

COMPARISONS BETWEEN EXPERIENTIAL
EFFECTS AND DETERRENT EFFECTS
ON ALCOHOL CONSUMPTION AND
DRUNK DRIVING

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TABLE OF CONTENTS

| Chapter | Page |
|-------------------------------------------------------------|------|
| I. INTRODUCTION..... | 1 |
| II. LITERATURE REVIEW..... | 3 |
| Deterrence in Context of Criminal Law..... | 3 |
| General Deterrence and Specific Deterrence..... | 3 |
| Deterrence and Drunk Driving..... | 5 |
| The Reasoning of Deterrence and Deterrence Research..... | 5 |
| III. METHODOLOGY..... | 7 |
| Literature Criticizing Methodology..... | 7 |
| Cross-Sectional Designs..... | 7 |
| Specification Erros..... | 9 |
| Opportunity Structure..... | 11 |
| IV. RESEARCH DESIGNS AND HYPOTHESES..... | 13 |
| Designs..... | 13 |
| Research Hypoteses..... | 14 |
| Specification..... | 15 |
| Hypothesis 1..... | 17 |
| Hypothesis 2..... | 18 |
| Hypothesis 3..... | 19 |
| Elaboration..... | 19 |
| V. LIMITATIONS..... | 28 |
| Methodology Defects..... | 28 |
| Specification Problem..... | 30 |
| Non-Longitudinal Design..... | 31 |
| Validity..... | 31 |
| Reliability..... | 32 |
| Generalizability..... | 33 |
| VI. ANALYSIS..... | 35 |
| First Stage..... | 35 |
| Second Stage..... | 35 |
| Third Stage..... | 36 |

| Chapter | Page |
|-----------------------------------------------------------------------------------------|------|
| Fourth Stage..... | 37 |
| Fifth State..... | 37 |
| VII. RESEARCH FINDINGS..... | 39 |
| Formation of Scales..... | 39 |
| Recoding and Collapsing of Items..... | 39 |
| Scale Construction..... | 41 |
| Basic Feature of The Four-Year Data Set... | 48 |
| Subjects' Features..... | 48 |
| Frequencies of Independeant and Dependent Variables..... | 53 |
| Relationships between Independent and Dependent Variables..... | 58 |
| Zero-Order Correlations Between Independent and Dependent Variables..... | 58 |
| Partial Correlations for Independent and Dependent Variables..... | 62 |
| Partial Correlations for Independent and Dependent Variables, Sorted by Sex..... | 64 |
| Partial Correlations for Independent and Dependent Variables, Sorted by Job..... | 67 |
| Partial Correlations for Independent and Dependent VARIables, Sorted by Year..... | 70 |
| Mean Scores and Analysis of Variance..... | 74 |
| Mean Scores and Analysis of Variance For Scales by Years, Sexes, and Job..... | 74 |
| VIII. DISCUSSIONS AND CONCLUSIONS..... | 82 |
| Summary of Results..... | 82 |
| Conclusions..... | 86 |
| BIBLIOGRAPHY..... | 95 |
| APPENDIX - SURVEY INSTRUMENT..... | 100 |

LIST OF TABLES

| Table | Page |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Factor Loadings, Alpha on Scales..... 44 |
| 2. | Sample Characteristics..... 49 |
| 3. | Correlations and Partial Correlations Between DUI Experience, Perceived Punishment, Tough Opinion, Drinking/Driving Behavior, and Alcohol Consumption..... 59 |
| 4. | Partial Correlation Between Independent and Dependent Variables, Sorted by Sex..... 66 |
| 5. | Partial Correlation Between Independent and Dependent Variables, Sorted by Job..... 68 |
| 6. | Partial Correlation Between Independent and Dependent Variables, Sorted by year..... 72 |
| 7. | Means and F-Ratios For Independent and Dependent Variable Across Years, Job, and Sex..... 76 |

LIST OF FIGURES

| Figure | | Page |
|--------|------------------------------------------|------|
| 1. | Research Model..... | 16 |
| 2. | An Example of Intervening Variables..... | 29 |
| 3. | Research Model after Testing..... | 83 |
| 4. | A Model for Future Research..... | 90 |

CHAPTER I

INTRODUCTION

This research will compare experiential and deterrent effects on perceived punishment for potential drunk driving offenses. Instead of serving as a predictive theory, deterrence doctrine is used as a guideline in forming research hypotheses. Independent variables in this research are previous experience of being arrested for driving under the influence of alcohol (DUI experience), perceived punishment of potential drunk driving, and tough opinion held toward police treatment of drunk driving.

Drinking/driving behavior and alcohol consumption are dependent variables. It is hypothesized that experiential and deterrent effects on drunk driving and consumption of alcohol are the same. That is, subjects with more DUI experience are less likely to commit drinking/driving behavior and are likely to consume less alcohol than those without such an experience. In addition, subjects with a higher degree of perceived punishment and a tougher opinion are less likely to commit drinking/driving behavior and are likely to consume less alcohol than those who with a lesser degree of perceived punishment and tough opinion. Furthermore, it is also hypothesized that these

relationships will remain the same even when the four year data set is sorted separately by sex and by year (time factor). However, these relationships are predicted to be different when adult and student subjects are compared. Stated alternatively, adult subjects are expected to have more DUI experience, higher degree of perceived punishment, tougher opinion, and therefore, less degree of drinking/driving behavior and less alcohol consumption. Student subjects are expected to display the opposite of such expectations.

This study will contribute to the deterrence literature as it will test several hypotheses which are implied in or generated from previous research in deterrence. Four years of continuous data have been collected to examine the stability of perceived punishment and the experiential and deterrent effects. Although generalizability of the research is limited because the four-year data was only collected from Payne County, Oklahoma, it is argued that data from large samples as in this study (N=1757) can be comparatively confident in estimating population characteristics. The implications of this study may be considered in policy making concerning preventing drunk driving or advanced understanding of the effects and limitations of the deterrence doctrine. Similar efforts have already been made in exploring possible alternatives for reducing drunk driving (Holden, 1983; Mosher, 1983; Ball and Lilly, 1986; (Formby and Smykla, 1984).

CHAPTER II

LITERATURE REVIEW

Deterrence in Context of Criminal Law

Deterrence will be presented in the context of criminal law so that it can be understood in its broadest sense. According to Ross (1984), deterrence is only one of the functions or goals of criminal law. Other goals of such laws are retribution, incapacitation and rehabilitation (p. 7). Retribution refers to the punitive aspect of law. What matters here is not whether the offender will commit crimes again after being punished; instead, the view is that any prohibited behavior must be punished no matter who commits the crime or what crime has been committed. Incapacitation, on the other hand, is a condition under which the offender is restricted so as to not be able to commit new violations. Rehabilitation tries to improve or change offenders through special treatment or educational programs in the hope that future behavior will fall within the approval region regulated by law.

General Deterrence and Specific Deterrence

The main theme of deterrence is that future criminal behavior will be deterred if the possibility and severity of

punishment is perceived by potential law violators as likely to happen and likely to happen harshly. Deterrence can be understood separately for various levels of society. General deterrence refers to a threat of potential punishment which is addressed to the population in general no matter whether specific people commit the offense in question or not. Specific deterrence aims at preventing those who have already committed some sort of crime from committing future crime by having them experience the certainty and severity of punishment for committing their crimes.

The efficacy of the threat of punishment can be assessed by the perceived certainty, severity and swiftness of punishment. In other words, a greater deterrent effect of the threat of punishment is warranted when a greater likelihood of punishment, a more severe punishment, and a more swift administration of the judicial process are perceived by the potential offender.

As suggested by Ross (1984), the deterrence doctrine will be treated as a group of propositions instead of a theory since it is not yet integrated into a body of principles capable of explaining board ranges of empirical facts (p. xxvi). Moreover, because of the inevitable complex nature of the doctrine, deterrence will serve as a guide in reasoning for the research rather than as a theory to predict the direction and nature of the research hypotheses in the proposal.

Deterrence and Drunk Driving

Traditionally, the deterrent effects of criminal laws are assessed by comparing the differences of criminal rate before and after the implementation of certain laws. An example is provided in Ross, McCleary, and Peppermints (1981-82) study on examining the effect of a law implemented in 1978, France. Such an approach in research is called a natural experiment (Cook 1980, p. 212). The purpose of this approach is to determine the effectiveness of certain social policies or laws.

A natural experiment, however, is not the case in this study. Instead, the focus will be on the general deterrent effects on drunk driving and alcohol consumption. In other words, no specific laws regarding to drunk driving will be tested to detect the deterrent effects of those laws, and no specific group of people (for instance, serious crime offenders) were sampled for the purposes of hypothesis testing of deterrent effects.

The Reasoning of Deterrence and Deterrence Research

The basic reasoning behind the deterrence doctrine in relation to drunk driving is that individuals are deterred from committing criminal acts only if they perceive legal sanctions as certain, swift, and/or severe (Williams and Hawkins, 1986, p. 545; Grasmick and Green, 1980, p. 326). However, there is a major inconsistent research finding in

this literature which is that while perceived punishment is found to be inversely related to drinking/driving behavior in most research with cross-sectional designs (Klepper and Nagin, 1989), such a relationship has been found to be spurious in some research with panel designs (Paternoster, et al., 1983b; Paternoster, 1988; Minor and Harry, 1982). In other words, whether there is an inverse association between perceived punishment and drinking/driving behavior seemingly is highly related to which research design (i.e. cross-sectional or panel) is used. On the other hand, some researchers have been trying to criticize and incorporate both designs to improve research in deterrence (Green, 1989). As explained in a later section on research designs, this study utilized a four-year data set obtained from Payne County, Oklahoma, in the summer of 1985, 1986, 1987, and 1988. Subjects were interviewed at The Tag Agency when they renewed their driver's license. Although this is not a panel design, it is possible to test if there is any significant difference of perceived punishment as well as the relationship between perceived punishment and drinking/driving behavior across each year. This will be further explained in the analysis chapter.

CHAPTER III

METHODOLOGY

Literature Criticizing Methodology

According to Piliavin et al. (1986), previous deterrence research is inflicted with at least three major methodological defects. They include inferring causality from cross-sectional designs, specification errors in the rational-choice model, and samples without an opportunity structure to test the deterrent hypothesis (p. 103-104).

Cross-Sectional Designs

Research with cross-sectional designs has long been seriously criticized for its inability to test the time ordering of independent and dependent variables suggested by deterrence doctrine. As reported by Piliavin et al. (1986), cross-sectional research actually reverses the causal order of the variables by measuring the perceived threat of punishments and self-reported crime in the same time interview process (p. 103). Since any criminal activity prior to the interview is likely to impact the perceptions of punishments, it is illogical to claim that the reported inverse relationship between the variables is due to the influence of perceived punishments on the criminal

behavior as deterrence theory directs.

Nevertheless, if cross-sectional designs are used, a high degree of stability of perceptions must be confirmed (Williams & Hawkins, 1986, p. 552; Paternoster, et al., 1983a). Under such a circumstance, it can be asserted that since perceptions are stable over time, the past perceptions can be assumed to be the same as the latter perceptions. Therefore, perceptions at any period would have the same impact on current reported crime. Most of the past research, however, leaves this question unanswered and only assumes perceptions remain stable over time. Moreover, Paternoster et al. (1988) observe that an important variable relevant to perceived punishment, the influence of peer's involvement in crime on perceptions of sanction, also changes over time (p. 177). In addition, Piliavin et al. (1986) conclude, as a final result of cross-sectional designs, that "perceived risk is a consequence of crime, not a cause" (p. 103).

On the other hand, some researchers (Saltzman et al., 1982) argue that cross-sectional research in deterrence confuses an experiential effect with a deterrent effect (p. 173). Because cross-sectional studies measure perceived sanctions and criminal behavior at the same time, what is actually being measured is the impact of previous criminal experiences, if any, on current perceptions of punishments. This is the so-called experiential effect. However, according to deterrence theory, perceived punishments should

influence the subject's future criminal behavior.

Therefore, the experiential effect measures variables in the opposite way to that of the deterrent effect.

Since there are many problems with cross-sectional designs, some researchers (Paternoster, 1988; Piliavin et al., 1986; Paternoster et al., 1983) prefer panel designs. In these designs, variables are measured as they occur over time such that the sequential relationship between perceived punishments and criminal behavior can be detected. Thus, the confounding of the time ordering with the independent and dependent variables in cross-sectional designs will be eliminated. However, some other researchers claim that similar research conclusions can be drawn from cross-sectional designs and panel designs (Green, 1989, p. 166). If so, the specifications and sample structure problems could be more important.

Specification Errors

Specification errors have also plagued previous deterrent research. One problem comes from asserting the reported inverse relationship between perceived punishments and criminal behavior by using bivariate correlations between the two variables (Paternoster, 1988, p. 136; Piliavin et al., 1986, p. 103). This procedure excludes intervening variables. As illustrated by Paternoster (1988), a detected relationship between perceived punishment and criminal behavior may be spurious when controlling a

third variable, for instance peer's involvement in crime, in partial correlation models (p. 138). Moreover, Piliavin et al. (1986) indicate that non-experimental research should include "all important nonorthogonal explanatory variables" in their research model to decrease the likelihood of inconsistent conclusions (p. 103). Considering this, informal sanctions has been suggested for inclusion in the research (Anderson et al., p. 104). In contrast to formal sanctions, informal sanctions refer to social support or disapproval from small groups, especially peers (Anderson et al., p. 104-105). Paternoster (1988) also points out that peer's criminal behaviors play an important role in explaining adolescent criminal behavior and perceived punishments. Some researchers even started to investigate different types of informal sanctions possible in intervening drunk driving behavior (Hernandez & Rabow, 1987). Stated alternatively, a low degree of perceived risk of being arrested and a high degree of committing crime may result from peer's high involvement in crime without apprehension and punishment (Paternoster, 1988, p. 138).

