it could easily have been a statistical artifact. Forty x^2s were run on these data, and there is a reasonable chance that any one could be significant by chance even at the .01 level. For this reason there was a clear need to replicate this finding. Fortunately, this replication could be approximated in the current data base. There were an additional 116 experimental subjects, aged 20-24 who were not on methadone for all of 1971. These subjects were on methadone only for 6 months to just under one year during 1971 and the first few months of 1972.

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*This effect was suggested in several other control versus experimental distributions introduced in the section dealing with yearly comparisons. For these comparisons, however, the x^2s were not significant and the Kolmogorov-Smirnov test also failed to show the effect. If such an effect were real, it would mean that a very small number of heroin addicts were significant highway risks whereas the vast majority of addicts are as safe or more safe than non-addicts. However, this effect cannot be proved from the current data. The significance levels reported here are only .05 for the basic tests (summed ages, 1968, accidents and violations), the effect was not replicated for 1969 or 1970, and the entire issue is confounded by the inordinate Heroin Period mileage of the experimentals.

During this time they accumulated 18 accidents for an adjusted rate of .19 accidents per driver per year. This rate is not significantly different from the .17 rate for the control group, and, therefore, it appears highly probable that the original effect was merely a statistical artifact. In general, these data suggest that neither the heroin addict nor the methadone patient constitute a significant highway safety risk. Table XVII presents a summary of these findings with regard to accidents.

In order to add additional clarification to these analyses, statewide data, interpolated to represent the same age and sex distribution as the experimentals were examined. This examination was qualitative in nature because the statewide data were not completely comparable for various reasons already discussed. In general, accident per driver rates for both the experimentals and controls were somewhat higher than State norms, but not markedly so. In view of the comparable accident per million mile rates already cited, it is likely that this observed difference merely reflects increased exposure.

The conclusions arising from the results presented above will be given in the next section. The overwhelming weight of evidence indicates that the experimental subjects, during their narcotic use and enrollment in methadone maintenance, did not represent a significant highway safety problem.

Table XVII

Accidents Per Driver for Heroin Addicts and Methadone Patients Compared with Controls

	Accidents/Driver/ Year	N (Subjects)
Experimentals on Heroin for all of 1968	.108	544
Controls for 1968	.116	579
Experimentals on Heroin for all of 1969	.147	580
Controls for 1969	.156	579
Experimentals on Heroin for all of 1970	.171	433
Controls for 1970	.144	579
Experimentals on Methadone for all of 1971	.198	278
Controls for 1971	.154	579

N. B. Based on abstract data.

V. CONCLUSIONS AND RECOMMENDATIONS

The foregoing discussion of results leads to a set of strong conclusions with respect to the objectives of the study. These are enumerated below. The reader is cautioned against indiscriminately extending these conclusions beyond the bounds of the data. Subjects were obtained only from New York State methadone maintenance programs. To the extent that these individuals are representative of all methadone patients, these conclusions may be generalized to other geographic areas. Similarly, heroin addicts who become methadone patients may not be typical of all addicts. Further, the sample is composed primarily of young, male, Caucasions. Therefore, care should be exercised when interpreting these conclusions for other age, sex, race or geographic distributions of methadone patients or other groups of narcotic addicts.

- It appears (from self-estimates) that individuals who are abusing narcotic drugs drive significantly above the national mileage average. Moreover, the vast majority of these individuals drive daily in close proximity to the time of use of the narcotic. Hence, on the basis of exposure and degradation of psychomotor performance, narcotic addicts would be expected to display more accidents than non-addicts of the same age and sex distribution.

- Methadone maintenance patients estimate that they drive at or above the national average of mileage.

- Methadone maintenance patients estimate that they drove at or above the national mileage average during the time they were abusing non-narcotic drugs. It also appears that they were driving frequently immediately after drug use during this Period.

- Drug abusers, regardless of specific drug being abused, estimate that they drive significant amounts of mileage even if they are not licensed.

- Despite the greater expected accident rate, the experimentals during their abuse of heroin were not involved in more accidents of any type than were the controls or the total driver population of New York State of similar age and sex distribution.

- Methadone maintenance patients are not involved in any more accidents of any type than the controls. Their accident rate also compares favorably with that of all New York drivers of similar age and sex distribution.

- Violation rates for experimentals and controls do not differ significantly for the period covered by driver records with the exception of violations for improper equipment or documents. These are most likely the combined result of the great extent of unlicensed operation (yielding the offense of driving without a license) and the desire of police officers to provide reasonable grounds for stopping a vehicle when making a drug arrest.

- Experimental subjects show a higher rate of license revocation and suspension than the controls despite no differences in moving violations or accidents. These revocations and suspensions are probably the result of license reviews after felony convictions for non-driving drug offenses.

- Admitted accident rates of non-narcotic drug abusers do not display marked differences as a function of drug type. In general, however, users of marijuana appear slightly better than users of harder drugs such as amphetamines, barbiturates, and the other hallucinogens. Subjects who admitted driving immediately after using non-narcotic drugs do not, in general, display worse accident records than other users of the same drug. Since these data were based on self-admission of accidents and drug use habits on average over 9 years prior to the interview, these findings must be considered inconclusive.

- It is evident that drug abusers, particularly heroin addicts, on the road are successfully compensating for both their large exposure and any performance degradation produced by the drug. This compensatory action is prompted by the fear of discovery, accident, and/or arrest for a drug charge. Likewise, the unlicensed drug abusing drivers also appear to be applying extra caution to avoid any notice by the police.

- Female drug abusers in the experimental population were significantly worse than females in the control group. They were not, however, worse than males in either group. It appears that the female drug abusing driver behaves more like a male driver than like her non-drug abusing female counterpart.

- Data from this study do not provide any evidence which would support prohibiting methadone patients or narcotic addicts as a group from driving.

- Existing laws against driving under the influence of drugs are not deterring the drug abuser from driving.

- New countermeasures against driving by the narcotic addict or methadone patient do not appear warranted for the study population. Existing conditions appear to be providing sufficient incentive to make these individuals extremely cautious about their driving.

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APPENDIX A

DATA COLLECTION INSTRUMENTS

PART I - GENERAL

1. a. In what month and year did you begin Methadone Maintenance?
(Enter here and on top of pages 13 and 19, PARTS IV and V)

_____Year (67, 68, 69, etc.) F1 (6-7)

_____Month (1 = Jan., 2=Feb., etc.) F1 (8-9)

b. Have you been on it ever since? 1. Yes___ 2. No___ 9. No Answer___ F1 (10)
If no, write explanation here:

2. How many bags of heroin (or morphine) did you use per day during the month before you began Methadone Maintenance?
(Record amount and main drug.)

_____bags F1 (11-12)

1. Heroin ___
2. Morphine ___ F1 (13)
3. Other ___
4. Unknown ___

3. In what month and year did you start using heroin (or morphine)?
(Enter here and on top of pages 8 and 13, PARTS III and IV.)

_____Year (67, 68, 69 etc.) F1 (14-15)

_____Month (1=Jan., 2=Feb., etc.) F1 (16-17)

4. How many bags of heroin (or morphine) did you use per day when you began using?

_____bags F1 (18-19)

5. In what month and year <u>before</u> you took heroin did you begin to use any drugs other than alcohol?
(Enter here and on pages 3 and 8, PARTS II and III)

_____Year (67, 68, 69 etc.) F1 (20-21)

_____Month (1=Jan., 2=Feb., etc.) F1 (22-23)

6. Which types of drugs were you using?
(List in order mentioned; i.e., 1, 2, 3, 4, etc.)

Marijuana and Hashish	___	F1 (24)
Hallucinogens (LSD, Mescaline, Psilocybin, D.M.T.)	___	F1 (25)
Amphetamines ("Uppers")	___	F1 (26)
Barbiturates ("Downers")	___	F1 (27)
Cocaine	___	F1 (28)
Deliriants or inhalents (Sniffing glue, gasoline, etc.)	___	F1 (29)
Other (specify) _____	___	F1 (30)
No answer	___	

7. In general, would you classify yourself as a heavy, medium, or light user of these drugs?

1. Heavy ___
2. Medium ___ F1 (31)
3. Light ___
9. No answer ___

PART II. PRE-DRUG

Now let's focus on the period before _____
(from Ques. 5) when you were not using any drugs other than alcohol.