To validate a more complete specification in the research models, reward, returns, and opportunity components warrant inclusion in deterrence research among other variables (Piliavin et al., 1986, p. 103). In regard to the reward and return variables the perceived reward or earning from committing crime is thought to be important. As Piliavin et al. (1986) explain, this is "the other side of

the two-sided rational-choice model (p. 103). In Paternoster's (1986) terms, not only should inhibitory variables which prevent the commission of crime be included, such as moral beliefs, but just as imperative are the generatory variables which encourage involvement in crime, such as peer's criminal behavior (p. 136). Here, the reward component is thought to be included as well.

Some researchers suggest important psychological factors should be included in research on drunk driving as well. For example, Donovan, Marlatt, and Salzborg (1983) argue that personality traits and acute states of emotional distress also have relationships with drunk driving. Green (1989) also mentions that individual motivation should be included in future research. McCord's (1984) research on life history of drunken drivers maintains that early childhood and parental relationship may also have an impact on drunk driving offenders. Other social factors, such as socioeconomic status, are also discussed in studying perceptions of arrest probabilities (Richards and Tittle, 1982). However, those variables are excluded from the current study, therefore, its implications are limited.

Opportunity Structure

The last methodological problem is sample structure. In a recent publication, Green (1989) criticizes previous deterrence research which has used samples that lack sufficient opportunity and diversity to test deterrent

hypotheses (p. 165). Student samples, for instance, have been accused of not possessing the necessary diversity of attitude and contain those who are conceptually incapable of committing particular offenses (Green, 1989, p. 165). Some researchers (Gibbs, 1975; Silberman, 1976) further claim that, "deterrence may be more relevant to serious forms of offenses (crimes proscribed by both law and public mores) and less relevant to trivial forms of offenses (crimes proscribed by law but not by public mores)." In short, an adequate test of deterrence should employ samples either with adults or serious offenders in order to guarantee the needed opportunity structure.

Other methodological issues such as measurement levels of perceived risk, types of punishment being measured, and techniques of statistical analysis are also discussed (Paternoster, et al., 1982) in the hope that more consistent research findings will result.

However, instead of correcting all of the aforementioned methodological defects, the following research designs aim at testing some hypotheses in deterrence. With the awareness of those defects and available data on hand, research attempts will only focus on deterrent-related issues rather than deterrence itself.

CHAPTER IV

RESEARCH DESIGNS AND HYPOTHESES

Designs

The research for this thesis follows a cross-sectional design. A different sample was drawn from the population of driver's license holders in Payne County, Oklahoma, in September of each year from 1985 to 1988. The questionnaire administration was conducted at The Tag Agency when subjects were renewing their driver's license. The questionnaire was handed out to all such persons coming to The Tag Agency by an employee to complete while they were waiting for their pictures to be developed. A locked box, located away from any employee, in the agency was provided for the respondents to drop in the finished questionnaire. In addition, the questionnaire was approved by the Human Rights Committee at Oklahoma State University and the confidentiality and anonymity of the respondents were protected as described in the instructions printed on the questionnaire (see Appendix).

While the research questionnaire was given to the subjects each year and therefore the independent and dependent variables were measured at the same time, samples in each year will be examined separately to detect the

extent to which different samples might have the same relationships between variables as well as the stability of perceived punishment and other variables over time. Although cross-sectional designs cannot overcome the causality problems mentioned above, the examination of each year's data can be used to observe if, through a certain amount of time, the same causality bias can be balanced out. Therefore, if the results show that perceived punishments have consistent degree of deterrent effects on drunk driving and consumption of alcohol across four years data with different samples, cross-sectional designs then can serve as more adequate methods to test deterrent hypotheses as well. Furthermore, the stability or consistency of perceptions may be established if there are no significant differences of perceived punishment found across each year. These propositions will be formalized as research hypotheses as depicted in the following section and testing of the hypotheses will be reported in the research findings chapter.

Research Hypotheses

Three main hypotheses listed below will be tested with the analytic techniques stated in the next section.

1. There is no significant difference between the experiential effect and the deterrent effect on perceived punishment. Therefore, cross-sectional designs could be used as adequate tools to test deterrence theory when

measuring the experiential and deterrent effects simultaneously.

2. Students and adults show differences on the relationships specified in Hypothesis 1. Some literature has suggested that student samples lack diversity and chance structure appropriate for testing deterrence doctrine. This will be tested in this study.

3. Samples from each year show no significant difference on perceptions of punishment. Therefore, stability of perceptions could be confirmed. The time factor which has been conceived of as causing problems in the specification process may not be as serious as previously thought. The same applies to sex. That is, different genders show no significant differences on the relationships specified in Hypothesis 1, neither. These three hypotheses will be further elaborated in the following specification section.

Specification

The research model is represented in Figure 1. It involves sex (C1), student versus adult status (C2), previous experiences of drunk driving (X1, or DUI experience as driving under the influence of alcohol), perceived punishment (X2), tough opinion regarding police reactions to driving and drinking behavior (X3), self-reported drinking and driving behavior (Y1), and alcohol consumption (Y2). In this model the four-year data set will be separately sorted

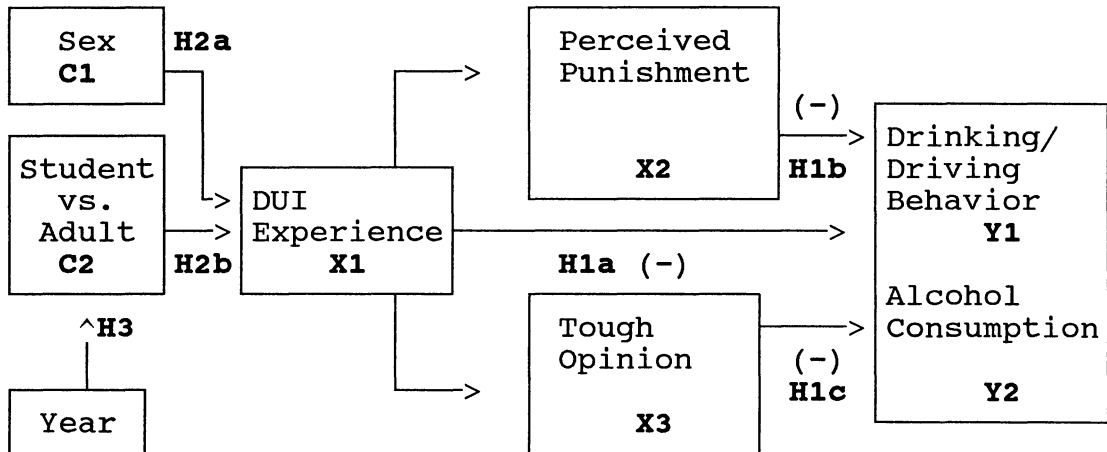


Figure 1. Research Model

by sex (C1) and by student versus adult status (C2) to test the correlations between the independent and dependent variables. DUI experience (X1), perceived punishment (X2), and tough opinion (X3) are independent variables. Dependent variables are drinking/driving behavior (Y1) and alcohol consumption (Y2). The symbol (-) indicates a negative or inverse relationship is expected between variables.

Hypothesis 1

DUI experience (X1) is believed to have an impact upon future drinking/driving behavior (Y1) and alcohol consumption (Y2). Actually an inverse relationship is predicted between DUI experience and drinking/driving behavior as well as between DUI experience and alcohol consumption. The relationships between DUI experience and the two dependent variables are defined as experiential effects which is indicated as **H1a** in Figure 1.

In addition, following the logical implication of deterrence, it is reasonable to hypothesize an inverse relationship between perceived punishment (X2) and drinking/driving behavior (Y1) as well as between perceived punishment (X2) and alcohol consumption (Y2). That is, the more severe, certain, and swift the perceived punishments of potential criminal behavior are, the less likely or less often drunk driving will occur and less amount of alcohol consumption. The relationships delineated above are defined as deterrent effects which represented in Figure 1 as **H1b**.

Besides testing the zero-order correlations as explained above, it is also anticipated that the partial correlations between the independent and dependent variables as described above are the same after controlling for the other variables in the model. In other words, there is no significant difference between H1a and H1b after the effects of other variables in the model have been taken out.

Hypothesis 1c as represented **H1c** in the model is testing the moral commitment aspect of the deterrence by examining the relationships between tough opinion (X3) and drinking/driving behavior (Y1) as well as between tough opinion (X3) and alcohol consumption (Y2). Tough opinion is expected to be inversely related to drinking/driving behavior and alcohol consumption. In other words, subjects with tougher opinion are expected to have less drinking/driving behavior and less alcohol consumption.

Hypothesis 2

Although some researchers suggest that gender does differentiate actual criminal offenses (Argeriou, McCarty and Blacker, 1985), according to Anderson and Waldo (1977), gender does not impact perceptions of punishment for potential criminal activity. It will be worth of testing this finding again to detect if consistency exists. Hypothesis 2, therefore, is designed to explore if gender has an significant impact on expeditious and deterrent effects. Hypothesis 1, as stated above, will be tested

separately for both males and females. Specifically, the same procedure will be applied to Student versus Adult Status (C2). As quoted in the above literature review, Green (1989) argued that students samples used to test deterrence hypothesis do not reflect the diverse attitudinal and behavioral patterns needed to test deterrence hypothesis (p. 165). This argument will be examined in Hypothesis 2. That is, are there significant differences between student subjects and adult subjects in the expediential and deterrent effects on drunk driving and consumption of alcohol? Student subjects will be separated from adult subjects to test Hypothesis 1.

Hypothesis 3

Hypotheses 1 and 2 will be tested for samples from each year of 1985-1989. It is hypothesized that the findings in each year will be consistent over this four-year period. The purpose of this hypothesis is to test the legitimacy of cross-sectional designs in deterrence research by examining for stability of perceived punishment as well as the correlations between the independent and dependent variables over time.

Elaboration

Out of three main aspects of the deterrence doctrine, legal punishment, social disapproval, and internalization (called moral commitment by Grasmick and Green, 1980), only

legal punishment is directly measured in this study by the variable, perceived punishment. The social disapproval (or informal sanction) is omitted. The internalization of moral norms is not directly tested. A close measure is the toughness of opinion held toward police treatment of drunk driving. It is believed that tough opinion is closely related to moral commitment, i. e. subjects with tougher opinion tend to have higher moral commitment or a tougher opinion held against drinking/driving behavior is associated with a higher degree of wrongfulness of drunk driving. However, while in this research there is no formal test of the correlation between these two variables and no direct test of moral commitment as suggested by previous research, tough opinion is utilized here as an important inhibitory factor in explaining drinking/driving behavior.

DUI Experience

DUI experience is defined as previous experience of being arrested for drunk driving. There is one question to measure this variable:

22. Have you been arrested for drunk driving in the last year?

_____ 1 Yes _____ 2 No

Subjects with and without previous experience of being arrested as a drunk driver will be separated for comparing their perceptions of punishments. According to the aforementioned methodological review and deterrence theory,

subjects with previous experience of being arrested are expected to hold more serious views of punishment.

Perceived Punishment

Perceived punishment is defined as the individual's perceived severity of punishment for criminal behavior. The reasoning here is that subjects who believe more serious punishments exist will more likely be deterred from future criminal behavior. Questions 9, 10, and 12 are constructed to measure this variable and an index will be formed by combining these three questions. Question 10 and question 12 will be recoded as having 5 response categories in each question. This is explained below.

9. If you drive after drinking too much, what do you feel are your chances of being stopped by the police.

- 1 very low
- 2 low
- 3 about even (50-50)
- 4 high
- 5 very high

This question measures the perceived possibility of punishments. A higher score indicates a greater perceived possibility of punishment.

10. If you are stopped by the police after drinking too much, which one of the following do you feel would most likely happen? (check one)

- 1 nothing

- _____ 2 warning
- _____ 3 ticket
- _____ 4 fine
- _____ 5 counseling program
- _____ 6 driver training school
- _____ 7 license removed
- _____ 8 jail sentence

This question measures the perceived severity of punishments. It will be recoded with 5 responses as to be equivalent to question 9 in order to have an unbiased weighing when combining the questions. A response 1 (nothing) will be recoded "0", a 2 response (warning) will be "1". A response 3 or 4 (ticket or fine) will be recoded "2" and the same applies to response 5 or 6 (counseling program or driver school) to be recoded "3". A response 7 (license removed) will be recoded "4"; and response 8 (jail sentence) "5". A higher score on the measurement indicates a more severe perception of punishment.

12. Which penalties for drunk driving do you feel should be used more often or increased? (check all that apply)

- _____ 1 fines
- _____ 2 removal of license
- _____ 3 community service
- _____ 4 driving school
- _____ 5 counseling programs
- _____ 6 jail after first offense

_____ 7 jail after second offense

_____ 8 other

This question measures severity but pertains to what should be used more often or increased to stop drunk driving. The intention is that subjects who perceive a high degree of severity of punishments would score higher on this question than those with a low degree of perceived severity of punishments. Again, this question will be recoded 1-5 when combining with the above two questions for unbiased weighting. Similar to the previous item, response 3 (community service) will be recoded "1", response 4 or 5 (driving school or counseling programs) "2", response 1 or 2 (fines or removal of license) "3", response 6 (jail after first offense) "4", and response 7 (jail after second offense) "5". A higher score on the index constituted the above three questions will indicates a higher degree of perceived punishment.

Tough Opinion

As a indirect test of the moral commitment aspect of the deterrence doctrine, tough opinions on police treatment of drinking behavior will be measured by the following three questions:

17. Police do not arrest enough drunk drivers.

18. Police should set up road blocks to catch drunk drivers.

20. A drunk stopped by the police close to home should be taken there rather than to jail.

A Likert type of response set consisted of five response categories from strongly disagree (score 1) to strongly agree (score 5) was used with these three questions. The response set appears as following:

| | | | | |
|----------|---|---------|---|----------|
| Strongly | | | | Strongly |
| disagree | | Neutral | | Agree |
| 1 | 2 | 3 | 4 | 5 |

An index will be formed by combining the above three questions with question 20 reversely scored for its reverse phrasing. The index shows the degree of tough attitude toward how police should treat drunk driving. The rationale is that a tougher attitude toward police treatment of drunk driving leads to a lower degree of drinking/driving behavior. Stated alternatively, this index may show a reverse relationship with drinking/driving behavior and alcohol consumption. Another purpose of this index is to observe the relationship between perceived punishment and drink/drive behavior after controlling the effects of tough opinion to see if the original relationship still exists.

Alcohol Consumption

Consumption of alcohol will be measured by a series of six questions in two parts.

Part 1.

In the last year, how often, on the average, did you usually drink:

| | | a few times a year | 1-2 times a month | 1-2 times a week | 1-2 times a day |
|-----------|------------|--------------------------|-------------------------|------------------------|-----------------------|
| 1. Beer | Never 1 | 2 | 3 | 4 | 5 |
| 2. Wine | 1 | 2 | 3 | 4 | 5 |
| 3. Liquor | 1 | 2 | 3 | 4 | 5 |

Part 2.

In the last year, when you drank, how much of the following did you usually have during one drinking period?

| | | a few times a year | 1-2 times a month | 1-2 times a week | 1-2 times a day |
|-----------|------------|--------------------------|-------------------------|------------------------|-----------------------|
| 1. Beer | Never 1 | 2 | 3 | 4 | 5 |
| 2. Wine | 1 | 2 | 3 | 4 | 5 |
| 3. Liquor | 1 | 2 | 3 | 4 | 5 |

Subjects who respond with a two or more on at least one question will be considered to be drinkers. Otherwise, subjects who answer one (Never) on all six questions are labeled as non-drinkers.

An index combining the above six items will be constructed as a measurement of consumption of alcohol. The validity and reliability of the scale has been already established by previous research (Hughes & Dodder, 1988, p. 102; Meier, Brigham and Handel, 1987). However, factor analysis and alpha will also be used to assess the

reliability of this index as well as the others in this research.

Drinking/Driving Behavior

Drinking/driving behavior refers to self-reported experience of driving while under the influence of alcohol. Three questions was constructed to measure this variable:

7. How many drinks do you feel you can handle and still drive well?

- _____ 1. none
- _____ 2. 1-2 drinks
- _____ 3. 3-4 drinks
- _____ 4. 5-6 drinks
- _____ 5. over 6 drinks

8. How often during the past year have you driven after consuming more than that amount?

- _____ 1. never
- _____ 2. a few times
- _____ 3. once or twice a month
- _____ 4. once or twice a week
- _____ 5. nearly every day

20. How often do you usually drive after having at least 2 drinks or 3 beers?

- _____ 1. never
- _____ 2. a few times a year
- _____ 3. 1-2 times a month
- _____ 4. 1-2 times a week

_____ 5. nearly every day

Question 7, 8 and 20 will be added up together and their average will be used as a combined scale of drinking/driving behavior. Thus, a subject who responds "1" on question 7, "2" on question 8, and "3" on question 20 will be assigned an average score of "2". The higher score on each of these two indices will stand for more serious and more frequent drinking/driving behavior.

CHAPTER V

LIMITATIONS

Several limitations in the research design will be specified before moving on to data analysis. The discussion covers exclusion of important intervening variables, non-longitudinal design, and the difficulty in testing external validity.

Methodology Defects

As shown in the above discussion of methodological defects of previous research, this research may have a serious specification problem for exclusion of an important variable, peer's involvement in criminal behavior without punishment. As mentioned above, a detected inverse relationship between perceived punishment and criminal behavior might be a spurious one when employing peer involvement in the research model as a controlling variable. A schematic depiction of a three--variable model in Figure 2 below can illustrate this problem.

For example, as illustrated in Figure 2, a high degree of perceived punishments could lead to a low degree of criminal behavior; but this effect might result from a low frequency of peer involvement in crime without punishments.

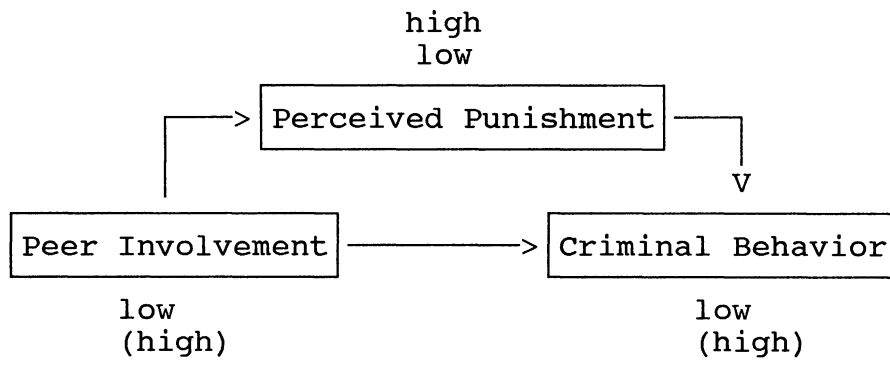


Figure 2. An Example of Intervening Variables

Since peer involvement may have an inverse relationship with perceived punishments (such that a high frequency of knowing peer involvement could cause a low degree of perceived punishments), an inverse relationship between perceived punishment with criminal behavior might be a by-product of the influence of the impact of peer involvement.

Another important variable which is also excluded in the research model is informal sanctions. It has been pointed out by some researchers that informal sanctions (or social disapproval) may be the most important variable in explain preventing criminal behavior (Green, 1989).

Specification Problem

On the other hand, this research could partially solve this specification problem by introducing two other variables, previous experience of being arrested for drunk driving and opinions on police treatment of drunk driving, as intervening variables. Although these two variables might not have the same importance as peer's involvement, they may have some influence on consumption of alcohol and drinking/driving behavior different from that of perceived punishments. In this way, the inverse relationship which might be formed between perceived punishments (high), consumption of alcohol (low) and drinking/driving behavior (low) could be verified if the effects of previous experience and opinion about police treatment are being controlled and the inverse relationship still exists.

Non-Longitudinal Design

Another limitation with this research is non-longitudinal designs. Although there is still continuous discussion of the appropriateness for using cross-sectional or longitudinal designs in deterrence research, it seems the latter has more preferable attributes for the built-in logical and time ordering considerations. However, while this research is not a longitudinal one, it is a chance for defending the cross-sectional designs if consistent or similar results with previous research are found.

Validity

Tests of construct validity has always been a problem for research in which either theoretical-relevant criterion variables are difficult to identify or are excluded from research designs. Since deterrence research has not been able to identify which demographic variables are important for including in the research model, construct validity of the research cannot be established. However, factor analysis will be used in assessment of validity. It will determine if items correlate together as a measure of a specific variable and inspection of item content will determine the name of each scale.

Besides, hand checks of data input and computer programs also improve the face validity of the data. Three questionnaires were randomly chosen and compared by hand

with the numerical values coded in the data set. There were no errors found. Impossible codes were also checked by examining the frequencies of each variable. For example, it is impossible for a subjects to report a code of "3" for sex because there were only two possible answers to this question, it can be either "1" for male or "2" for female. Besides these, all missing values in the data set were examined by hand checking the original questionnaires to see if they were truly missing or miscoded.

Reliability

Although test and retest reliability can hardly be used in the research, the reliability of the research can be estimated by using Cronbach's alpha coefficient. It has been argued to be a conservative estimation of the unmeasured reliability of a index (Carmines and Zeller, 1979, p. 45). That is, in most cases, alpha is smaller than the true value of reliability of a index. In short, alpha values will be reported to establish the reliability of the research.

As reported in a research in reliability of self-reported alcohol consumption conducted by Williams, Aitken, and Malin (1985) self-reported alcohol consumption measures can be used with considerable confidence. Based upon one survey that involved a 2-week recall period and another that involved a 4-week period, alternate forms, test-retest and a combined method were used to test reliability. The findings

indicate an average of .91 reliability of those measures for beer, wine, and distilled spirits (Williams, Aitken, and Malin, 1985, p. 223). Similar self-reported measurements of alcohol consumption were used in the current research.

Since the data was administered as self-reported questionnaires and respondents were asked to complete the questionnaire when they were renewing driver's license at The Tag Agency, it is likely that subjects with DUI experience might have tried to avoid answering the questionnaire in the first place. Although research findings in later stages of the analysis show that there are some consistencies between the current research and some previous research, a unreliable measurement may have already occurred when the data was collected. Actually, out of 1757 subjects in the four-year data set there were only 51 (3.3%) reported they were arrested for DUI experience. This has caused difficulties in comparisons between the proposed experiential and deterrent effects on drinking/driving behavior and alcohol consumption due to the low percentage of DUI experience population in the data set.

Generalizability

Besides the above, since this research was conducted in Payne County, Oklahoma, no further generalizability or external validity will be attempted. This means the conclusion of this research cannot be generalized to other places either in Oklahoma or the U. S. However, the samples

will be described in demographic terms to present the general characteristics of each sample. Therefore, others who may make their own generalization based on the findings in this research will know as much about this study as possible.

CHAPTER VI

ANALYSIS

The process of analysis of data will follow in several stages stated below. This discussion is based on the research model in Figure 1.

First Stage

The first stage of the analysis of data will be examining the experiential effects. An inverse correlation is predicted between DUI experience (X1) and drinking/driving behavior (Y1) as well as between DUI experience (X1) and alcohol consumption (Y2). Stated alternatively, those with more frequent previous experience will be less likely to engage in drunk driving behavior and consume less alcohol.

Second Stage

The second stage will be examining the deterrent effects. There are two aspects of the deterrence will be tested, i. e. perceived punishment and tough opinion. Inverse correlations are predicted between perceived punishment (X2) and drinking/driving (Y1) as well as between perceived punishment (X2) and alcohol consumption (Y2).

Inverse correlations are also expected between tough opinion (X3) and drinking/driving behavior (Y1) as well as between tough opinion (X3) and alcohol consumption. That is, those who perceive more punishment will be less likely to engage in drunk driving behavior and will consume less alcohol. In addition, subjects with tougher opinion held toward police treatment of stopping drunk driving will have less drinking/driving behavior and less alcohol consumption.

Third Stage

Pearson's partial correlation will be used in the third stage in order to check if each bivariate relationship in stage one and stage two holds true after the effects of other variables have been taken out. By excluding the effects of other variables, each bivariate relationship in stage one and stage two will be examined to present the non-contaminated relationship between two variables; for example, the relationship between perceived punishment (X2) and alcohol consumption (Y2) will be examined by controlling for the effects of DUI experience (X1), tough opinion (X3), and drinking/driving behavior (Y1).

The experiential and deterrent effects are predicted to have the same strength of relationship to drinking/driving behavior and alcohol consumption as stated in Hypothesis 1. The verification of Hypothesis 1 is based on the results of this data analysis stage.

Fourth Stage

This will examine Hypothesis 2 to see if the diversity of sample structures will have significantly different impacts on the experiential (X1) and deterrent (X2 and X3) effects on drinking/driving behavior (Y1) as well as on alcohol consumption (Y2). DUI experience (X1) and perceived punishment (X2), and tough opinion (X3) are expected to be inversely correlated with drinking/driving (Y1) and alcohol consumption (Y2) in the adult group. The above inverse correlations are expected to be absent in the student group since students are assumed to lack the diversity desired for tests of the deterrent hypotheses.

Different gender groups will also be separated in each year sample to see if sex has a significant impact on the relationship specified in Hypothesis 1. Adequate computer programs and statistical procedures in those programs will be utilized to sort out subjects with different attributes for the above variables, student versus adult status and sex.

Besides the above, as indicated in Hypothesis 3, the experiential effects and deterrent effects are predicted to be the same across each year. Hypothesis 3, the stability of perception, will be tested partially in this stage of analysis.

Fifth Stage

In addition to comparing the relationship between experiential and deterrent effects for each year, in the fifth stage, the mean scores of the perceived punishment (X2) and tough opinion (X3) will be compared to one another in each year's sample to test the stability of perceptual deterrence. In other words, besides checking significant differences of relationships in each year, the mean score of each variable (X2 and X3) in each year is also used in checking the stability of perceptions and similarity is expected over time. Analysis of variance will be used in this stage to test if significant differences of means have been found across years.