8. Did you have a valid driver's license or permit during this period?

1. Yes ___ 2. No ___ 9. No response ___ F1 (32)
Go to Ques. 11

9. What state issued this license?

1. New York ___
2. Connecticut ___ F1 (33)
3. New Jersey ___
4. Other (specify) _____ ___
9. No response ___

10. What type of license was it?

1. Operator or junior operator ___
2. Chauffeur ___ F1 (34)
3. Interim or learner's permit ___
4. Other (specify) _____ ___
9. No response ___

11. Did you **drive a car or other motor vehicle during this** period before you began using drugs?

1. Yes ___ 2. No ___ 9. No response ___ F1 (35)
Go to Ques. 20

12. What type of vehicle did you use most?

1.	Car	___	
2.	Bus	___	
3.	Truck	___	F1 (36)
4.	Motorcycle	___	
5.	Other (specify) _____	___	
9.	No response	___	

13. Who owned this vehicle?

1.	Self or spouse	___	
2.	Family	___	
3.	Friend	___	F1 (37)
4.	Employer	___	
5.	Other (specify) _____	___	
9.	No response	___	

14. During this period before you began using drugs, about how often did you drive? (Show Card 1)

1.	Once a day	___	
2.	Several times a day	___	
3.	Once a week	___	
4.	Several times a week	___	F1 (38)
5.	Once a month	___	
6.	Several times a month	___	
7.	Less often	___	
8.	Not at all	___	(Skip to Part III)
9.	No response	___	

15. Approximately how many miles per year did you drive during this period?

_____ miles

F1 (39-43)

16. For what purpose did you do most of this driving?

1. To and from work or school ___
2. For work (professional driver) ___
3. Personal and pleasure ___ F1 (44)
4. Other (specify) _____ ___
9. No response ___

17a. Did you drive more miles on weekdays or weekends during this period?

1. Weekdays ___
2. Weekends ___
3. About the same ___
9. No answer ___ F1 (45)

b. During what time period of these (weekends, weekdays) did you drive the most mileage? (Record actual response)

_____
Answer

Not to be filled in by interviewer	
1. Morning	___
2. Daytime	___
3. Evening	___
4. Morning & evening	___
5. Night	___
6. Other	___
9. No response	___
F1 (46)	

18. During this period before you used drugs, did you ever have any accidents?

1. Yes ___ 2. No ___ 9. No response ___ F1 (47)
Go to Ques. 19 Go to Ques. 19

I would like to ask you some questions about each accident.
(Ask questions in chart below and record code numbers for each.)

Code:

State
1. New York
2. Connecticut
3. New Jersey
4. Other (specify)
5. No answer

Type
1. Pedestrian
2. Other moving motor vehicle
3. Fixed object
4. Parked motor vehicle
5. Ran off road
6. Overturned in road
7. Other (specify)
8. No answer

Result
1. Property damage
2. Injury
3. Fatality
4. No answer

No.	Approx. Date of Accident	In what State?	What type of accident?	What did the accident result in?
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Not to be completed by interviewer

F1(48)	P. D. ___	Type:	1	___	F1(53)
F1(49)	Inj. ___		2	___	F1(54)
F1(50)	Fat. ___		3	___	F1(55)
F1(51)	All ___		4	___	F1(56)
F1(52)	In state ___		5	___	F1(57)
			6	___	F1(58)
			7	___	F1(59)
			8	___	F1(60)

19. During this period, did you ever get a ticket for a moving traffic violation?

1. Yes ___ 2. No ___ (go to Ques. 20) 9. No response ___ F1(61)

I would like to ask you some questions about each violation.

State
1. New York
2. Conn.
3. New Jersey
4. Other (specify)
5. No answer

Approx. Date of Violations	In What State?	What was the ticket for? (List each)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Not to be completed by Interviewer

	Ticket Types	Total
F1(62)	1. Red light, stop sign or other traffic device	
F1(63)	2. Speeding	
F1(64)	3. Reckless driving or following too close	
F1(65)	4. Wrong way or wrong turn	
F1(66)	5. Improper equipment or documents	
F1(67)	6. Driving while intoxicated or impaired (Alc)	
F1(68)	7. Driving on drugs	
F1(69)	8. Other (specify)	
F1(70)	9. No response	
F1(71)	TOTAL	

PART III. DRUG - NON-HEROIN

Now let's discuss the period of time between _____ (Ques. 5) and _____ (Ques. 3) when you said you were using drugs other than heroin.