CHAPTER VII

RESEARCH FINDINGS

Formation of Scales

There are two parts of discussion in this section. The first part, recoding and collapsing of items, reports how each item is recoded and transformed into the same number (usually five) of categories. The second part, scale construction, describes processes in which each scale is constructed by combining several items. The decision to combine particular items into scales is based upon (1) the elaboration section in chapter IV, Research Designs and Hypotheses, and (2) the factor loadings for each group of items.

Recoding and Collapsing of Items

Some original items are recoded or collapsed into a smaller number of categories to be consistent with other items. After these processes, most items have the same number of categories (usually five); therefore, manipulating and analyzing in later data processes will be without over-weighting of particular scale items. Any original item that is recoded is identified by an extension name "R" attached behind the original variable name (as in "revised").

Those recoded variables are used for replacing the original items in later stage of the data analysis processes. They are listed below.

JOBR. This item is created by recoding the original JOB data into two categories to identify whether a subject is a student or a non-student (adult). Respondents were asked their present occupation and then collapsed into (1) student; or (2) adult (includes professional, white collar, blue collar, housewife, and retired).

DRIVE10R. DRIVE10R is generated by recoding DRIVE10 in terms of different degree of severity of punishment. Respondents were asked if they are stopped by the police after drinking too much, which one of the following they felt would most likely happen: (1) noting or warning; (2) ticket or fine; (3) counseling program or driver training school; (4) license removed; or (5) jail sentence. The larger the number of the category, the higher the degree of perceived punishment.

The item DRIVE10 had 280 subjects (16%) in the category "Missing" and 13 in the category of "Other." They are combined into the category "Missing" in the revised DRIVE10R.

DRIVE12R. This item is created by recoding item DRIVE12 in terms of perceived severity of punishment. Respondents were asked which penalties for drunk driving

they felt should be used more often or increased: (1) community service; (2) driving school or counseling programs; (3) fines or removal of license; (4) jail after first offense; or (5) jail after second offense. DRIVE12R has five categories, which is consistent with most recoded variables. However, DRIVE12R will not be combined with DRIVE9 and DRIVE10R to form a scale of perceived punishment because its weak factor loading which indicates that it does not fit well with the other two items to form a scale of perceived punishment. This item's literal connotation refers to "what should be" as opposed to "what is" in DRIVE9 and DRIVE10R. This is explained more fully in the next "Scale Construction" section.

OPIN20R. Together with OPIN17 and OPIN18, item OPIN20 is designed to measure the degree of "tough" attitude in terms of what should be used by police for drunk driving. OPIN20R is a "reversed" version of OPIN20 in order to be consistent with OPIN17 or OPIN18. Respondents were asked if they (1) strongly agreed, (2) agreed, (3) were neutral, (4) disagreed, or (5) strongly disagreed that a drunk stopped by the police close to home should be taken there rather than to jail. Higher scores on these items indicate a tougher attitude toward police treatment of drunk driving.

Scale Construction

This section contains two parts. In the first part, factor loadings and alphas for each scale are examined. Factor loadings are utilized mainly for checking the "fitness" of combining variables in each scale, not for searching for primary factors. The alpha values are believed to be a conservative test of reliability for scales combining several items, which means alpha is a minimum reliability index of a scale. A scale with an alpha value larger than 0.80 is considered reliable (Carmines and Zeller, 1979, p.50-51).

Based on the information on factor loadings, the processes of combining variables into scales are explained in the second part. Although there are some slight changes made from the results of factor loadings, most scales are constructed in the same way as discussed in the Elaboration section of Chapter IV.

Factor Loadings and Alphas. Although there is no objective standard in regard to how high a factor loading must be for an item to be included in forming a scale, two general rules are applied in deciding whether items of a group will be combined as a scale: (1) the factor loadings have to exceed 0.30 (Nunnally, 1967, p. 292) and (2) there must be only one major factor for a group of items. Although this is not presented in Table 1, all of the scales have only one major factor.

As shown in Table 1, "the chances of being stopped by police" and "the result of being stopped" have equally high factor loadings, of course, on the first primary factor; 0.80 and 0.80 respectively. Furthermore, there is only one major factor for these two items. This indicates that these two items fit together well to form a scale of perceived punishment. On the other hand an alpha value of 0.41 for the scale of perceived punishment seems to be unreliable since it does not exceed the standard of being reliable, 0.80. However, the alpha value is the average correlation weighted by the number of items forming the scale (Nunnally, 1967, p. 210). Since there are only two items, alpha will be low even though the two items have a 0.80 correlation. This needs to be kept in mind in later stages of analysis because low correlations of one scale, for example perceived punishment, with other scales may be attributable to the low reliability of that scale.

The factor loadings for the tough opinion items, "not arrest enough", "should use road blocks", "should be taken home", and "penalties should be used", show that they fit together well in forming a scale of tough opinion for police treatment of drunk driving because all of those factor loadings are larger than 0.50. An alpha value of 0.60 is better than that of the scale of perceived punishments, but not high enough for the standard of 0.80. It is concluded that this scale is also likely to be unreliable.

Table 1

Factor Loadings, Average Correlations, Alphas On Scales

| Item | Mean | Std Dev | Factor Loading | Alpha |
|-------------------------------------------------|------|---------------------------|----------------|-------|
| | | | | 0.41 |
| | | Perceived Punishment | | |
| 1. Chances of being stopped | 2.78 | 1.08 | 0.80 | |
| 2. Result of being stopped | 2.80 | 1.23 | 0.80 | |
| | | | | 0.60 |
| | | Tough Opinion | | |
| 1. Not arrest enough | 3.74 | 1.16 | 0.75 | |
| 2. Should use road blocks | 2.89 | 1.44 | 0.79 | |
| 3. Should be taken home | 3.43 | 1.44 | 0.61 | |
| 4. Penalties should be used | 3.77 | 1.13 | 0.56 | |
| | | | | 0.81 |
| | | Drinking/Driving Behavior | | |
| 1. How many drinks can handle drive | 2.08 | 0.89 | 0.78 | |
| 2. How often driving after consuming more | 1.49 | 0.69 | 0.85 | |
| 3. How often driving after drinking 2 or 3 more | 1.76 | 0.90 | 0.92 | |

Table 1 (Continued)

| Item | Mean | Std Dev | Factor Loading | Alpha |
|-----------------------------------|------|---------|---------------------|-------|
| | | | Alcohol Consumption | 0.84 |
| 1. How often drink beer | 2.53 | 1.23 | 0.80 | |
| 2. How often drink wine | 1.98 | 0.89 | 0.63 | |
| 3. How often drink liquor | 2.12 | 0.99 | 0.79 | |
| 4. Drinks of beer in one period | 2.39 | 1.26 | 0.76 | |
| 5. Drinks of wine in one period | 1.85 | 0.78 | 0.72 | |
| 6. Drinks of liquor in one period | 2.03 | 0.99 | 0.81 | |

The scale of drinking/driving behavior has higher factor loadings when compared to the above two scales. Also, an alpha value of 0.81 indicates that these three items form a reliable scale. Therefore, "how many drinks can still drive and handle well", "how often consuming more than that amount", and "how often drink 2 or 3 more drinks", together form a good measure of drink/driving behavior.

The factor loadings of the alcohol consumption items ("how often drink beer", "how often drink wine", "how often drink liquor", "drink how much beer", "drink how much wine", and "drink how much liquor") are equally high when forming the scale of amount of alcohol consumption. An alpha value of 0.84 further indicates them to form a reliable scale.

In summary, the scales of drink/driving behavior and alcohol consumption are better measurements as they are more reliable and also "fit together" better. On the other hand, the scales of perceived punishment and tough opinion are less satisfactory measurements because they are likely to be unreliable and need to include more relevant items in forming the scales.

Scale of Perceived Punishment. The items "chances of being stopped" and "result of being stopped" are combined together and the average of them makes up the scale of perceived punishment. The item "penalties should be used" is excluded from forming the scale because of its weak factor loading and because the wording of this item detracts from the concept of perceived punishment. The item

"penalties should be used" asks about what should be, which is different from the connotation in the other two items of this scale, "chances of being stopped" and "result of being stopped", which refer to "what is". Higher scores on this scale indicate higher degree of perceived punishment.

Scale of Tough Opinion. A scale of tough opinion is created by the mean of the sum of items "not arrest enough", "should use road blocks", "should be taken home", and "penalties should be used". The item about what penalties should be used was designed for measuring perceived punishment, but its wording and connotation are closer to the measurement of tough opinion; therefore, it is combined here with "not arrest enough", "should use road blocks", and "should be taken home" to construct the scale of tough opinion. Higher scores in this scale indicate a tougher opinion toward police treatment of drunk driving.

Scale of Drinking/Driving Behavior. The same process described above is utilized to create a scale of drinking/driving behavior by the mean of the sum of items "how many drinks can drive and handle well", "how often consuming more than that amount", and "how often drink 2 or 3 more drinks". Higher scores on the scale stand for more serious and more frequent drinking/driving behavior.

Scale of Alcohol Consumption. Items "how often drink beer", "how often drink wine", "how often drink liquor", "drink how much beer", "drink how much wine", and "drink how

much liquor" are combined together and their average is the scale of alcohol consumption. A higher score on his scale indicates more alcohol consumption.

Basic Features Of The Four-Year Data Set

Sample characteristics are presented in this section by describing subjects' demographic features and frequencies of independent and dependent variables.

Subjects' Features

On the gender variable in Table 2, there are almost equal numbers of male and female subjects in the four-year data set (males=880, 50.3%; female=870 49.7%). On the frequency of Job, almost 40% of subjects are students and 60% are adults. These two basic features of the data set provide a balanced base for comparing males with females as well as students with adults in later stages of the analysis. Frequencies of the year variable indicate that subjects in each year have about the same percentage of total subjects in the total four-year data; 24.7% for 1985, 28.5% for 1986, 24.9% for 1987, and 21.9% for 1988. However, in 1986, there were 500 subjects in the survey which constitutes the highest percent (28.5) of the total population.

Table 2

Sample Characteristics

| Variable | Frequency | Percent |
|----------------------------|-----------|---------|
| <hr/> | | |
| Sex: | | |
| Male | 880 | 50.3 |
| Female | 870 | 49.7 |
| *Missing = 7 | | |
| Job: | | |
| Student | 697 | 39.7 |
| Adult | 1060 | 60.3 |
| Year: | | |
| 1985 | 434 | 24.7 |
| 1986 | 500 | 28.5 |
| 1987 | 438 | 24.9 |
| 1988 | 385 | 21.9 |
| Marital Status: | | |
| Never | 759 | 43.4 |
| Married | 828 | 47.4 |
| Other | 161 | 9.2 |
| *Missing = 9 | | |
| Income: | | |
| Less than \$10,000 | 359 | 21.1 |
| \$10,000-\$30,000 | 600 | 35.3 |
| \$30,000-\$50,000 | 449 | 26.4 |
| Over \$50,000 | 293 | 17.2 |
| *Missing = 56 | | |
| Residence: | | |
| Stillwater | 1279 | 77.0 |
| Town other than Stillwater | 215 | 12.9 |
| Rural Area | 168 | 10.1 |
| *Missing = 95 | | |
| School: | | |
| Less than high school | 54 | 3.2 |
| High school graduate | 211 | 12.3 |
| Some college | 762 | 44.5 |
| College graduate | 371 | 21.6 |
| Higher college degree | 361 | 18.4 |
| *Missing = 43 | | |

Table 2 (Continued)

| Variable | Frequency | Percent |
|-----------------|-----------|---------|
| DUI experience: | | |
| Not arrested | 1503 | 96.7 |
| Arrested | 51 | 3.3 |

Items of Perceived Punishment

| | | |
|----------------------------|-----|------|
| Chances of being stopped: | | |
| Very low | 188 | 12.9 |
| Low | 373 | 25.6 |
| About even (50-50) | 580 | 39.9 |
| High | 206 | 14.2 |
| Very high | 108 | 7.4 |
| Result of being stopped: | | |
| Nothing or warning | 175 | 12.0 |
| Ticket or fine | 585 | 40.0 |
| Counseling/driving program | 243 | 16.6 |
| License removed | 280 | 19.1 |
| Jail sentence | 181 | 12.4 |

Items of Tough Opinion

| | | |
|-------------------------|-----|------|
| Not arrest enough: | | |
| Strongly disagree | 96 | 5.6 |
| Disagree | 122 | 7.1 |
| Neutral | 500 | 29.2 |
| Agree | 418 | 24.4 |
| Strongly agree | 578 | 33.7 |
| Should use road blocks: | | |
| Strongly disagree | 431 | 25.2 |
| Disagree | 256 | 15.0 |
| Neutral | 420 | 24.6 |
| Agree | 275 | 16.1 |
| Strongly agree | 327 | 19.1 |

Table 2 (Continued)

| Variable | Frequency | Percent |
|-----------------------------|-----------|---------|
| Should be taken Home: | | |
| Strongly agree | 253 | 14.9 |
| Agree | 217 | 12.8 |
| Neutral | 334 | 19.7 |
| Disagree | 328 | 19.3 |
| Strongly disagree | 564 | 33.3 |
| Penalties should be used: | | |
| Community Service | 46 | 3.0 |
| Counseling/driving program | 141 | 9.3 |
| Fines or removal of license | 480 | 31.5 |
| Jail after first offense | 302 | 19.8 |
| Jail after second offense | 555 | 36.4 |

Items of Drinking/Driving Behavior

| | | |
|-----------------------------------------------|-----|------|
| How many drinks can handle drive: | | |
| None | 404 | 25.9 |
| 1-2 drinks | 756 | 48.6 |
| 3-4 drinks | 292 | 18.8 |
| 5-6 drinks | 78 | 5.0 |
| Over 6 drinks | 27 | 1.7 |
| How often driving after consuming more: | | |
| Never | 946 | 60.4 |
| A few times | 501 | 32.0 |
| Once or twice a month | 92 | 5.9 |
| Once or twice a week | 27 | 1.7 |
| Nearly every day | 1 | 0.1 |
| How often driving after drinking 2 or 3 more: | | |
| Never | 737 | 48.4 |
| A few times a year | 511 | 33.5 |
| 1-2 times a month | 196 | 12.9 |
| 1-2 times a week | 66 | 4.3 |
| Nearly every day | 14 | 0.9 |

Table 2 (Continued)

| Variable | Frequency | Percent |
|---------------------------------|-----------|---------|
| Items of Alcohol Consumption | | |
| How often drink Beer: | | |
| Never | 450 | 29.2 |
| A few times a year | 324 | 21.0 |
| 1-2 times a month | 313 | 20.3 |
| 1-2 times a week | 419 | 27.2 |
| 1-2 times a day | 37 | 2.4 |
| How often drink Wine: | | |
| Never | 487 | 33.0 |
| A few times a year | 637 | 43.2 |
| 1-2 times a month | 257 | 17.4 |
| 1-2 times a week | 85 | 5.8 |
| 1-2 times a day | 8 | 0.5 |
| How often drink Liquor: | | |
| Never | 477 | 32.0 |
| A few times a year | 519 | 34.8 |
| 1-2 times a month | 342 | 22.9 |
| 1-2 times a week | 144 | 9.7 |
| 1-2 times a day | 9 | 0.6 |
| Drinks of beer in one period: | | |
| None | 415 | 27.9 |
| 1-2 drinks | 524 | 35.2 |
| 3-4 drinks | 252 | 16.9 |
| 5-6 drinks | 147 | 9.9 |
| Over 6 drinks | 149 | 10.0 |
| Drinks of wine in one period: | | |
| None | 464 | 32.9 |
| 1-2 drinks | 755 | 53.5 |
| 3-4 drinks | 144 | 10.2 |
| 5-6 drinks | 27 | 1.9 |
| Over 6 drinks | 20 | 1.4 |
| Drinks of liquor in one period: | | |
| None | 450 | 31.9 |
| 1-2 drinks | 656 | 45.8 |
| 3-4 drinks | 203 | 14.2 |
| 5-6 drinks | 75 | 5.2 |
| Over 6 drinks | 49 | 3.4 |

Note: Missing values are excluded from counting percentage.

Other basic background information about subjects are also provided in Table 2, although they are not used in later stages of analysis. For example, marital status shows 43.4% subjects in the data set were never married, 47.4% were married, and 9.2% were in some other status of marriage. On the income variable there are 35.3% of the subjects who reported having incomes of \$10,000-\$30,000. The second largest income group is the category of \$30,000-50,000. In addition, most of the subjects were from Stillwater (70% of the total population of 1662 subjects in the four year data). Also, 44.5% of the subjects were college students, and 21.6% reported they were college graduates.

In summary, it is found that half of the subjects were college students at Oklahoma State University and were living in Stillwater. Most of them were married, and about 40% of them were students.

Frequencies of Independent and Dependent Variables

In Table 2 the variable DUI experience shows that over the four-year period only a total of 51 subjects were arrested for drunk driving. This small portion of 3.3% subjects with previous experiences of being caught creates difficulties when compared with other subjects without such experiences in analyzing the experiential and deterrent effects on drunk driving and alcohol consumption. In other

words, there are not enough subjects with such experiences for believable comparisons with others. Therefore, it will be difficult to conclude whether the experiential effects or the deterrent effects are stronger in predicting the prevention of drunk driving.

On the item "chances of being stopped", most subjects reported that there were only low chances to get caught by the police if driving under the influence of alcohol. About 40% of the subjects reported that the chance is "about even," and about 38% of the subjects believed that chances for being caught were "low", or "very low." This finding indicates that most subjects perceive it is not very likely to be stopped by the police if they drive drunk.

On the other hand, the frequencies of the item "result of being stopped" show that 40% of the subjects reported that the most likely thing to happen to them if they get stopped is to get a "ticket or fine." In contrast, 31% of the subjects believed more serious penalties like "license removed", or "jail sentence" will happen to them. Overall, subjects tend to believe less serious punishments will happen if they drive drunk.

The notion of "perceived punishment," derived from the deterrence doctrine, states that people do not commit criminal behavior because of the fear of being punished. Since it is perceived that there are only slight chances to be stopped and only a non-serious punishment will happen, drunk driving may not be deterred.

Four items "not arrest enough", "should use road blocks", "should be taken home", and "penalties should be used" are referenced to the measurement of tough opinion. The frequencies of "not arrest enough" show that about half of the subjects (57%) "agree" or "strongly agree" that police do not arrest enough drunk drivers. This implies that this sample believes police should arrest more drunk drivers than they do. For the item "should use road blocks," 40% of the subjects "strongly disagree" or "disagree" that police should set up road blocks to catch drunk drivers, while 35% of them "strongly agree" or "agree" that they should do so. However, on the item, "should be taken home", 54% of the subjects "disagree" or "strongly disagree" that the police should take a drunk driver home if it is close to the offensive scene rather than to jail. On the item, "penalties should be used," 55% of the subjects believe "jail after first offense" or "jail after second offense" should be used to stop drunk driving, while 12% of the subjects believe "community service" or "counselling or driving training program" should be used to punish drunk driving.

A combination of the above findings reveals that, generally speaking, most subjects believe their chances of being stopped by the police for drunk driving tend to be low or very low; furthermore, they believe only minor punishment would happen if they were stopped. In other words, both certainty and severity of perceived punishment for drunk

seemingly is not strong in this sample. On the other hand, their opinion on police treatment of drunk driving indicates that most subjects tend to agree or strongly agree that more severe or serious punishments should be used to stop drunk driving.

The item concerning how many drinks one can have and still drive well, how often they consume more than that many drinks, and how often they drive after drinking 2 or 3 drinks make up the drinking/driving behavior scale. About 48% of the subjects reported that they can handle themselves and drive well after "1-2 drinks." And about 25% of the subjects report they can handle themselves and drive well after 3 to 6 or more drinks. In short, most subjects believe they cannot handle themselves and drive well if they take too many drinks (that is, more than 3). On a sequential question, "how often during the past year have you driven after consuming more than the above amount?", 60% of the subjects reported they never did. About 40% reported that they did consume more alcohol than they think they could and still drive well. In other words, about 40% of the subjects were potential offenders of drunk driving in the past year. It is possible that in the past year they took the chance of not being caught after consuming more alcohol than they thought they could still drive well. For the item asking "how often they drive after drinking 2 or 3 more", 48% of the subjects reported they never did, but 52%

of them reported that they did commit such behavior in a variety of different ways.

In summary, this measurement tests the likelihood or potential of a subject to commit drunk driving. It is estimated from the findings that in general about 40% of the survey population were potential offenders of drunk driving because about 50% (48.6%) of the subjects reported they can only handle themselves and drive well after 1-2 drinks and about 40% (39.6%) of the total population reported consuming more than that amount in the past year when driving. Also about 50% (48.4%) of the subjects did drive after at least 2 or 3 drinks.

In measuring alcohol consumption, it is indicated in Table 2 that beer is more often consumed than either wine or liquor. This finding is consistent with a research on college student alcohol consumption pattern (Hughes & Dodder, 1984). In each category of frequency of alcohol consumption, about 20% of the total subjects reported that they consumed beer ("how often drink beer"), while 43% of the subjects reported that they only consumed wine "a few times a year" ("how often drink wine"). On the other hand, 27% of the subjects reported that they consume beer "1-2 times a week" ("how often drink beer"), while only 9.7% of the subjects reported that they consume liquor "1-2 times a week" ("how often drink liquor"). On sequential questions about "how many drinks in one drinking period?", about the same frequencies are found for beer, wine, and liquor. Most

subjects reported that they had 1-2 drinks whether they were drinking beer, wine, or liquor. About 35% of the subjects reported that they had 1-2 drinks if drinking beer, 53% reported having this same amount of drinking wine, and 45% reported the same amount of drinking liquor.

Relationships between Independent and Dependent Variables

Zero-order correlations between the independent variables are examined first. Partial correlations between the independent and dependent variables are then discussed in a following section.

Zero-Order Correlations Between Independent and Dependent Variables

In this section, the zero-order correlations between the independent and dependent variables are examined. Here, all four years of data are used as a unit. The first and second stages of the analysis section specified in the previous chapter will be discussed in this section.

Table 3 presents the zero-order Pearson correlation coefficients between DUI experience, perceived punishment, tough opinion, drinking/driving behavior, and alcohol consumption. All of these correlations are significant at the .01 level.

The Experiential Effects. The correlation between DUI

Table 3

Correlations and Partial Correlations Between DUI Experience, Perceived Punishment, Tough Opinion, Drive/Driving Behavior, And Alcohol Consumption (N=1757)

| Measures | 1. | 2. | 3. | 4. | 5. | |
|-------------------------------|----|------|-------|------------------|------------------|---|
| 1. DUI Experience | -- | .10* | -.12* | .12* (.07*) | .07* (-.02) | a |
| 2. Perceived Punishment | | -- | -.15* | 0.10* (-.01) | .12* (-.06*) | b |
| 3. Tough Opinion | | | -- | -.44* (-.23*) | -.41* (-.16*) | |
| 4. Drinking /Driving Behavior | | | | -- | .69* | |
| 5. Alcohol Consumption | | | | | -- | |

* Probability <.01

Note. Partial correlations are in the parentheses.

^a the experiential effects

^b the deterrent effects

experience and drinking/driving behavior is a positive association of .12 meaning that those with DUI experience are more likely to engage in drinking/driving behavior. This finding is contradictory to what was found in Shapiro and Votey's study (1984) in which an arrest experience reduces the probability that a person drives under the influence of alcohol. The correlation between DUI experience and alcohol consumption is also a positive association of .07. In other words, those with DUI experience are likely to consume more alcohol. These two correlations are referred to as the experiential effects and are extremely weak.

The Deterrent Effects. There are two dimensions of the deterrent effects that need to be discussed, i. e. perceived punishment and moral commitment. The correlation between perceived punishment and drinking/driving behavior is .10, which means that the higher degree of perceived punishment, the more likely drinking/driving behavior will occur. The correlation between perceived punishment and alcohol consumption is .12; i. e. the higher degree of perceived punishment, the higher degree of alcohol consumption. Both correlations are positive and similar in strength of. These two correlations are referred as the perceived punishment dimension of the deterrent effects and although still very weak, are stronger than the two correlations for experiential effects.

The moral commitment dimension of the deterrent effects

is represented by the tough opinion scale. The correlation between tough opinion toward police treatment of drunk driving and drinking/driving behavior is $-.44$ meaning that the tougher the opinion, the less likely drinking/driving behavior is to occur. The correlation between tough opinion and alcohol consumption is $-.41$. This correlation suggests that the tougher the opinion, the less amount of alcohol consumed. These two correlations are both significant and much stronger. These four correlations as mentioned above represent two dimensions of the deterrent effects.

The Remaining Correlations. The last three correlations in Table 3 are not direct tests of deterrence versus experiential effects so are just briefly reported. The correlation between DUI experience and perceived punishment is $.10$, which means that those with higher degree of DUI experience have a higher degree of perceived punishment. The correlation between DUI experience and tough opinion is a negative $-.12$ meaning that those with DUI experience have less tough opinion. The correlation between perceived punishment and tough opinion is a negative $-.15$. In other words, the higher degree of perceived punishment, the less tough is the opinion. The correlation between drinking/driving behavior and alcohol consumption is a strong positive association of 0.69 . This suggests that the higher degree of drinking/driving behavior, the higher degree of alcohol consumption, which is consistent with Norstrom's (1983) research.

Partial Correlations for Independent and Dependent Variables

In the above section only zero-order correlations are examined, but this section now examines the partial correlations between each independent and dependent variable by controlling for the other variables remaining in the model. This is the third stage in the analysis section and the following discussions are based upon the information in the Table 3.

The Experiential Effects. The experiential effects, which is identified as Hypothesis 1a, are tested by the relationships between DUI experience and drinking/driving behavior as well as between DUI experience and alcohol consumption. The partial correlation between DUI experience and drinking/driving behavior is a positive .07 (significant at .01), meaning that in taking the four years data as a unit, those with DUI experience score higher on degree of drinking/driving behavior, after the effects of perceived punishment, tough opinion, and alcohol consumption have been taken out. Although the correlation is statistically significant, it is extremely weak. The partial correlation between DUI experience and alcohol consumption is a non-significant $-.02$, which suggests that those with DUI experience consume less alcohol. However, this correlation is negligible and not significant.