20. Did you have a valid drivers license or permit during this period?

1. Yes ___ 2. No ___ 9. No Response ___ F1(72)
Go to Ques. 23

21. What state issued this license?

1. New York	___	
2. Connecticut	___	F1(73)
3. New Jersey	___	
4. Other (specify)_____	___	
9. No response	___	

22. What type of license was it?

1. Operator or Junior operator	___	
2. Chauffeur	___	F1(74)
3. Interim or learner's permit	___	
4. Other (specify)_____	___	
9. No reponse	___	

23. Did you drive a car or other motor vehicle during this period of non-heroin drug use?

1. Yes ___ 2. No ___ 9. No Response ___ F1(75)
Go to Ques. 33

24. What type of vehicle did you use most?

1. Car	___	
2. Bus	___	
3. Truck	___	F1(76)
4. Motorcycle	___	
5. Other (specify)_____	___	
9. No response	___	

25. Who owned the vehicle?

1. Self or spouse	___	
2. Family	___	
3. Friend	___	F1(77)
4. Employer	___	
5. Other (specify)_____	___	
9. No response	___	

26. During this period of non-heroin drug use, about how often did you drive? (Show Card 1)

1. Once a day	___	
2. Several times a day	___	
3. Once a week	___	
4. Several times a week	___	F1(78)
5. Once a month	___	
6. Several times a month	___	
7. Less often	___	
8. Not at all	___	(Skip to Part IV)
9. No response	___	

27. Approximately how many miles per year did you drive during this period?

_____ Miles
F2(6-10)

28. For what purpose did you do most of this driving?

1. To and from work or school	___	
2. For work (professional driver)	___	
3. Personal and pleasure	___	F2(11)
4. Other (specify)_____	___	
5. To get drugs	___	
9. No response	___	

29. a. Did you drive more miles on weekdays or weekends during this period?

1. Weekdays ___ 2. Weekends ___ 3. About the same ___

9. No Answer ___ F2(12)

b. During what time period of these (weekends, weekdays) did you drive the most mileage?

_____
Answer

Not to be filled in by Interviewer	
1. Morning	___
2. Daytime	___
3. Evening	___
4. Morning and evening	___
5. Night	___
6. Other	___
9. No response	___
F2(13)	

30. Did you ever drive immediately after using:
(Mention only those classes of drug which respondent has previously admitted he used.)

	1. Yes	2. No	9. Not Applicable	
a. Marijuana or hashish	___	___	___	F2(14)
b. Hallucinogens	___	___	___	F2(15)
c. Amphetamines	___	___	___	F2(16)
d. Barbituates	___	___	___	F2(17)
e. Cocaine	___	___	___	F2(18)
f. Deliriants	___	___	___	F2(19)
g. Other (from Ques. 6)	___	___	___	F2(20)

31. During this period before you used heroin but used other drugs, did you ever have any accidents?

1. Yes ___ 2. No ___ 9. No Response ___ F2(21)
Go to Ques. 32 Go to Ques. 32

I would like to ask you some questions about each accident. (Ask questions in chart below and record code number for each.)

	State	Type	Result
Code:	1. New York	1. Pedestrian	1. Property damage
	2. Connecticut	2. Other moving motor vehicle	2. Injury
	3. New Jersey	3. Fixed object	3. Fatality
	4. Other (specify)	4. Parked motor vehicle	4. No response
	5. No answer	5. Ran off road	High
		6. Overturned in road	Y = Yes N = No
		7. Other (specify)	D = Don't know
		8. No answer	O = No response

No.	Approx. date of Accidents	In what state?	What type of accident?	What did the accident result in?	Were you high?
1					
2					
3					
4					
5					
6					
7					
8					