The Deterrent Effects. Hypothesis 1b, concerning the deterrent effects, examines the relationships between perceived punishment and drink/driving behavior, between perceived punishment and alcohol consumption, between tough opinion and drinking/driving behavior, as well as between tough opinion and alcohol consumption. The partial correlation between perceived punishment and drink/driving behavior is $-.01$ meaning that the higher degree of perceived punishment, the lower degree of drinking/driving behavior after the effects of DUI experience, tough opinion, and alcohol consumption have been taken out. However, this correlation is not significant. The partial correlation between perceived punishment and alcohol consumption is a positive significant coefficient of $.06$ after the effects of the other three variables are taken out, meaning that the higher degree of perceived punishment, the higher degree of alcohol consumption.

The partial correlation between tough opinion and drinking/driving behavior is a significantly negative association of $-.23$, which means the higher degree of tough opinion, the lower degree of drinking/driving behavior after the effects of DUI experience, perceived punishment, and alcohol consumption have been taken out. The partial correlation between tough opinion and alcohol consumption is also a negative $-.16$ and significant at the $.01$ level, meaning that the higher degree of tough opinion, the lower degree of alcohol consumption after removing the effects of

DUI experience, perceived punishment, and drinking/driving behavior.

In summary, concerning the experiential effects, there is one significant positive partial correlation between DUI experience and drinking/driving behavior ($r=.07$). In regard to the deterrent effects, there are three significant correlations between perceived punishment and alcohol consumption ($r=.06$), between tough opinion and drinking/driving behavior ($r=-.23$), as well as between tough opinion and alcohol consumption ($r=-.16$).

Generally speaking, the above findings are consistent with the previous section of zero-order correlations but with weaker correlations due to taking out the effects of other variables. The following section is going to examine the same partial correlations but sorted for each sex, year, and job (student versus adult) in the four-year data set.

Partial Correlations for Independent and Dependent Variables, Sorted By Sex

This section examines the partial correlations sorted by sex. As stated in Hypothesis 2, male subjects and female subjects should not have differences in the correlations between experiential effects and deterrent effects with words, subjects in each year have a similar average response on perceived drinking/driving behavior, as well as with alcohol consumption.

As presented in Table 4, the partial correlation between DUI experience and drinking/driving behavior is .06 among male subjects and .04 among females after the effects of perceived punishment, tough opinion, and alcohol consumption have been taken out, which means that for both male and female subjects, those with DUI experience are more likely to engage in drinking/driving behavior. Neither coefficients, however, are significant, but the direction of each correlation is the same and the strength of correlation is about the same. For DUI experience and alcohol consumption, the partial correlation is $-.03$ for male subjects and $.01$ for female subjects meaning that for male subjects, having a DUI experience is associated with less alcohol consumption, but the opposite is found for female subjects. But these two coefficients are not significant and the strength is essentially zero. The correlation between perceived punishment and drinking/driving behavior is $-.02$ for male subjects and $.02$ for female subjects. Again, they are both non-significant weak correlations, but with different directions of correlation. The correlation between perceived punishment and alcohol consumption is $.07$ among male subjects and $.04$ among female subjects. Both correlations are not significant, very weak in strength, but do have the same direction of correlation.

The remaining correlations are significant for both sexes. A significant negative correlation of $-.24$ appears between tough opinion and drinking/driving behavior among

Table 4

Partial Correlation Between Independent and Dependent Variables, Sorted by Sex

| Relationships | Partial Correlations | |
|-----------------------------------------------------------------|----------------------|---------|
| | Males | Females |
| DUI experience * (X1) Drinking/Driving Behavior (Y1) | 0.06 | 0.04 |
| DUI experience * (X1) Alcohol Consumption (Y2) | -0.03 | 0.01 |
| Perceived Punishment (X2) * Drinking/Driving Behavior (Y1) | -0.02 | 0.02 |
| Perceived Punishment (X2) * Alcohol Consumption (Y2) | 0.07 | 0.04 |
| Tough Opinion (X3) * Drinking/Driving Behavior (Y1) | -0.24* | -0.22* |
| Tough Opinion (X3) * Alcohol Consumption (Y2) | -0.18* | -0.14* |

* Probability < 0.01

male subjects and of $-.22$ for females. In other words, for male subjects, the higher degree of tough opinion, the lower degree of drinking/driving behavior. For the correlation between tough opinion and alcohol consumption among male subjects, there is a significant negative association of $-.18$. For female subjects, the correlation between tough opinion and alcohol consumption is a weaker -0.14 .

In summary, both genders show similar patterns of correlations between independent and dependent variables. For the six pairs of correlations in Table 4, the first four are not significant and weak in strength of correlation for both sexes. Only the correlations between tough opinion and drinking/driving behavior, as well as tough opinion and alcohol consumption are significant for both male and female subjects. Furthermore, for both male and female subjects, these last two pairs of correlations are all negative and very similar in strength. Stated more precisely, for both genders, subjects with higher degree of tough opinion are less likely to engage in drinking/driving behavior and tend to consume less alcohol than those subjects with a lower degree of tough opinion.

Partial Correlation Between Independent and Dependent Variables, Sorted by Job

As shown in Table 5, the partial correlation between DUI experience and drinking/driving behavior is a non-significant $.03$ for student subjects but a significant $.11$

Table 5

Partial Correlation Between Independent and Dependent Variables, Sorted by Job (Student verses. Adult)

| Relationships | Partial Correlations | |
|-----------------------------------------------------------------|----------------------|--------|
| | Students | Adults |
| DUI experience * (X1) Drinking/Driving Behavior (Y1) | 0.03 | 0.11* |
| DUI experience * (X1) Alcohol Consumption (Y2) | 0.02 | -0.08* |
| Perceived Punishment * (X2) Drinking/Driving Behavior (Y1) | -0.02 | -0.00 |
| Perceived Punishment * (X2) Alcohol Consumption (Y2) | 0.06 | 0.05 |
| Tough Opinion (X3) * Drinking/Driving Behavior (Y1) | -0.16* | -0.28* |
| Tough Opinion (X3) * Alcohol Consumption (Y2) | -0.24* | -0.10* |

* Probability < 0.01

for adult subjects after the effects of perceived punishment, tough opinion, and alcohol consumption have been removed. In other words, for student subjects, those who with a DUI experience are more likely to engage in drinking/driving behavior. However, this relationship is weak and not significant. On the other hand for adult subjects, this same relationship is strong enough to be significant ($r=.11$). Therefore, for both student and adult subjects, the DUI experience is associated with more drinking/driving behavior, but adult subjects show a much stronger and significant association between the two variables.

The partial correlation between DUI experience and alcohol consumption is a non-significant .02 for student subjects and a significant $-.08$ for adult subjects. In other words for student subjects, having a DUI experience is related to more alcohol consumption, although the association is not significant. However, for adult subjects, having a DUI experience is significantly related to less alcohol consumption.

The partial correlation between perceived punishment and drinking/driving behavior is $-.02$ for student subjects and .00 for adult subjects. Both correlations are weak and not significant but for students the direction is negative meaning that for students, the higher degree of perceived punishment, the lower the degree of drinking/driving behavior.

The partial correlation between perceived punishment and alcohol consumption is .06 among student subjects and .05 among adult subjects. That is to say, for both student and adult subjects, the higher degree of perceived punishment, the higher degree of alcohol consumption. However, both correlations are weak and not significant.

The partial correlation between tough opinion and drinking/driving behavior is a significant $-.16$ for student subjects and $-.28$ for adult subjects. Both coefficients are negative and mean that the higher the degree of tough opinion, the less likely drinking/driving behavior is to occur. The two correlations are in the same direction (both are negative), and both are significant. However, for adult subjects, the negative correlation between tough opinion and drinking/driving behavior is stronger ($-.28$) than for student subjects ($-.16$).

Concerning the partial correlation between tough opinion and alcohol consumption for student subjects, there is a significant, negative $-.24$ and a significant $-.10$ for adults. Thus, the higher the degree of tough opinion, the lower the degree of alcohol consumption. However, student subjects show a stronger negative correlation between the two variables ($-.24$) compared to that of adult subjects ($-.10$).

Partial Correlations for Independent and
Dependent Variables, Sorted By Year

The same partial correlations mentioned in the above sections will now be examined separately for each year. As shown in Table 6, the partial correlation between DUI experience and drinking/driving behavior is .10 for 1985, .09 for 1986, .00 for 1987, and .01 for 1988 after controlling for the effects of perceived punishment, tough opinion, and alcohol consumption. This finding means for each year, the more DUI experience, the more likely drinking/driving behavior will occur except for 1987 where there is no correlation between DUI experience and drinking/driving behavior. However, none of these four correlations are significant.

The partial correlation between DUI experience and alcohol consumption is -0.03 for 1985 and -0.04 for 1986 meaning that for both years, the more DUI experience, the less alcohol consumption. However, the correlation between the two variables is .04 for 1987 and .06 for 1988, which means that for these two years, the more DUI experience, the more alcohol consumption. Nevertheless, these four correlations are all insignificant and extremely weak.

The partial correlation for perceived punishment and drinking/driving behavior is -.01 for 1985, -.03 for 1986, and -.03 for 1988. For these three years, the higher degree of perceived punishment, the lower degree of drinking/driving behavior. For 1987, the correlation

between the two variables is .03 meaning that the higher degree of perceived punishment, the higher degree of drinking/driving behavior. Again, these four correlations are not significant and extremely similar in strength.

The partial correlation between perceived punishment and alcohol consumption is .04 for 1985, .07 for 1986, .03 for 1987, and .07 for 1988. This means that for all four years, the higher degree of perceived punishment, the higher degree of alcohol consumption. However, all four correlations are insignificant and extremely weak in strength.

For tough opinion and drinking/driving behavior the partial correlation is $-.23$ for 1985, which means that in 1985, the higher degree of tough opinion, the less likely drinking/driving behavior will occur. In 1988, the correlation between the two variables is a similar $-.28$. In 1986, the correlation is a weaker $-.10$ and in 1987, the correlation is a stronger $-.32$. These four correlations are all significant and have the same direction (negative) of correlation but do vary greatly in strength.

The strongest negative correlation between tough opinion and alcohol consumption among the four years is $-.23$ in 1986. This indicates that in 1986 the higher degree of tough opinion, the lower degree of alcohol consumption. Weaker correlations are $-.18$ in 1985, $-.12$ in 1988, and the weakest is $-.08$ in 1987. In general, for each of the four years, the higher degree of tough opinion, the lower degree

of alcohol consumption but the strength of relationships varies; the one for 1987, however, is not significant.

In summary, for the first four pairs of correlations between DUI experience and drinking/driving behavior, between DUI experience and alcohol consumption, between perceived punishment and drinking/driving behavior, as well as between perceived punishment and alcohol consumption, there is no significant correlations across years. Significant partial correlations appear between tough opinion and drinking/driving behavior as well as between tough opinion and alcohol consumption for each of the four years except one correlation between tough opinion and alcohol consumption for 1987.

Mean Scores and Analysis of Variance

As stated in the fifth stage of analysis, means and analysis of variance are used to test the stability of perception of punishments over time. The first section examines mean scores and the second section discusses analysis of variance.

Mean Scores and Analysis of Variance For Scales by Years, Sexes, and Job.

While the previous sections examines the correlations and partial correlations between the independent and dependent variables, this section examines means for each scale and analysis of variance for each scale first by year,

then by sex, and then by job. The following discussions are based upon the information provided in Table 7.

Difference between years. As shown in Table 7, there are some insignificant differences in the means across years. For instance, the F-Ratio of .43 ($P=.73$) shows that the mean scores of perceived punishment for four years are not significantly different at the .01 level. In other words, subjects in each year have a similar average response on perceived punishment. A similar finding appears for drinking/driving behavior. The F-Ratio of 1.76 ($P=.15$) means that subjects in each year report similar likelihoods of drinking/driving behavior.