Not to be completed by Interviewer

F2(22)	P. D. ___	Type 1. ___		F2(28)
F2(23)	Inj. ___	2. ___		F2(29)
F2(24)	Fat. ___	3. ___		F2(30)
F2(25)	All ___	4. ___		F2(31)
F2(26)	In state ___	5. ___		F2(32)
F2(27)	High ___	6. ___		F2(33)
		7. ___		F2(34)
		8. ___		F2(35)

32. During this same period, did you ever get a ticket for a moving traffic violation?

1. Yes ___ 2. No ___ Go to Ques. 33 9. No response ___ Go to Ques. 33 F2(36)

I would like to ask you some questions about each violation.

State

1. New York
2. Connecticut
3. New Jersey
4. Other (specify)
5. No answer

Were you High?

Y = Yes
N = No
D = Don't know
O = No response

No.	Approx. Date of Violations	In what state?	What was the ticket for? (list each)	Were you high?
1				
2				
3				
4				
5				
6				
7				
8				

Not to be completed by Interviewer

Ticket Types	Total	
1. Red light, stop sign or other traffic device	_____	F2(37)
2. Speeding	_____	F2(38)
3. Reckless driving or following too close	_____	F2(39)
4. Wrong way or wrong turn	_____	F2(40)
5. Improper equipment or documents	_____	F2(41)
6. Driving while intoxicated or impaired (Alc)	_____	F2(42)
7. Driving on drugs	_____	F2(43)
8. Other (specify)	_____	F2(44)
9. No response	_____	F2(45)
TOTAL	_____	F2(46)
HIGH	_____	F2(47)

PART IV. HEROIN PERIOD

Thank you. Now, let's talk about the time between _____ (Ques. 3), when you began using heroin, and _____ (Ques. 1), when you started methadone maintenance.

33. Did you have a valid driver's license or permit during this period?

1. Yes ___ 2. No ___ (go to Ques. 36) 9. No response ___ F2(48)

34. What state issued this license?

1. New York ___
2. Connecticut ___
3. New Jersey ___ F2(49)
4. Other (specify) _____ ___
9. No response ___

35. What type of license was it?

1. Operator or junior operator ___
2. Chauffeur ___
3. Interim or learner's permit ___ F2(50)
4. Other (specify) _____ ___
9. No response ___

36. Did you drive a car or other motor vehicle during this period of heroin use?

1. Yes ___ 2. No ___ (go to Ques. 50) 9. No response F2(51)

37. What type of vehicle did you use most?

1. Car ___
2. Bus ___
3. Truck ___ F2(52)
4. Motorcycle ___
5. Other (specify) _____ ___
9. No response ___

38. Who owned this vehicle?

1. Self or spouse	___	
2. Family	___	
3. Friend	___	F2(53)
4. Employer	___	
5. Other (specify) _____	___	
9. No response	___	

39. During this period of heroin use, about how often did you drive? (show Card

1. Once a day	___	
2. Several times a day	___	
3. Once a week	___	
4. Several times a week	___	
5. Once a month	___	
6. Several times a month	___	F2(54)
7. Less often	___	
8. Not at all	___	(Skip to Part V)
9. No response	___	

40. Approximately how many miles per year did you drive during this period?

_____ miles
F2(55-59)

41. For what purpose did you do most of this driving?

1. To and from work or school	___	
2. For work (professional driver)	___	
3. Personal and pleasure	___	F2(60)
4. Other (specify) _____	___	
5. To get drugs	___	
9. No response	___	

42. a. Did you drive more miles on weekdays or weekends during this period?

1. Weekdays	___	
2. Weekends	___	F2(61)
3. About the same	___	
9. No response	___	

42. b. During what time period of these (weekends, weekdays) did you drive the most mileage?

_____
answer

Not to be filled in by interviewer	
1. Morning	___
2. Daytime	___
3. Evening	___
4. Morning and evening	___
5. Night	___
6. Other	___
9. No response	___
F2(62)	

43. Did you ever drive within one (1) hour of using heroin?

1. Yes ___ 2. No ___ (go to Ques. 48) 9. No answer ___ F2(63)

44. About how often did you drive within one (1) hour of heroin use?

1. Daily ___
2. Several times a week ___
3. Several times a month ___
4. Less than once a month ___
5. Only once or twice total ___
9. No response ___

F2(64)

45. Did you notice any difference in the way you drove when you had just used heroin?

1. Yes ___ 2. No ___ (go to Ques. 47) 9. No answer ___ F2(65)

46. Could you tell me the number of the item on this card (show Card 2) which best describes the major difference you noticed?