There are significant differences, however, on the mean scores for DUI experience, tough opinion and alcohol consumption across each year. The F-Ratio of 8.47 ($P=.01$) means that the mean scores of DUI experience for four different years are significantly different from each other with the highest mean for DUI experience appearing in 1985 (mean=1.06) and the lowest mean appearing in 1987 and 1988 (mean=1.01). The F-Ratio of 3.51 ($P=.01$) for tough opinion means the mean scores for tough opinion for four years are significantly different from each other. In 1988, subjects have the highest mean on this variable (mean=3.55), while in 1987 subjects show the lowest mean (mean=3.36). A similar finding appears in alcohol consumption. The F-Ratio of 3.75 ($P=.01$) for alcohol consumption means that the average alcohol consumption is significantly different across each

Table 7

Means and F-Ratios For Independent and Dependent Variable
Across Years, Jobs, and Sexes

| | N | Mean | Std Dev | F-Ratio | Pr of F |
|----------------|-----|------|---------|---------|-----------|
| DUI Experience | | | | | |
| Year | | | | | |
| 1985 | 398 | 1.06 | 0.25 | | |
| 1986 | 436 | 1.04 | 0.20 | | |
| 1987 | 384 | 1.01 | 0.09 | | |
| 1988 | 336 | 1.01 | 0.11 | 8.47 | 0.01 |
| Job | | | | | |
| Student | 625 | 1.04 | 0.21 | | |
| Adult | 929 | 1.02 | 0.16 | 4.74 | 0.03 (NS) |
| Sex | | | | | |
| Male | 778 | 1.05 | 0.22 | | |
| Female | 774 | 1.01 | 0.11 | 19.54 | 0.01 |

| Perceived Punishment | | | | | |
|----------------------|-----|------|------|------|-----------|
| Year | | | | | |
| 1985 | 386 | 2.75 | 0.89 | | |
| 1986 | 422 | 2.80 | 1.02 | | |
| 1987 | 378 | 2.72 | 0.92 | | |
| 1988 | 329 | 2.78 | 1.05 | 0.43 | 0.73 (NS) |
| Job | | | | | |
| Student | 625 | 2.86 | 0.95 | | |
| Adult | 890 | 2.72 | 0.93 | 7.71 | 0.01 |
| Sex | | | | | |
| Male | 768 | 2.77 | 0.94 | | |
| Female | 747 | 2.79 | 0.94 | 0.24 | 0.63 (NS) |

Table 7 (continued)

| | N | Mean | Std Dev | F-Ratio | Pr of F |
|---------------------------|------|------|---------|---------|-----------|
| Tough Opinion | | | | | |
| Year | | | | | |
| 1985 | 431 | 3.47 | 0.88 | | |
| 1986 | 495 | 3.39 | 0.88 | | |
| 1987 | 430 | 3.36 | 0.90 | | |
| 1988 | 366 | 3.55 | 0.96 | 3.51 | 0.01 |
| Job | | | | | |
| Student | 689 | 3.31 | 0.88 | | |
| Adult | 1033 | 3.52 | 0.91 | 24.17 | 0.01 |
| Sex | | | | | |
| Male | 862 | 3.35 | 0.95 | | |
| Female | 854 | 3.53 | 0.84 | 16.75 | 0.01 |
| Drinking/Driving Behavior | | | | | |
| Year | | | | | |
| 1985 | 403 | 1.75 | 0.68 | | |
| 1986 | 447 | 1.82 | 0.73 | | |
| 1987 | 389 | 1.80 | 0.72 | | |
| 1988 | 342 | 1.71 | 0.70 | 1.76 | 0.15 (NS) |
| Job | | | | | |
| Student | 636 | 1.93 | 0.75 | | |
| Adult | 945 | 1.67 | 0.66 | 53.08 | 0.01 |
| Sex | | | | | |
| Male | 787 | 1.94 | 0.75 | | |
| Female | 792 | 1.60 | 0.62 | 96.10 | 0.01 |

Table 7 (continued)

| | N | Mean | Std Dev | F-Ratio | Pr of F |
|---------------------|-----|------|---------|---------|---------|
| Alcohol Consumption | | | | | |
| Year | | | | | |
| 1985 | 408 | 2.07 | 0.77 | | |
| 1986 | 455 | 2.22 | 0.83 | | |
| 1987 | 395 | 2.25 | 0.83 | | |
| 1988 | 344 | 2.18 | 0.83 | 3.75 | 0.01 |
| Job | | | | | |
| Student | 640 | 2.41 | 0.83 | | |
| Adult | 962 | 2.03 | 0.77 | 87.25 | 0.01 |
| Sex | | | | | |
| Male | 798 | 2.32 | 0.82 | | |
| Female | 802 | 2.04 | 0.79 | 50.11 | 0.01 |

Note. NS = Not Significant

year with the highest in 1987 (mean=2.25) and the lowest in 1985 (mean=2.07).

Differences between Job. The F-Ratio of 4.74 ($P=.03$) indicates that the means of DUI experience are not significantly different between student subjects and adult subjects at .01 significance level. However, student subjects have a higher mean (mean=1.04) than adult subjects (mean=1.02), which means on the average, student subjects have more DUI experience than adult subjects. Although this finding is not significant at .01 level, it is consistent with Vingilis & Chung's (1982) study in which young drivers had higher proportion of being requested for screening drunk driving.

The F-Ratio of 7.71 ($P=.01$) for perceived punishment as classified by job means that students are significantly different from adult subjects. The mean for students is 2.86 which is higher than the adults' mean of 2.72. indicating that student subjects have a higher degree of perceived punishment. The F-Ratio of 24.17 ($P=.01$) for scores of tough opinion is also significantly different between student and adult subjects with adults having a higher mean than students (3.52 to 3.31). That is, adult subjects have a tougher opinion.

A similar finding follows for drinking/driving behavior. The F-Ratio of 53.08 shows that the mean scores of drinking/driving behavior are significantly different between the two groups. On the average, student subjects

have a higher mean (1.93) than adults (1.67), meaning that students engage in more drinking/driving behavior than adults. For alcohol consumption, the F-Ratio of 87.25 ($P=.01$) is further consistent with the previous three F-Ratios suggesting that the mean scores of alcohol consumption are significantly different between student and adult subjects. Students have a higher average consumption (2.41) than adults (2.03). Note that for student subjects vs. adult subjects, there are consistent significant differences on all mean scores of DUI experience, perceived punishment, tough opinion, drinking/driving behavior, as well as alcohol consumption.

Differences between Sexes. On the DUI experience, male subjects have a higher mean (1.05) than female subjects (1.01). The F-Ratio of 19.54 ($P=.01$) indicates that this difference is statistically significant, indicating that males have more DUI experience than females. Further, the F-Ratio of 16.75 ($P=.01$) shows that the mean scores of tough opinion are significantly different between male subjects and female subjects. Females have an average of 3.53 which is higher than males' 3.35. This indicates that, on the average, females have a tougher opinion than males on police treatment of drunk driving.

Two other significant differences of means are found for drinking/driving behavior and alcohol consumption. The F-Ratio of 96.10 ($P=.01$) for drinking/driving behavior suggests significant differences between the two gender

groups. Males have a mean of 1.94 on drinking/driving behavior while females have a lower 1.60. This means that males engage in more drinking/driving behavior than females. In addition, the F-Ratio of 50.11 ($P=.01$) shows that the mean scores of alcohol consumption are significantly different between male and female subjects with males having a higher mean than females (2.32 to 2.04).

The F-Ratio of 0.24 ($P=.63$), however, in Table 7 shows that the mean scores on perceived punishment are not significantly different among the two genders.

CHAPTER VIII

DISCUSSIONS AND CONCLUSIONS

Summary of Results

Concerning the experiential effects, there are two positive zero-order correlations between DUI experience and drinking/driving behavior ($r=.12$) as well as between DUI experience and alcohol consumption ($r=.07$). Both correlations are statistically significant, but in opposition to the directions predicted in the research model of Figure 1. The partial correlations between DUI experience and drinking/driving behavior ($r=.07$, $p<.01$), as well as between DUI experience and alcohol consumption ($r=-.02$, $p>.01$), on the other hand, are negligibly related to each other. These findings that subjects with more DUI experience have more drinking/driving behavior are contradictory to past literature which states that pervious arrest experience has an inverse relationship with drunk driving (Shapiro and Votey, 1984). In other words, the notion that the experiential effects have an inverse impact on drinking/driving behavior is not supported by the findings. Hypothesis 1a, therefore, is disconfirmed. Of the two aspects of deterrence examined in this study, perceived punishment does not show a negative relationship

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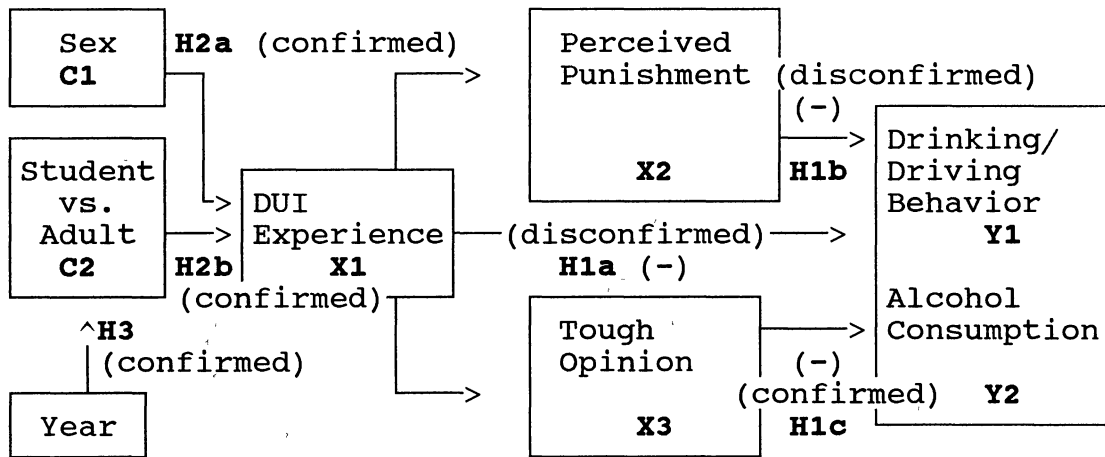


Figure 3. Research Model after Testing

either with drinking/driving behavior or with alcohol consumption. Similar to the findings regarding the experiential effects, the zero-order correlations between perceived punishment and drinking/driving behavior ($r=.01$) as well as between perceived punishment and alcohol consumption ($r=.12$) are also statistically significant but opposite to the direction predicted in the research model. The first-order partial correlations between perceived punishment and the two variables ($r=-.01$, $p>.01$ and $r=-.06$, $p<.01$; respectively) are also negligibly related. These findings suggest that Hypothesis 1b (subjects with higher perceived punishment are less likely to commit drinking/driving behavior and less likely to consume more alcohol) is also disconfirmed.

A close measure of another aspect of deterrence, moral commitment, is tough opinion. Both zero-order and first-order correlations between this variable and the two dependent variables are statistically significant, modestly strong in strength, and in the direction predicted in the research model. That is to say, Hypothesis 1c is confirmed that subjects with tougher opinion engage in less drinking/driving behavior and less alcohol consumption, is confirmed.

As predicted by the past literature (Anderson, Chiricos, and Waldo, 1977), the associations between independent and dependent variables in this study are not different in each sex. For both males and females, there

are no significant associations between DUI experience and drinking/driving behavior as well as between DUI experience and alcohol consumption. Further, there are no correlations between perceived punishment and the two dependent variables. Concerning the partial correlations between tough opinion and the two dependent variables, both sexes have equally strong negative associations between the variables.

On the other hand, each sex tends to show different amounts on the variables. Males have more DUI experience than females, more drinking/driving behavior, and more alcohol consumption on the average; however, females have tougher opinion than males. With respect to perceived punishment there is no difference between sexes.

In short, sex does not impact on the correlations between the independent and dependent variables, but it does identify different amounts on four of the five variables.

As regard to student vs. adult subjects, the partial correlations show that adult subjects have a stronger association between tough opinion and drinking/driving behavior ($r = -.28$), but student subjects have a stronger association between tough opinion and alcohol consumption ($r = -.24$). Furthermore, there is a significant positive correlation between DUI experience and drinking/driving behavior ($r = .11$) and a significant negative correlation between DUI experience and alcohol consumption ($r = -.08$) among adult subjects. Both correlations are absent in the student

subjects. For each independent and dependent variable, students have significantly different means than adults. For example, students have more DUI experience, higher degree of perceived punishment, less tough opinion, more drinking/driving behavior, and more alcohol consumption. Therefore, since there are differences in the correlations between the independent and dependent variables for student and adult groups, it is concluded that student vs. adult is an important sample structure factor to be considered for deterrence research.

Concerning the partial correlations for each year, the major finding is the similarity of correlations. Out of the six pairs of correlations between the independent and dependent variables for each year, the first four pairs are not significant and the last two are significant except for one year. Therefore, the general conclusion is that there are not differences in the correlations between the independent and dependent variables across each year. On the mean of each variable, different years have different DUI experience, tough opinion, and alcohol consumption, but there are not differences of means for perceived punishment and drinking/driving behavior across each year.

Conclusions

An important finding concerning the stability of perceived punishment is contradictory to previous research (Paternoster, et al., 1983; Minor and Harry, 1982).

According to previous research, perception of punishment is not stable over time. The current research, however, indicates that there is no difference between perceived punishment across each year. Therefore, it is concluded that perception of punishment is the same over time and the stability of perceived punishment is thus established. As discussed previously, the causal ordering between previous experience of criminal behavior and perception of punishment in cross-sectional research was criticized for measuring the two variables at the same time. A counterpoint to this argument is that if a stability of perception of punishment can be found over time, then it seems reasonable to assume there is no differences between "previous" perception and "present" perception of punishment. Therefore, cross-sectional designs are still legitimate in testing deterrence.

In addition, this research has found that the most important inhibitory variable in deterring drinking/driving behavior is tough opinion, but not DUI experience or perceived punishment. If, in reality, this is true; then the conclusion is that neither pervious experience of being caught for drunk driving nor perceived punishment of being arrested deters drunk driving. Other variables, such as moral commitments or informal sanctions, may be more powerful in deterring drinking/driving behavior.

However, if it is not true, then other considerations need to be pursued. The reason why DUI experience is not

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found inversely related to perceived punishment may be attributed to the fact that nothing really serious happens when a subject is arrested by the police for drunk driving. A seriously legal punishment may not be experienced by the subject. If an "actual" punishment (as opposed to a perceptual punishment) is not experienced, then a perception of that punishment may not represent a real test of deterrence. It has been argued by Piliavin, et. al (1986) that subjects without involvement in serious crimes or high risk of formal sanctions do not constitute an appropriate sample for testing deterrence because if a real punishment is not experienced then it is unknown whether the deterrent effects of that punishment work or not. This issue suggests that deterrence should have a broader scope than examined in the current research. Most research in deterrence may overemphasizes the perceptual aspect of deterrence (Green, 1989; Grasmick and Green, 1980; Williams and Hawkins, 1986; Paternoster, et al., 1983a), while the "real" or "actual" punishment, not the perceived possibility of the punishment, tends to be ignored or overlooked (Grasmick and Green, 1980, p. 325).