1.	Lack of concentration	___
2.	Driving less of a hassle	___
3.	Ability to judge speed impaired	___
4.	Ability to judge distance impaired	___
5.	Ability to judge time impaired	___
6.	Vision problems (including hallucinations)	___
7.	Noticed no difference	___
8.	Turned on by driving	___ F2(66-67)
9.	Nodding out--excessively drowsy	___
10.	Drove better	___
11.	Weaving, reckless driving	___
12.	Confusion or indecisiveness in reacting to emergency situations	___
13.	Nervous, defensive	___
14.	Lack of physical coordination	___
15.	Other (specify) _____	___
99.	No answer	___

47. What was the main thing on your mind when you were driving immediately after using heroin?
Please choose one item from this card (show Card 3).

1.	Enjoying the high	___
2.	Driving well enough to avoid being stopped by the police	___
3.	Fear of getting stopped	___ F2(68)
4.	Physical discomfort	___
5.	Fear of accident	___
6.	Not caring about anything	___
7.	Not driving well	___
8.	Other (specify) _____	___
9.	No response	___

48. During this period when you were using heroin, did you ever have any accidents?

1. Yes ___ 2. No ___ (go to Ques. 49) 9. No response ___ (go to Ques. 49) F2(69)

I would like to ask you some questions about each accident.

(Ask questions in chart below and record code number for each.)

Code:

State:
1. New York
2. Connecticut
3. New Jersey
4. Other (specify)
5. No answer

Type:
1. Pedestrian
2. Other moving motor vehicle
3. Fixed object
4. Parked motor vehicle
5. Ran off road
6. Overturned in road
7. Other (specify)
8. No answer

Result:
1. Property damage
2. Injury
3. Fatality
4. No response

Approx. date of accident	In what state?	What type accident?	What did the accident result in?	Had you just used heroin?
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Not to be completed by Interviewer

F2(70) P. D. ___
F2(71) Inj. ___
F2(72) Fat. ___
F2(73) All ___
F2(74) In State ___
F2(75) High ___

Type 1. ___ F2(76)
2. ___ F2(77)
3. ___ F2(78)
4. ___ F2(79)
5. ___ F2(80)
6. ___ F3(6)
7. ___ F3(7)
8. ___ F3(8)

49. During this period of heroin use, did you ever get a ticket for a moving traffic violation?

1. Yes ___ 2. No ___ (go to Ques.50) 9. No response ___ (go to Ques.50) F3(9)

I would like to ask you some questions about each violation.

State: 1. New York 4. Other (specify)
2. Connecticut 5. No answer
3. New Jersey

No.	Approx. date of violation	In what state?	What was the ticket for? (list each)	Had you just used heroin?
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Had you just used heroin?
Y = Yes
N = No
D = Don't know
O = No answer

Not to be completed by Interviewer

Ticket Types	Total	
1. Red light, stop sign or other traffic device	_____	F3(10)
2. Speeding	_____	F3(11)
3. Reckless driving or following too close	_____	F3(12)
4. Wrong way or wrong turn	_____	F3(13)
5. Improper equipment or documents	_____	F3(14)
6. Driving while intoxicated or impaired (Alc)	_____	F3(15)
7. Driving on drugs	_____	F3(16)
8. Other (specify)	_____	F3(17)
9. No response	_____	F3(18)
TOTAL	_____	F3(19)
JUST USED	_____	F3(20)

PART V. METHADONE

Our final period of interest is the time since _____, when you began Methadone Maintenance.
Ques. 1

50. Did you have a valid drivers license or permit during this period?

1. Yes ___ 2. No ___ (go to Ques. 53) 9. No response ___ F3(21)

51. What State issued this license?

1. New York ___
2. Connecticut ___
3. New Jersey ___ F3(22)
4. Other (specify)_____ ___
9. No response ___

52. What type of license was it?

1. Operator or Junior Operator ___
2. Chauffeur ___
3. Interim or learner's permit ___ F3(23)
4. Other (specify)_____ ___
9. No response ___

53. Have you driven a car or other motor vehicle since you began Methadone treatment?

1. Yes___ 2. No ___ (go to Ques. 62) 9. No response ___ F3(24)

54. What type of vehicle did you use most?

1. Car ___
2. Bus ___ F3(25)
3. Truck ___
4. Motorcycle ___
5. Other (specify)_____ ___
9. No response ___

55. Who owned this vehicle?

1. Self or spouse	___	
2. Family	___	
3. Friend	___	F3(26)
4. Employer	___	
5. Other (specify)_____	___	
9. No response	___	

56. Since you've been undergoing Methadone treatment, about how often do you drive? (Show card 1.)

1. Once a day	___	
2. Several times a day	___	
3. Once a week	___	
4. Several times a week	___	F3(27)
5. Once a month	___	
6. Several times a month	___	
7. Less often	___	
8. Not at all	___	(Skip to PART VI)
9. No response	___	

57. Approximately how many miles per year have you driven since being on Methadone Maintenance?

_____ Miles

F3(28-32)

58. For what purpose did you do most of this driving?

1. To and from work or school	___	
2. For work (professional driver)	___	
3. Personal and pleasure	___	F3(33)
4. Other (specify)_____	___	
9. No response	___	

59. a. Did you drive more miles on weekdays or weekends during this period?

1. Weekdays ___ 2. Weekends ___ 3. About the same ___ F3(34)
9. No answer ___

b. During what time period of these (weekends, weekdays) did you drive the most?

_____
answer

Not to be filled in by Interviewer	
1. Morning	___
2. Daytime	___
3. Evening	___
4. Morning & evening	___
5. Night	___
6. Other	___
9. No response	___
F3(35)	

60. Since you've been on Methadone treatment, have you had any accidents?

1. Yes ___ 2. No ___ (go to Ques. 61) F3(36)

9. No response ___ (go to Ques. 61)

I would like to ask you some questions about each accident.
(Ask questions in chart below and record code number for each.)

CODE:	State	Type	Result
	1. New York	1. Pedestrian	1. Property damag
	2. Conn.	2. Other moving motor vehicle	2. Injury
	3. New Jersey		3. Fatality
	4. Other(specify)	3. Fixed object	4. No response
	5. No answer	4. Parked motor vehicle	
		5. Ran off road	
		6. Overturned in road	
		7. Other (specify)	
		8. No answer	

Approx. Date of Accidents	In What State?	What Type of Accident?	What did the Accident result in?
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Not to be completed by interviewer			
F3(37)	P.D. ___	Type 1 _____	F3(42)
F3(38)	Inj. ___	2 _____	F3(43)
F3(39)	Fat. ___	3 _____	F3(44)
F3(40)	All ___	4 _____	F3(45)
F3(41)	In State ___	5 _____	F3(46)
		6 _____	F3(47)
		7 _____	F3(48)
		8 _____	F3(49)

61. During this same time of Methadone use, have you received any tickets for a moving traffic violation?

1. Yes ___ 2. No ___ (go to Ques. 62) F3(50)

9. No response _____ (go to Ques. 62)

I would like to ask you some questions about each violation.

State
1. New York
2. Conn.
3. New Jersey
4. Other (specify)
5. No answer

Approx. Date of Violations	In What State?	What was the ticket for? (List each)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Not to be completed by Interviewer

Ticket Types	Total	
1. Red light, stop sign or other traffic device	_____	F3(51)
2. Speeding	_____	F3(52)
3. Reckless driving or following too close	_____	F3(53)
4. Wrong way or wrong turn	_____	F3(54)
5. Improper equipment or documents	_____	F3(55)
6. Driving while intoxicated or impaired (Alc)	_____	F3(56)
7. Driving on drugs	_____	F3(57)
8. Other (specify)	_____	F3(58)
9. No response	_____	F3(59)
TOTAL	_____	F3(60)

PART VI. CLASSIFICATION INFORMATION

That completes the driving questions. The remainder of the interview deals with questions about you which will allow us to classify your answers and compare them to those of other people of your age, sex, etc.