Another methodological debate on whether panel or cross-sectional designs should be more adequate to test deterrence further impedes research in deterrence. For petitioners in favor of panel designs, the confounding of causal ordering between perceptions of punishment and criminal behavior in cross-sectional research is their major

issue to attack. However, even if the time ordering is considered, this is only a necessary condition for establishing a causality between perception of punishment (usually measured in Time 1) and criminal involvement (usually measured in Time 2), but not a sufficient one. Green's (1989) position that both designs are eligible is taken in this study. While cross-sectional designs cannot take into consideration the time factor, panel designs have to suffer from such things as high attrition rates, appropriate time lag; and usually even a panel design cannot identify exactly when an orientation may have changed relative to an act. Additional considerations when planning deterrence research should include specification (i.e. which variables are to be included), sample structure, (i.e. what group of subjects are to be studied), and a variety of other methodological concerns.

Combined all the above issues and findings in the current research, a possible model is suggested for future research as presented in Figure 4.

It is found in the current research that there is a strong correlation between alcohol consumption and drinking/driving behavior. This finding is consistent with studies conducted by Norstrom (1983) and Begier and Snortum (1986). Therefore, it is logical to hypothesize that subjects with more alcohol consumption are more likely to engage in drinking/driving behavior.

Alcohol consumption —> Drinking/driving behavior
—> Social status —> Actual chances of being caught
—> DUI experience —> Actual punishment —>
Moral commitment and Informal sanction —>
Perceived punishment —> Future drunk driving behavior

Figure 4. A Model for Future Research

Another finding indicates that DUI experience is positively related to drinking/driving behavior. This is inconsistent with Shapiro and Votey 's study (1984). The difference may be due to an omission of measurement of actual punishment in the current research. The experience of being caught may not result in a belief that the possibility of being caught again in the future is high or that punishment will be severe. Experiences after being caught may be the important factors determining whether the punishment will deter future criminal behavior or not. This argument may generate another hypothesis for further research that subjects with more drinking/driving behavior are more likely to have more DUI experience.

Still another finding that students have higher DUI experience (not significant at the .01, but would be at the .05 level) than adults. This is consistent with Vingilis and Chung's (1982) finding suggesting that the young seemed to be initially suspected more often for suspicion of impaired driving. Combined with other research (Richards and Tittle, 1982), this finding suggests social status and demographic characteristics need to be included in deterrence research. It may be hypothesized that subjects with low social status or younger age may have higher their chances of being stopped or arrested for drunk driving; therefore, they may have more DUI experience.

An additional finding in the current research is that most subjects perceived only slight chances of being stopped

by the police if they drive drunk. This low degree of perceived punishment may reflect a low possibility of actually being caught in reality. As reported by Lanza-Kaduce and Bishop (1986), the risk of arrest ranges from one arrest in between 200 and 2000 occurrences of driving while intoxicated (p. 364-365). Therefore, actual chances of being stopped and/or arrested need to be included in future research in order to compare the perceived chances of being stopped with being arrested for drunk driving.

In Figure 4, the proposed research model suggests that perceived punishment is expected to be influenced by actual punishment. This formulation makes possible a comparison between perceived punishment and actual punishment, which was omitted or ignored by previous research (Grasmick and Green, 1980).

On the findings that tough opinion is inversely related to drinking/driving behavior and to alcohol consumption, a suggestion is that moral commitments and informal sanction (or social disapproval) should be included in future research (Lanza-Kaduce, 1988; Bishop 1984; Berger and Snortum, 1986). Although tough opinion was used in the current research to index moral commitment, it is not a direct measure of moral commitment. But its significant correlations and partial correlations with drinking/driving behavior may indicate that what really deters people from drunk driving are some attitudinal variables with regard to punitive enforcement. However, if this tough opinion is

followed by alcohol-related policy and severer penalties are increase, would the behavior decrease? According to Kingsnorth and Jungsten (1988), increased severity of punishment is not related to reduced criminal behavior. Similar findings were found that according to quasi-experimental evaluations, tougher sanctions and enforcement crackdowns have had few enduring consequences on the rates of drunk driving (Lanza-Kadue, 1988).

Another variable that could be included in the model is future criminal behavior. As utilized by Smith and Gartin (1989) and mentioned by Green (1989a), future criminal behavior (in our case, drinking/driving behavior) were measured or estimated in modern deterrence theory in either panel or cross-sectional designs. While there is still a methodological debate (for example, debate between Greenberg, 1981 and Grasmick, 1981) on which designs are more adequate to test deterrence, it may be imperative to include the variable into consideration for a more complete research model. If panel designs are used then it may test "actual" future criminal behavior. For cross-sectional designs, it may test "estimated" future criminal behavior. In either case, it is expected to be influenced by perceived punishment as the deterrence doctrine predicts.

Finally, there are theoretial assumptions which need to be examined. Deterrence is originally based upon two assumptions, utilitarian philosophy and law enforcements. The utilitarian philosophy basically means that rational

actors take all the information available, consider all the costs and benefits which may be involved, then make decisions maximizing their own self-interest. Therefore, some researchers employ a rational-choice model in deterrence research. Subjects in their research are perceived to have the ability to process all the information available in making decisions on whether to engage in criminal activity or not according to their own benefits. But when people are intoxicated, maybe they do not think in this way. Recent research also shows that people may follow a "sloppy" approach in their cognitive processes when making decisions (Knottneus, 1988, p. 429).

Another assumption behind deterrence is that the laws are enforced all the time with severe penalties. In the rational model, subjects may know they will only have slight chances of being stopped and/or arrested if they drive drunk. Therefore, they take an educated chance of being caught by driving under the influence of alcohol. Both rational and irrational models may be worth testing.

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APPENDIX

SURVEY INSTRUMENT

AS A PART OF A STATE- AND LOCALLY-FUNDED PROJECT, WE WOULD LIKE SOME OPINIONS FROM THE DRIVING PUBLIC IN OKLAHOMA. PLEASE COMPLETE THE FOLLOWING QUESTIONNAIRE AND RETURN TO THE LOCKED BOX. ALL RESPONSES ARE STRICTLY CONFIDENTIAL—PLEASE DO NOT SIGN YOUR NAME.

1. SEX: 1 male
 2 female
2. PRESENT MARITAL STATUS: 1 never married
 2 married
 3 other (divorced, widowed, etc).
3. COMBINED FAMILY INCOME: 1 less than \$10,000
 2 \$10,000-\$30,000
 3 \$30,000-\$50,000
 4 over \$50,000
4. PAYNE COUNTY RESIDENCE: 1 Stillwater
 2 town other than Stillwater
 3 rural area
- 5-6. YEAR YOU WERE BORN: _____
7. EDUCATION: 1 less than high school
 2 high school graduate
 3 some college
 4 college graduate
 5 higher college degree
8. PRESENT OCCUPATION: 1 professional
 2 white collar
 3 blue collar
 4 housewife
 5 student
 6 retired

THESE ITEMS CONCERN KNOWLEDGE OF ALCOHOL—PLEASE CIRCLE YOUR ANSWER

| | Don't | | |
|-----------------------------------------------------------------------------------------------------------|-------|-------|------|
| | True | False | Know |
| 9. Drinking coffee or taking a cold shower can help sober a person. | 1 | 2 | 3 |
| 10. Alcohol is usually classified as a stimulant. | 1 | 2 | 3 |
| 11. Approximately 10% of fatal highway accidents are alcohol related. | 1 | 2 | 3 |
| 12. Liquor mixed with soda pop will affect you faster than liquor drunk straight. | 1 | 2 | 3 |
| 13. In order to avoid arrest, a 150 pound person should drink less than three beers in a two hour period. | 1 | 2 | 3 |
| 14. Moderate consumption of alcoholic beverages is generally not considered harmful to the body. | 1 | 2 | 3 |
| 15. Eating while drinking will help slow down becoming drunk. | 1 | 2 | 3 |
| 16. A person cannot become an alcoholic by just drinking beer. | 1 | 2 | 3 |

THESE ITEMS CONCERN YOUR OPINIONS

| | Strongly | | | Strongly | |
|---------------------------------------------------------------------------------------------|----------|---------|-------|----------|-------|
| | Disagree | Neutral | Agree | Disagree | Agree |
| 17. Police do not arrest enough drunk drivers. | 1 | 2 | 3 | 4 | 5 |
| 18. Police should set up road blocks to catch drunk drivers. | 1 | 2 | 3 | 4 | 5 |
| 19. The new drinking age of 21 for 3.2 beer is good. | 1 | 2 | 3 | 4 | 5 |
| 20. A drunk stopped by the police close to home should be taken there rather than to jail. | 1 | 2 | 3 | 4 | 5 |
| 21. Social hosts should be held liable for drunk driving accidents caused by their guests. | 1 | 2 | 3 | 4 | 5 |
| 22. Bartenders should be held liable for drunk driving accidents caused by their customers. | 1 | 2 | 3 | 4 | 5 |

23-29. In a situation where someone you knew had been drinking too much and was about to drive, which do you think you might do? (check all that apply)

- 1 nothing (it is not my business)
 2 offer a ride home
 3 persuade the person not to drive
 4 prevent the person from driving
 5 ask people nearby for help
 6 call the police
 7 other (please list) _____

30-36. If your behavior regarding alcohol has changed over the past year, please check all changes.

- 1 discuss drinking/driving more often with others
 2 drink more
 3 drink less
 4 serve more at parties
 5 serve less at parties
 6 plan for transportation home
 7 other (please list) _____

37. In the last year, have you become aware of any programs in Stillwater that are trying to reduce alcohol related traffic accidents?
 _____ 1 yes _____ 2 no

38. Please tell us about these programs.

| <u>Name of program</u> | <u>Who conducted it</u> | <u>How you heard of it</u> | <u>Your involvement in it</u> |
|------------------------|-------------------------|----------------------------|-------------------------------|
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

PART II PLEASE CIRCLE THE CORRECT ANSWER

In the last year, how often, on the average, did you usually drink:

| | Never | a few times a year | 1-2 times a month | 1-2 times a week | 1-2 times a day |
|-----------|-------|--------------------|-------------------|------------------|-----------------|
| 1. Beer | 1 | 2 | 3 | 4 | 5 |
| 2. Wine | 1 | 2 | 3 | 4 | 5 |
| 3. Liquor | 1 | 2 | 3 | 4 | 5 |

In the last year, when you drank, how much of the following did you usually have during one drinking period?

| | None | 1-2 Drinks | 3-4 Drinks | 5-6 Drinks | Over 6 Drinks |
|-----------|------|------------|------------|------------|---------------|
| 4. Beer | 1 | 2 | 3 | 4 | 5 |
| 5. Wine | 1 | 2 | 3 | 4 | 5 |
| 6. Liquor | 1 | 2 | 3 | 4 | 5 |

PLEASE CHECK THE CORRECT ANSWER FOR THE FOLLOWING

- 7. How many drinks do you feel you can handle and still drive well?
 _____ 1 none
 _____ 2 1-2 drinks
 _____ 3 3-4 drinks
 _____ 4 5-6 drinks
 _____ 5 over 6 drinks
- 8. How often during the past year have you driven after consuming more than that amount?
 _____ 1 never
 _____ 2 a few times
 _____ 3 once or twice a month
 _____ 4 once or twice a week
 _____ 5 nearly every day
- 9. If you drive after drinking too much, what do you feel are your chances of being stopped by the police?
 _____ 1 very low
 _____ 2 low
 _____ 3 about even (50-50)
 _____ 4 high
 _____ 5 very high
- 10. If you are stopped by the police after drinking too much, which one of the following do you feel would most likely happen? (check one)
 _____ 1 nothing
 _____ 2 warning
 _____ 3 ticket
 _____ 4 fine
 _____ 5 counseling program
 _____ 6 driver training school
 _____ 7 license removed
 _____ 8 jail sentence
 _____ 9 other (please list) _____
- 11. In Oklahoma, what percentage of alcohol in the blood will determine that you are driving under the influence?
 _____ 1 .02 percent
 _____ 2 .05 percent
 _____ 3 .08 percent
 _____ 4 .10 percent
 _____ 5 don't know
- 12-19. Which penalties for drunk driving do you feel should be used more often or increased? (check all that apply)
 _____ 1 fines
 _____ 2 removal of license
 _____ 3 community service
 _____ 4 driving school
 _____ 5 counseling programs
 _____ 6 jail after first offense
 _____ 7 jail after second offense
 _____ 8 other _____
- 20. How often do you usually drive after having at least 2 drinks or 3 beers?
 _____ 1 never
 _____ 2 a few times a year
 _____ 3 1-2 times a month
 _____ 4 1-2 times a week
 _____ 5 nearly every day
- 21. Have you ever had a family member or close friend injured or killed by a drunk driver?
 _____ 1 yes _____ 2 no
- 22. Have you been arrested for drunk driving in the last year?
 _____ 1 yes _____ 2 no
- 23. Have you been involved in a traffic accident after drinking and driving in the last year?
 _____ 1 yes _____ 2 no

THANK YOU FOR YOUR COOPERATION

VITA

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