We will also ask you to volunteer your name and the names of some of your friends or acquaintances who are your sex and approximate age but are neither methadone patients nor heroin addicts. These names will only be used to obtain a driver abstract similar to this one (SHOW ABSTRACT) of one of our researchers. These abstracts are public information and are easily obtained by anyone. They are important to our research because they are the only basis we have for comparing the driving records of the methadone patients we will interview with the records of a comparison group who will not be interviewed. WE WILL NOT CONTACT THE PEOPLE YOU NAME AND NO ONE WILL EVER KNOW YOUR NAME or that you were interviewed. This is group research and individual records will never be identified.

62. Sex (observe)

1. Male	___	
2. Female	___	F3(61)
9. No observation	___	

63. Race (observe)

1. White	___	
2. Black	___	
3. Latin American	___	F3(62)
4. Other (specify)	___	_____
9. No observation	___	

64. What is your exact date of birth?

_____	_____	_____
Year	Month	Day
F3(63-64)	F3(65-66)	F3(67-68)

65. What is your marital status?

1.	Single (never married)	___	Go to Ques. 67
2.	Married	___	
3.	Separated	___	F3(69)
4.	Widowed	___	
5.	Divorced	___	
6.	Other (specify)	___	_____
9.	No response	___	

66. How many children do you have living with you?

_____ F3(70)
Number

67. Would you please give me an estimate of your total family income?

$_____ per _____ F3(71-75)
year, month, week, day

68. Did you ever take a driving course?

1.	Yes	___	F3(76)
2.	No	___	(Go to Part VII)
9.	No answer	___	

69. Was it a high school or commercial course?

1.	High school	___	
2.	Commercial	___	F3(77)
3.	Other	___	
9.	No answer	___	

PART VII - IDENTIFICATION

70. Respondent's full name (get correct spelling!). PLEASE PRINT!

_____ _____ _____
Last First Middle

71. Address:

_____ Street and Number
_____ City
_____ State and Zip Code

72. Control Group Names: Please give the names and addresses of at least two friends of your sex and approximate age who you know are neither heroin addicts nor methadone patients now and never were.

	Name 1	Name 2	Name 3
Name:	_____	_____	_____
Address:	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
Approx. Age?	_____ years	_____ years	_____ years

73. Eye Color: (Observe! Do not ask.)

1. Blue ___
2. Brown ___
3. Green ___
4. Hazel (Greenish-Brown) ___ F3(78)
5. Black ___
6. Other (specify)_____ ___
9. Did not observe ___

Unit Number of Subject _____ All (1-4)

Center Number _____ F3(79-80)

Center Name _____

Date of Interview _____

Interviewer's Name (Print) _____

Reviewed by: _____ _____

Coder's Name (Print): _____ _____

INTERVIEWER DEBRIEFING

"Drug Abuse and Driver Performance"

Interviewer's Name: _____

Methadone Center: _____

A. Methadone Center

1. General impression of facilities: (small, crowded, clean, adequate, etc.)

_____

_____

2. Where did you interview subjects? (e.g., clinic waiting room, clinic office, general waiting room, main entrance, private room) _____

_____

3. Did the center seem well-run and organized? _____

B. Center Staff

1. Was the staff cooperative and helpful? _____

2. Did the staff refer subjects to you or did you approach subjects yourself? _____

_____

3. Did you use any printed handout sheets? _____

4. If yes, did you post them or hand them out, or did you have the staff post them or hand them out? _____

C. Subjects

1. In general, were the subjects cooperative and willing to submit to the interview?

_____

2. Do you feel that most subjects were truthful in their answers? _____

3. Do you feel that most subjects showed an interest in the interview? _____

4. What was the average length of an interview? _____

5. What was the most often cited reason for refusal to be interviewed? _____

_____

D. Questionnaire

1. Was there any particular area in the questionnaire that you had difficulty with?
_____(Specify) _____

_____

2. Was there any particular area in the questionnaire that subjects had difficulty wit'
_____(Specify) _____

_____

Please feel free to add additional observations or comments: