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ALCOHOL REGULATION AND GENDER-SPECIFIC PARENTAL VIOLENCE TOWARDS CHILDREN

by

Sara Markowitz

A dissertation submitted to the Graduate Faculty in Economics in partial fulfillment of the requirement for the degree of Doctor of Philosophy, The City University of New York

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Abstract

ALCOHOL REGULATION AND GENDER-SPECIFIC
PARENTAL VIOLENCE TOWARDS CHILDREN

by

Sara Markowitz

Advisor: Professor Michael Grossman

In recent years, economists have paid much attention to the demand for alcohol and the negative externalities associated with excessive drinking. Largely ignored in the economic literature is the link between alcohol use and domestic violence. Given the established positive relationship between alcohol consumption and acts of violence, the purpose of this study is to examine the role that changes in alcohol related public policies may play in reducing the incidence of violence aimed at children. Data on violence come from the 1976 and 1985 Physical Violence in American Families surveys. Models are estimated in which violent outcomes are affected by the state excise tax rate on beer, illegal drug prices and other regulatory variables such as availability measures and laws restricting the advertising of alcohol. Models are estimated separately for males and females, and results show that increasing the tax on beer can be an effective policy tool in reducing violence committed by females. Increases in the tax on beer have no effect on the probability that males will commit violence. Laws designed to make obtaining beer more difficult may also be effective in reducing violence by women, while restrictions on advertising and increases in illegal drug prices have no effects.

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This dissertation is dedicated to my loving husband.

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I. INTRODUCTION

Alcohol use and abuse is an important topic to study because of the significant costs alcohol abuse imposes on individual users, their families, and society as a whole. Individual costs may include those related to employment, such as reduced productivity, absenteeism or unemployment. Health related costs arise due to diseases such as liver cirrhosis or chronic conditions resulting from poor birth outcomes. Societal costs may include motor vehicle accidents and fatalities as a result of drunk driving. Finally, the emotional and physical harm often done to the children and spouses of heavy alcohol users may be costly to both individuals and society.

The existing economic research on alcohol focuses on many of the harmful outcomes of alcohol abuse, with one notable exception. Currently, there is little work on the role of alcohol and domestic violence. Many studies from other disciplines have shown that alcohol plays a significant role in incidents of domestic violence. For example, it is estimated that about forty percent of all cases of child maltreatment (including physical abuse, sexual abuse and neglect) involve alcohol (Children of Alcoholics Foundation, 1996). Because of the prevalence of alcohol in such violence, it may be possible to reduce domestic violence through changes in economic policies which affect the demand for alcohol. The purpose of this study, therefore, is to identify some economic policy tools through which the incidence of physical violence towards children may be reduced.

This study is structured as follows: The first section discusses the links between alcohol, drugs and violence as described in disciplines such as sociology and epidemiology. Section two provides an overview of the relevant economic literature.

This literature includes studies relating alcohol regulation to the negative by-products of alcohol consumption as well as studies on the economic analysis of spousal abuse. The third section presents the analytical framework that is the basis for the empirical analyses presented in this study. Section four discusses the data sources and the dependent and independent variables that are used. Section five presents estimation issues and the results of changes in the alcohol regulatory variables on the probability of violence. These results are shown separately for males and females in the two years of data. The results of illegal drug price measures on violence are discussed, as well as are the results for alternative measures of violence. This section concludes with a discussion of the effects of the individual and household characteristics on the probability of violence. The final sections include results of the estimation of the structural relationship between violence and alcohol consumption and conclusions.

The main findings of the study show that the probability of violence committed by females is sensitive to changes in the price of alcohol. However, this finding does not hold for violence committed by males. There is some evidence that violence by either parent can be altered through changes in the availability of alcohol, while restrictions on advertising have indeterminate effects.

II. THE LINKS BETWEEN ALCOHOL, DRUGS, AND VIOLENCE

The links between alcohol, drugs and violence have been the focus of many biological, psychological, sociological, and epidemiological studies. While each discipline seeks to answer its own questions about the associations, for the purpose of this study one can draw a few main conclusions from the existing literature.

A. Alcohol and Violence

First, there is a general agreement that a strong link exists between alcohol consumption and violence. In a variety of settings, alcohol is found to have been used prior to assault. There is an overwhelming amount of evidence showing that the use of alcohol is prevalent in many cases of criminal assaults and rapes (see Collins, 1981 for an overview). For example, the Bureau of Justice Statistics (1988) reports that about 60 percent of all persons convicted of assault had been drinking just prior to the crime. By contrast, about 40 percent of burglars and 30 percent of drug offenders used alcohol just prior to the crime that they had committed. In the context of child abuse, Gil (1973) found that 13 percent of child abuse cases involved a perpetrator who was intoxicated at the time of the attack.[1] Many other studies link alcoholism to child abuse. Behling (1979) found that in 69 percent of cases of child abuse at least one parent was an alcoholic. Famularo et al. (1986) found that of parents who had lost custody of their children because of abuse and neglect, 38 percent were alcoholics. I caution the reader that these studies are not proof of a causal relationship from alcohol to violence, rather they merely suggest a strong association between alcohol consumption and violence.

Given the general association between alcohol use and violence, an important question for policy purposes is how alcohol use may promote violent behavior and does the causality go from alcohol consumption to violence. While this study makes no attempt to explain the causes of the link, a few theories which are relevant to this study are discussed. To begin, there is no general agreement in the existing literature on the cause of the observed association. Theories range from simple pharmacological effects

to the complex interaction of endocrinological, neurobiologic, environmental, social and cultural determinants. (See National Research Council, 1993 chapter 4, and Goldstein, 1985 for further information.) For example, there may exist a psychopharmacological relationship in which alcohol can alter behavior by increasing excitability and/or boosting courage. (See Pernanen, 1981 and Fagan, 1993 for a complete discussion.) Under this theory, people may be more likely to commit a violent act when under the influence of alcohol than they would otherwise. This theory implies that alcohol causes violence. A second theory asserts that people use alcohol as an excuse for aberrant behavior. Our society teaches people that alcohol use may cause people to lose their inhibitions and/or release violent tendencies, and thus users cannot be fully blamed for their actions. In other words, drunkenness may give people an excuse for violence, despite whether or not actual pharmacological effects exist (see Gelles and Cornell, 1990, and Fagan, 1990). This theory is particularly important for the domestic violence case for it may imply a reverse causality from violence to alcohol consumption. It is possible that people who plan on being violent may drink prior to the act in order to give themselves an excuse for their behavior and lower the probability of facing the consequences of their actions. Finally, there is the "third factor" theory in which there exists some unknown common cause, say personality, that results in both drinking and violent behaviors (see Fagan, 1990).

B. Drugs and Violence

It is commonly believed that there may also be a link between illegal drugs and violence, although the literature supporting this notion is mixed. For example, when the

perceived drug use of offenders is reported by the victims of violent crimes, the offender was reported to be under the influence of drugs 8 to 10 percent of the time (Bureau of Justice Statistics, 1993). The Bureau of Justice Statistics (1988) reports that about 25 percent of violent offenders claim they were under the influence of drugs at the time of the offense. The study also reports that jail and prison inmates are much more likely to use drugs than the general population. Another source of uncertainty regarding the link between drugs and violence concerns the possible biological effects of drugs. It is known that any biological effects differ by drug type and amount of use. For example, short-term use of marijuana, morphine and opium may inhibit aggressive behavior in humans, while long-term use can alter the nervous system in a way that actually promotes tendencies towards violence (National Research Council, 1993). Amphetamines, LSD, PCP and cocaine in small doses tend to increase aggressive behaviors, but this link may be an indirect result of the distortions in the interpretation of social signals by the users. (See Fagan, 1993 and Goldstein, 1985). In general, not much is yet known about the relationship between drugs and violence. Including drugs in this study may help to shed some light on the nature of this connection.

III. RELATED STUDIES

Domestic violence has been the focus of many studies in numerous disciplines, but there is very little work on any aspect of domestic violence in the economic literature. However, there have been a number of economic studies which relate negative outcomes of alcohol use to the consumption and price of alcohol and to policies designed to curtail and control alcohol consumption. This is the approach utilized in this study. It is therefore relevant to review the existing economic literature on domestic violence as well

as the literature relating negative outcomes of alcohol consumption to prices and alcohol control policies.

A. Studies of Alcohol Related Outcomes

In recent years, many economic studies have focused on outcomes such as crime, motor vehicle fatalities, and liver cirrhosis mortality as negative by-products of alcohol consumption. The main question in this literature is whether changes in public policies affect consumption and alter the incidence of the negative outcome. For example, there have been several studies focusing on the effectiveness of increases in the price of alcohol in reducing the adverse effects of alcohol on motor vehicle fatalities (Saffer and Grossman, 1987, Chaloupka, Saffer and Grossman, 1993, Kenkel, 1993, and Ruhm, 1996), and liver cirrhosis mortality (Cook and Tauchen, 1982 and Chaloupka, Grossman, Becker, and Murphy, 1993). The papers most relevant to this study are those by Cook and Moore (1993) and Chaloupka and Saffer (1992). Both of these papers examine the effects of alcohol prices on variations in aggregate state crime rates. In particular, both sets of authors look at rates of murder, rape, assault, and robbery. Cook and Moore model criminal offenses as a function of alcohol consumption and the socioeconomic and demographic characteristics of a state's population. Chaloupka and Saffer expand the model to include drug consumption and law enforcement as variables affecting crime rates. Alcohol consumption (and drug consumption in Chaloupka and Saffer) is treated as endogenous and is determined by price, availability, sentiment towards drinking, and laws designed to curtail consumption. Both sets of authors choose to address the endogenity by using a reduced form model where a specific crime rate is a function of the

state excise tax on beer and other demographic variables. Chaloupka and Saffer also include variables that may affect availability of alcohol such as the minimum legal drinking age and the percentage of a state's population living in dry counties. Results of both studies indicate that increasing the tax on beer reduces most types of crimes while the effects of the availability and control measures used by Chaloupka and Saffer are mixed.

Other evidence on the effects of alcohol on crimes comes from Scandinavian studies. One study by Lenke (1975) shows that there is a high statistical correlation between rates of violent crime and per capita alcohol consumption in several Scandinavian countries during the period 1960-1973. In addition, Lenke (1975) and Takala (1973) look at changes in alcohol prices, incidence of strikes by employees of liquor stores, and introduction of new sales points (i.e. selling beer in grocery stores) to explain changes in violent crime rates. Both studies show that violent crimes decrease when alcohol is less available.

The studies just reviewed all provide some evidence that changes in the price and possibly the availability of alcohol can have direct effects on crime. In particular, aggregate violent crime rates are shown to be reduced when the cost of alcohol increases. Child abuse, the topic of this study, is one form of a violent criminal act, but it is difficult to say whether similar conclusions are expected because there have been no studies to date on the relationship between child abuse, and alcohol and drug consumption.

B. Studies of Domestic Violence

The most notable economic studies of domestic violence are by Long, Witte and

Karr (1983) and Tauchen, Witte and Long (1991). Both papers focus only on spousal abuse and treat violence as a good which the dominant partner can purchase. The paper by Long, Witte and Karr is a theoretical discussion which models a dominant partner's utility as a function of family income, time spent engaged in violence, and tastes for violence. The dominant partner's choice problem is to maximize expected utility subject to income constraints, time constraints, the threat of dissolution of marriage, and the threat of interference by authorities.

Tauchen, Witte and Long (1991) propose a variation of this model where the utility functions for both partners depend on the behavior of the female, the violence the male inflicts on the female, and on the level of income of both the male and the female. Each partner also faces a reservation level of utility that can be achieved outside the relationship. The key assumption in this model is that the male can transfer income to the female and buy more violence, while the female can reduce the amount of violence inflicted on herself by raising her own income and thus raising the amount of utility that can be achieved outside the relationship. When the female's income is increased, the male must reduce violence inflicted on her in order for the marriage to stay intact. Using a sample of 125 women who had been physically abused by their partners, the authors empirically test their theory and find that in low income families the predictions of the model hold. For high income families, however, when the perpetrator holds most of the income, increases in income by either partner serves to decrease the violence. When the victim holds the bulk of the income, increases in income result in increased violence, possibly because the victim refuses to transfer income to lower the level of violence.

One drawback of these domestic violence studies is that the models are not applicable to instances of child abuse. The models reviewed assume that the victim has a choice to be in the relationship or not. In reality, this choice is not always available, especially for very young or very old dependents. In addition, such dependents generally have little or no income to transfer as a means of avoiding violence. Next, modeling income transfers as a means to avoid violence seems inappropriate when the husband is the victim because males tend to have a physical advantage over females. Finally, there are many other factors involved in the propensity to commit violence. As previously discussed, alcohol in particular plays a major role and should not be left out of any model dealing with domestic violence. To address these limitations, I present a more general framework that is appropriate for the case of violence aimed at children.

IV. ANALYTICAL FRAMEWORK

The model of domestic violence utilized here is derived from Long, Witte and Karr (1983) and Becker (1968). The model is as follows: A perpetrator's choice problem is to maximize a utility function which depends on V, a good representing violence, consumption of alcohol (A), and consumption of all other goods (C). More appropriately, gains from violence, such as control over the victim or stress relief, should be in the utility function, but for simplicity violence will enter directly.[2] Note that violence can positively or negatively affect utility.

1) $U=u(V, A, C)$.

Violence is produced by time spent engaged in violence (Tv), alcohol consumption (A), and is also affected by α which represents efficiency in producing violence.[3, 4]

2) $V=v(Tv, A, \alpha)$.

It is assumed that $\partial V/\partial Tv > 0$. Alcohol enters the production function in that alcohol consumption can result in a physical reaction that makes the user more prone to violence or that makes it easier to commit a violent act, therefore, $\partial V/\partial A > 0$. If however, excessive alcohol consumption causes a person to lose dexterity (say for example a person is too drunk to stand up) then alcohol consumption over a certain amount would result in less violence. In this situation, $\partial V/\partial A < 0$.

As previously discussed, alcohol and violence may be linked not only through the chemical effects of alcohol, but also by the notion that alcohol serves to reduce the probability of the offender having to face consequences by creating a viable excuse for the behavior. That is, the perpetrator may face costs of his actions only if caught. These costs can be monetary costs such as legal fees, fines, or lost wages due to prison sentences and can be accounted for in the budget constraint of the perpetrator. Non-monetary costs may include the dissolution of the relationship, or loss of respect by the victim, family members or friends. For simplicity, the probability of facing non-monetary costs are included in the α term and are assumed to affect the supply of violence. The term P represents the probability of facing monetary costs and is represented by

3) $P=p(\Pi, A)$,

where Π represents the part of the probability that is unaffected by alcohol use, A is alcohol consumption and $\partial P/\partial A < 0$.

Considering the possibility of monetary losses gives two possible budget constraints faced by the perpetrator:

4a) $I=C^{NL} + PaA + wTv$ when no monetary costs of violence are faced and

4b) $I=C^{L} + PaA + wTv + L(Tv)$ when costs are imposed.

The term I represents income, Pa represents the monetary price plus travel and time costs of obtaining alcohol, and w is the wage rate which is meant to represent the opportunity cost of spending time engaged in violence. The monetary costs of violence are represented by the loss function L(Tv). The losses are a function of the time spent in violence and it is assumed that losses increase as the time spent in violence increases. C^{NL} and C^{L} denote other consumption when there is no loss and when there is loss resulting from violence, respectively. By design, $C^{NL} > C^{L}$ since L(Tv) is positive. The price of other consumption is normalized to 1 for simplicity.

Substituting equations 2, 3, 4a, and 4b into 1 yields an expected utility function:

5) $EU= 1\text{-}p(\Pi, A) * U[v(Tv, A, \alpha), A, I - PaA - wTv] + p(\Pi, A) * U[v(Tv, A, \alpha), A, I - PaA - wTv - L(Tv)].$

Equation 5 is the expected utility function that a perpetrator maximizes. Maximization with respect to the inputs in the production of violence yields:

6) $$\frac{\partial EU}{\partial Tv} = 1 - p(\Pi, A)\left[U_V^{NL}V_{Tv} - U_C^{NL} * w\right] + p(\Pi, A)\left[U_V^{L}V_{Tv} - U_C^{L} * w - U_C^{L}L_{Tv}\right] = 0$$

and

7)

$$\frac{\partial EU}{\partial A} = \frac{\partial P}{\partial A}\left[U^{L} - U^{NL}\right] + 1 - p(\Pi, A)\left[U_V^{NL}V_A + U_A^{NL} - U_C^{NL} * Pa\right] + p(\Pi, A)\left[U_V^{L}V_A + U_A^{L} - U_C^{L} * Pa\right] = 0$$

Rearranging gives:

6a) $$1 - p(\Pi, A)\left[U_V^{NL}V_{Tv}\right] + p(\Pi, A)\left[U_V^{L}V_{Tv}\right] = 1 - p(\Pi, A)\left[U_C^{NL}w\right] + p(\Pi, A)\left[U_C^{L}w + U_C^{L}L_{Tv}\right]$$

and

$$7a)\ 1-p(\Pi,A)\left[U_A^{NL}+U_V^{NL}V_A\right]+p(\Pi,A)\left[U_A^{L}+U_V^{L}V_A\right]=$$

$$1-p(\Pi,A)\left[U_C^{NL}Pa\right]+p(\Pi,A)\left[U_C^{L}Pa\right]-\frac{\partial P}{\partial A}\left[U^{L}-U^{NL}\right]$$

Equation 6a equates the expected marginal benefit of time spent in violence to the expected marginal cost of time spent in violence. Similarly, equation 7a equates the expected marginal benefits of alcohol consumption to the expected marginal costs. Equations 6a shows that time spent in violence depends on the opportunity cost of time spent in violence, income, the losses from violence, and the probability of getting caught which in turn partly depends on alcohol consumption. Equation 7a shows that alcohol consumption depends on the price of alcohol, income, the part of the probability of getting caught that is not affected by alcohol consumption, and the losses imposed when caught. These losses are a function of the time spent in violence. Equations 6a and 7a imply the following reduced form demand functions:

8) $Tv=tv(Pa, w, I, \Pi, \alpha)$

9) $A=a(Pa, w, I, \Pi, \alpha)$

Substituting equations 8 and 9 into equation 2 gives:

10) $V=v(Pa, w, \Pi, \alpha)$.

Equation 10 is the reduced form model of the amount of violence supplied by the perpetrator and is the equation that will be estimated by regression techniques in this study. Equation 10 is the main focus of this study because the estimation of this equation will show the direct effects of increases of the price of alcohol and other regulatory measures on violence.

The shadow price of violence helps demonstrate the direction of the effects of changes in the determinants of violence in equation 10. Rearranging equation 6 gives the first order condition as

$$11) \qquad (1-P)U_V^{NL} + PU_V^L = (1-P)\frac{U_C^{NL}w}{V_{Tv}} + P\left[\frac{U_C^L w}{V_{Tv}} + \frac{U_C^L L_{Tv}}{V_{Tv}}\right].$$

The right-hand side of equation 11 represents the shadow price of violence. If the marginal utility of violence has the same value in both the no-loss and loss states, and the marginal utility of consumption is the same in both states as well (and is equal to one for simplicity) then equation 11 reduces to

$$12) \qquad U_V = \frac{w + PL_{Tv}}{V_{Tv}}.$$

From equation 12, it is easy to see that an increase in the wage rate (the opportunity cost of violence) will increase the shadow price of violence and decrease violence. The income effect from a wage increase would increase violence so the net effect would be ambiguous. An increase in the price of alcohol will decrease alcohol consumption and increase P, the probability of facing monetary costs. When P increases, the shadow price increases and violence decreases. This last prediction would result in a negative coefficient on the price of alcohol in an empirical estimation of equation 10.

Empirically, violence is a behavior that many people do not engage in. If violence is measured either as a continuous or dichotomous variable, in any data set there are bound to be numerous observations with a zero value for violence. The model outlined above allows for a corner solution. A corner solution occurs if the marginal cost of time spent in violence evaluated at V=Tv=0 is larger than or equal to the marginal benefit from time spent in violence evaluated at V=Tv=0:

13) $$U_V(Tv=0)V_{Tv}(Tv=0) \le U_C\left[w + pL_{Tv}(Tv=0)\right]$$

where U_V, V_{Tv}, and L_{Tv} are assumed to be finite when V=Tv=0. In addition, $U_C^{NL} = U_C^L = U_C$ is the marginal utility of consumption in either state because when violence is zero, the loss from violence is zero so consumption is the same in either state.

In choosing the optimal time spent in violence, note that the marginal utility of violence must be positive for there to be any time spent in violence (Tv). This can be seen from equation 6a where if the marginal utility of violence is negative, the marginal benefit of time spent in violence will be negative and be less than the marginal costs. This will result in the optimal amount of Tv=0, and if one makes the assumption that there must be time spent in violence in order to produce violence then when Tv=0, V=0.

The time a person spends in violence can be considered as a measure of the intention of violence. If Tv=0 one could say there is not intentional violence. According to this model, there can still be unintentional violence. This requires a relaxing of the assumption that when Tv=0, V=0. I have shown above that when the marginal utility of violence is negative, the optimal time spent in violence will be zero. However, if the marginal utility of alcohol consumption is greater than the product of the marginal utility of violence times the marginal product of alcohol in the production of violence (see equation 7a) then alcohol consumption will be positive, and violence can still be positive. If on the other hand, the disutility from violence outweighs the utility from alcohol consumption then A=0 and V=0.

In short, the time a person spends in violence can be considered as a measure of the intention of violence. If violence is intended (the marginal utility of violence is positive) then the optimal Tv will be positive. If a person does not like violence (the

marginal utility of violence is negative), violence can still occur without any time spent in violence because the utility from alcohol consumption will outweigh the disutility from violence.

A secondary focus of this study is the structural model as given by equation 2. This is the equation which relates alcohol consumption to violence directly. The structural model is not the primary focus, mainly because this relationship has been studied frequently in literature in other disciplines. Nevertheless, a positive coefficient on measures of alcohol consumption would indicate a positive relationship between consumption and violence.

V. DATA

Data on violence aimed at children come from the 1976 and 1985 Physical Violence in American Families (PVAF) surveys. These surveys were designed to collect information about violence in the home and have detailed information on how conflicts are resolved. The 1976 data consists of a nationally representative sample of 2,143 married or cohabiting individuals. Of these individuals, 1,147 have children ages 3-17 living at home and thus comprise the sample examining violence towards children. The 1985 data are a nationally representative sample of 4,990 individuals who are either married or cohabiting, are single parents living with children under 18, or are individuals who had been married or cohabiting within the past two years. Included in this total are 4,032 individuals in the initial cross section and 958 individuals in an oversample of states.[5] Of the 4,990 individuals in the cross section and state oversample, 2,675 have children ages 0-17 living at home.

A. Dependent Variables

Measures of domestic violence in the PVAF survey are collected by use of the "Conflict Tactic Scale" (CTS). The CTS gathers information on the number of times in the past year a respondent has committed or has been the victim of a violent act by first asking questions about verbal solutions to disagreements and building up to questions on the occurrence of violent acts.

The question aimed at measuring violence towards children is asked as follows:

> "Parents and children use many different ways of trying to settle differences between them. I'm going to read you a list of some things that you and (child) might have done when you had a dispute. For each one, I would like you to tell me how often you did it with (child) in the past year."
>
> a. Discussed the issue calmly
> b. Got information to back up your side of things
> c. Brought in or tried to bring in someone to help settle things
> d. Insulted or swore at the other one
> e. Sulked and/or refused to talk about it
> f. Stomped out of the room or house (or yard)
> g. Cried
> h. Did something to spite the other one
> i. Threatened to hit or throw something at the other one
> j. Threw, smashed, hit or kicked something
> k. Threw something at the other one
> l. Pushed, grabbed, or shoved the other one
> m. Slapped or spanked the other one
> n. Kicked, bit or hit with fist
> o. Hit or tried to hit with something
> p. Beat up the other one
> q. Burned or scalded him/her (1985 survey only)
> r. Threatened with a gun or knife
> s. Used a knife or gun

The designers of the survey classified the above answers into different scales. They categorize items a-c into the "reasoning" scale, items d-j make up the "verbal

aggression" scale and items k-s are termed the "violence" scale. Within the violence scale, items k-m are considered as "minor" acts, items n-s are considered "severe" acts and items n, p,q,r and s are termed "very severe" acts.

The first two dependent variables are dichotomous indicators that equal 1 if a parent has committed an act of violence towards the child in the past year. The first is termed the "severe violence" indicator, and equals 1 if the respondent committed an act which in general has potential to seriously injure a child. These acts are most commonly thought of as child abuse, and are classified by items n-s in the CTS. That is, in the past year, had the respondent kicked, bit or hit with fist, hit or tried to hit with something, beat up the child, burned or scalded him/her (1985 survey only) threatened with a gun or knife, or had used a gun or knife on the child.[6] Eighteen percent of women in the 1976 sample and 10 percent of men responded that they had committed at least one of the acts in the severe violence scale in the past year. In the 1985 data, 11.4 percent of women and 9.4 percent of males had committed at least one severe act of violence (see Table 1 for means and standard deviations of all variables by gender). Hypothesis tests of the proportions by gender reveals that females are more violent than men in both years, but the hypothesis can only be rejected at the 10 percent level in the 1985 sample.

The second dichotomous variable, termed the "overall violence" indicator measures whether a parent has hurt the child in any manner as described by all the items in the violence scale (items k through s) with the exception of item "m", slapping or spanking (see Table 2 for the percentage of respondents committing each violent act). Item m is omitted since slapping or spanking is usually considered a way of punishing a child rather than representing an abusive or violent act (Straus and Gelles, 1990). Item

"l" is included despite the fact that the acts of pushing, grabbing or shoving could be considered as either violence or as discipline. For example, a mother might grab a child to keep them from crossing the street. This example is not problematic for the purposes of this study since the initial question asks about the occurrence of these acts in the context of conflicts rather than discipline.

Thirty-nine percent of woman and 32 percent of males in the 1976 sample said they have committed at least one of the acts in the overall child violence scale in the past year. The corresponding numbers for the 1985 sample are 33 percent and 31 percent for females and males, respectively (see Table 1). Again, tests of the proportions by gender reveals that females are more violent than men both years, but the one-tailed hypothesis can only be rejected at the 10 percent level in the 1985 sample.

Another potentially problematic act is the act of hitting or trying to hit with something (item o), for it can be considered as either punishment or abuse. For example, hitting the child with a belt or a hair brush is a common way to punish a child but hitting with a frying pan would be considered violence. Unfortunately, there is no way to distinguish between responses that were meant as punishments or as violence. The violence scales just described treat the act of hitting or trying to hit with an object as violence. Therefore, two more dichotomous variables (referred to as non-punitive indicators) are tested which omit the act of hitting or trying to hit with an object from the relevant scales. Thirty-five percent of females and 30 percent of males in 1976 committed at least one of the acts in the non-punitive overall violence scale, and 5 percent of females and 3 percent of males said they had committed one of the acts in the non-punitive severe violence scale. These percentages are similar in the 1985 sample--31

percent of females and 28 percent of males for the non-punitive overall violence indicator, and 2 percent for both males and females for non-punitive severe violence.

Variations on the four basic measures of violence were constructed from the initial question. For example, one can argue that items i (threatened to hit or throw something at the other) and j (threw, smashed, hit or kicked something) should be included in the measures of overall violence. Models were tested that added item j first and then added items i and j together. Results were very similar to those given by the overall violence scales so these additional measures are not reported.

In order to measure the frequency of violence given positive participation, another dependent variable is created which represents the log of number of times in the past year a respondent has committed an act described by the overall child violence scale given that the respondent has committed any violence. Logs are used in order to mitigate the effects of outliers.[7] A similar variable for the severe violence scale is not reported because of imprecise estimates resulting from small sample sizes.

Caution is required in the interpretation of this frequency variable because of the ambiguity regarding the initial survey question. The question asks the respondent how many times in the past year he or she has committed each act. This wording does not allow for a distinction between specific acts of violence that occurred on different occasions or occurred along with other types of violence on the same occasion. For example, a value of "2" could mean that the respondent hit the child twice in the past year, implying separate occasions. Alternatively, the same value could mean that the respondent hit the child once and threw something at the child once, perhaps during the same incident. While unable to measure the frequency of broad categories of violence,

this third dependent variable more accurately represents a combination of intensity and frequency of violence. That is, higher values will represent people who either commit the same act of violence often or commit different acts frequently.

Additional alternative dependent variables are constructed and reported on in the results section below. The first is created to address the criticism that there is no measure of less severe acts of violence only. Both the severe and overall violence indicators includes people who commit acts that are considered abusive. The "mild violence" indicator is a dichotomous variable representing whether or not a person has in the past year, thrown something at the child (item k), or pushed, grabbed or shoved the child (item l) but has not committed any act higher up on the violence scale. In the 1976 sample 24.8 percent fall into this category, and 24.1 percent of the 1985 sample do as well. Lastly, a trichotomous indicator is created in order to examine the probabilities of committing the levels of violence. In this variable, a value of zero represents no violent acts in the past year, a one represents mild violence only (items k and l) and a two represents severe violence only (items n-s).

B. Reliability of the Violence Data

One criticism of the Physical Violence in American Families survey focuses on the reliability of the respondents' answers to the occurrence of violence. The survey seeks to gain information about sensitive and possibly deviant types of behavior that often arouses antagonism, high refusal rates and distorted answers from the respondents, thereby bringing into question the reliability of the results. The principal investigators of the survey discuss this criticism at length. (See Straus and Gelles, 1990 for complete discussion of this issue.) First, they claim that the antagonistic aspects are minimized by

presenting the questions in the context of resolving family conflicts. The questions begin with resolution tactics such as "discuss the issue calmly" which are generally viewed as positive methods of dealing with problems. The scale gradually increases to questions about more socially unacceptable behavior. Through this method of getting to the violence questions, the respondent has first been given a chance to give the "socially correct" answers and is less apprehensive about discussing incidence of violence. Currently, the CTS seems to be the best available technique for collecting truthful information on domestic violence and has been used in over 200 studies to date (see Straus and Gelles, 1990). Nevertheless, because of the potential for underreporting violence, I consider the dependent variables as conservative estimates of violence. This poses no problem for the conclusions since so long as the measurement error in the dependent variable is random, measurement error only serves to raise the standard errors leaving the coefficients as unbiased estimators. However, if for example, drinkers systematically underreport violence, then the coefficient on the beer tax will be biased towards zero.

A related criticism is how well the Physical Violence in American Families survey reflects the reported national incidence of violence aimed at children. It is difficult to compare the estimates of violence aimed at children from this survey with those collected from other sources. The most commonly cited source is the *National Study on Child Neglect and Abuse Reporting* as conducted by the American Association for Protecting Children (AAPC). Their data represent cases of physical and sexual abuse or neglect and come mainly from Child Protection Services agencies around the country. This implies that cases of abuse must be reported before they can get into the national

statistics, but unfortunately a large proportion of cases go unreported. In 1976 (the earliest year of data available) the AAPC estimates that 669,000 children or 10.1 children per thousand were abused or neglected (American Association for Protecting Children, Inc., 1986). The same number for 1985 is 1,928,000 children or 30.6 children per thousand. The Physical Violence in American Families survey accounts for many instances of abuse that are not reported to the authorities. The survey estimates that about 5.8 million children or 86.35 children per thousand who lived with both parents were the victims of severe violence in 1975. In 1985, about almost 6.9 million or 109.6 children per thousand were abused.

C. Independent Variables

i. Alcohol Control Variables

The price of alcohol is measured by the real (1982-1984 dollars) state excise tax rate on a case of beer (24 12-ounce cans) as reported by the Beer Institute's *Brewers' Almanac*. This measure was chosen because beer is the most commonly consumed alcoholic beverage and because taxes, rather than prices, are directly set by policy-makers. The 1976 survey is conducted in the first quarter of 1976, but pertains to violence in the past year. Therefore, the beer tax is taken as a simple average of the state excise tax rates that existed in the four quarters of 1975. The 1985 survey was conducted during the summer of 1985. Therefore, the tax on beer is taken as an average of the tax rate that existed in the first two quarters of 1985 and the last two quarters of 1984.

A variety of measures are constructed to represent the availability and prevalence of alcohol in each state. First, variables representing restrictions on beer advertising are

included in the models. These variables come from *Modern Brewery Age Blue Book* (various years). Specifically, dichotomous indicators are included for whether a state prohibits each of the following: price advertising of beer in newspapers and magazines; billboards advertising beer; window displays of signs, packages and products in liquor stores; and consumer novelty giveaways. Restrictions on the first three will serve to make the full price of beer higher due to increased search costs. Bans on consumer novelties also serve to raise the full price of beer because novelties act as discounts in kind.

Retail availability factors in to the full price of alcohol faced by individuals. To capture the availability effects, three measures are employed. The first is a dichotomous indicator for whether or not grocery stores can sell beer.[8] Data for grocery store sales come from *Jobson's Liquor Handbook* (various years). Secondly, the percentage of each state's population living in counties dry for beer as given by the *Brewers' Almanac* are included. With larger percentages of populations living in dry counties, travel time to obtain alcohol increases, adding to the full price of alcohol. In addition, this measure serves to capture some of the unobserved state sentiment towards drinking which may be reflected in the drinking habits of the state's residents. Finally, the number of retail outlets per 1,000 population that are licensed to sell alcoholic beverages for on-premise or off-premise consumption is included. These data come from *Jobson's Liquor Handbook*, (various years).

ii. Illegal Drugs

The price of one gram of pure cocaine is included in some models. Prices are

derived from the System to Retrieve Information from Drug Evidence (STRIDE) maintained by the Drug Enforcement Administration (DEA) of the U.S. Department of Justice. The reported prices vary by weight and purity, so the price of one gram of pure cocaine is obtained from a regression of the natural logarithm of purchase price on the natural logarithms of weight and purity, dichotomous variables for each city and year except one, and interactions between the year and variables representing eight of the nine Census of Population divisions. (See Grossman and Chaloupka, forthcoming, for further details.) Since 1977 is the earliest year the cocaine data are available, the 1976 violence data are matched with cocaine prices from 1977.

Prices of marijuana are generally unavailable. However, by 1976, some states had decriminalized the possession of small amounts of marijuana for personal use, thus effectively lowering the full price of its use. Therefore, a dichotomous indicator for whether a state decriminalized marijuana is included in some models. Information on decriminalization comes from the *Sourcebook of Criminal Justice Statistics*, (Bureau of Justice Statistics, 1984).

iii. Individual Characteristics

Literature on domestic violence from other disciplines provides insight into the personal characteristics that lead to a predisposition towards violence. (See Gelles and Cornell, 1990 for profiles of domestic abusers and their victims.) People who were abused by their parents or saw their parents fight a lot, for example, are more likely to be violent towards their own children. In order to proxy for these two factors, dichotomous indicators are included to represent whether or not the respondent's parents used physical

punishment and if the respondent's parents hit or threw things at each other during the respondent's teenage years.

Three measures of stressful life styles are also included. The first measure is the number of children at home. More children can lead to more stress as well as more opportunities for violence. The second is a dichotomous variable indicating whether the respondent talks to other people about personal family problems in order to help relieve stress. There are differences in the wording of this question in the two survey years so this variable is omitted from the pooled models. The third is a measure of stress. In the 1976 data, this question takes the form of the number of specific stressful events encountered in the past year. These events include trouble at work, health problems, money problems, and problems with family members. In the 1985 data, the question designed to measure stress simply asks how often the respondent felt nervous or stressed in the past year. The answers can range from never to sometimes to very often. Because of the difference in the form of the stress question, this measure is omitted from the models that pool the 1976 and 1985 cross sections.

Socio-economic and demographic characteristics also play a role in determining an individual's propensity towards violence. Three indicators of race are included; black, not Hispanic; Hispanic; and other race. The missing category is white, not Hispanic. The respondent's age, gender, education, income, occupation, employment status, religion, frequency of religious service attendance (in 1976 cross section only) , and an indicator for whether the respondent is a single parent (in 1985 only) are included in all models. In addition, the child's gender and age are included in the models. Any missing values are coded at the mean of the known observations. The variables with the largest number of

missing variables for the 1976 data are whether the respondent's parents hit him or her as a teenager (16 percent of the sample missing) and whether or not the respondent's parents hit each other when the respondent was a teenager (17 percent missing). The rest of the socioeconomic and demographic variables in the 1976 data have relatively few missing variables with amounts ranging from 0 to 6 percent missing. The percentage of the sample with missing values is much smaller for the 1985 data and ranges from 0 to 3 percent missing.

One potential problem with many of the individual characteristics is that they may be correlated with the error term in the violence equations. That is, there may be some unmeasured factor that affects the outcomes of both the propensity to commit violence and the individual characteristics. The characteristics most likely to be endogenous are the number of children at home, the indicator for whether people talk to others about their problems, the measures of stress, the respondent's education, income, occupation, employment status, religiosity and single parent status. The coefficients on these potentially endogenous variables are likely to be biased if not instrumented for. However, including these variables will not bias the coefficients on the state-level regulatory variables (the variables of interest in this study) so long as the individual and state-level variables are not correlated. Models were tested that exclude the above mentioned variables from the cross sections. The results are not shown, however, the coefficients on the beer tax and the other price, availability and advertising measures for both males and females are very similar to those that include the potentially problematic individual characteristics.

VI. ESTIMATION AND RESULTS

Equation 10 serves as the basic equation for estimation. The probability of participation in violence is specified as a probit function and depends on the full price of alcohol, the price of illegal drugs and the characteristics of the parent, the child, and the household. Secondly, the amount of violence conditional on participation is estimated using ordinary least squares and is a function of the full price of alcohol, the price of illegal drugs and the above-mentioned individual characteristics. The total effect of a change in the price of alcohol on violence (the unconditional elasticity) can thus be considered as the sum of the elasticities of participation with respect to price and frequency with respect to price. Estimating separate equations for participation and frequency is an application of Cragg's (1971) two-part model for an outcome with many nonparticipants. An advantage of Cragg's model over the tobit model is that it does not constrain the coefficients on price and other variables to be the same for the two outcomes.

Equation 10 is also estimated separately for males and females. This is done because of different observed drinking and violence patterns of men and women. For example, studies have shown that men are more likely than women to become violent when drinking (see Fagan, 1990 and the references he cites). In addition, some studies have shown that females drink less than males and are more price sensitive (Kenkel, 1993, Moore and Cook, 1995, and Pacula, 1997). Likelihood ratio tests on each of the two surveys reveal that the two sexes should not be pooled.[9]

The first set of tables display the effects of the beer tax, availability and advertising variables on the probability of violence. Given that the measures of alcohol

control are the variables of interest, the individual characteristics included in each model are not shown in the tables. Results of the individual characteristics are shown below in Tables 21 and 22. Two different models are presented in each table. The first model contains the state excise tax rate on beer and the individual characteristics. The second adds to the first all price, advertising, and availability measures. Not shown are additional models which add to the beer tax and individual characteristics, only the drug prices, only the availability measures, or only the advertising measures. None of the results of these three alternative specifications differ much from the findings presented here.

There are two potential problems with the two models presented. Specifically, the limited specifications are prone to omitted variable bias if the drug, advertising or availability measures are predictors of violence. Omitted variable bias is a more serious problem in probit models than in ordinary least squares because even if the omitted variables are uncorrelated with the included variable, the coefficient on the included variable can still be inconsistent. (See Greene, 1993 and Yatchew and Griliches, 1985 for a discussion of this issue.) However, including all the relevant control variables may lead to the problems of multicollinearity. This problem may arise because states which heavily restrict advertising are more likely to restrict availability. Also, states tend to simultaneously enact laws regulating different forms of advertising.

In all results, when the dependent variable is a dichotomous indicator the equations are estimated by probit techniques. The relevant tables show the probit coefficients first, the t-statistic on the coefficients in parentheses, and the marginal effects of the coefficients in bold italics. The marginal effects shown for the dummy variables

are calculated by $\Phi(X_1b) - \Phi(X_0b)$, where Φ is the cumulative normal density, and X_0 and X_1 are vectors of the means of the independent variables except that the value of the dummy variable of interest equals 0 and 1, respectively. Marginal effects for continuous variables are calculated at the mean of the independent variables.

A. Cross Sectional Estimates by Gender

i. The 1976 Sample --Females

Table 3 shows the effectiveness of the tax on beer in reducing the probability of both severe and overall violence committed by female respondents in the 1976 sample. The coefficient on the beer tax is negative and significant in all models.[10] Beginning with severe violence, the results show that a one percent increase in the tax on beer will decrease the probability of severe violence by about 0.33 percent (which is a simple average of the elasticities of the two models). Tax elasticities are calculated by multiplying the marginal effects by the ratio of the average tax to the proportion of respondents who are violent.

The number of outlets licensed to sell liquor is positive and significant at the ten percent level indicating that increasing the number of outlets by 1 per 1000 population will increase the probability of violence towards children by about 6 percentage points. In addition, increases in the percentage of a state living in dry counties will reduce severe violence. The other availability measure, the prohibition of the sale of beer in grocery stores, does not explain any of the variation in violence, nor do the drug prices or most of the advertising restrictions. The prohibition of window displays is the only advertising measure that is negative and significant at the ten percent level. Multicollinearity among

the advertising variables may make the individual effects of the variables indistinguishable from each other. Therefore, the last rows in each table reports a chi-squared test of the illegal drug prices, availability, and advertising variables each as a set. However, the results in Table 3 indicate that the drug prices, availability and advertising measures as sets are not statistically different from zero.

The predictions of the model as outlined in the analytical framework are further upheld in the results of overall violence equations as show in columns 3 and 4 of Table 3. Here, the average tax elasticity is -0.15, about half the size of that of severe violence. However, the marginal effects for overall violence are in the same range as severe violence, that is, a one dollar increase in the beer tax would decrease the probability of either definition of violence by about 7 percentage points. In the overall violence equations, none of the availability measures are significant, although the coefficients display the anticipated signs. Only the prohibition of window displays are significant (at the 10 percent level) in reducing the probability of violence, while none of the other advertising variables or drug prices are statistically different from zero. In addition, the other advertising variables often do not have the anticipated sign. A chi-squared test reveals that multicollinearity is not masking the individual effects, for as a set, the advertising restrictions have no impact on the probability overall violence.

Table 4 reports the results of alcohol control variables on the non-punitive definitions of violence. Columns 1 and 2 show the results for the non-punitive definition of severe violence. Here, the beer tax is negative in all models, but not statistically significant. However, only 4.6 percent of the sample of women (29 respondents) admitted to having severely injured their children. Lack of variation in the dependent

variable may be the reason for the imprecision of these estimates. This claim can be justified by examining the number of observations necessary to detect a difference in the average proportion of violence by people in high versus low tax states. For example, if the 1976 sample is divided into two groups of women living in high and low tax states, the proportion of females in low tax states who commit acts of non-punitive severe violence is 0.05 and the proportion who live in high tax states and commit acts of non-punitive severe violence is 0.043. In order to detect the difference of .007 (0.05-0.043) at a 95 percent confidence level, one would need a sample size of 7,023 observations. This calculation assumes that 0.047 percent of the population of women report acts of non-punitive severe violence.[11] By contrast, using the same analysis for the severe violence indicator, 0.214 of the sample live in low tax states and report severe violence, while 0.143 live in high tax states. Only 224 observations are needed to significantly detect a difference in proportions of 0.07 (0.214-0.143) in this case. Because of the small sample size, further results for the non-punitive definition of severe violence will not be reported for the 1976 data.

By contrast, the predictions of the model as outlined in the analytical framework above are upheld in the results of columns 3 and 4 of Tables 4. The results indicate that the beer tax is significant in reducing non-punitive overall violence committed by females. The results in columns 3 and 4 are very similar to the overall violence results in columns 3 and 4 of Table 3. In both definitions of overall violence the tax on beer is negative and significant in all models and marginal effects are of similar magnitudes. In addition, similar conclusions can be drawn about the availability and advertising variables. As in the overall violence equations, none of the availability measures in the

non-punitive overall violence equations are significant in reducing violence, although the signs are as anticipated. The prohibition of window displays in liquor stores serve to reduce non-punitive overall violence, while restrictions on price advertising in newspapers and magazines will increase the probability of violence. Because of the similarities between the two definitions of overall violence, henceforth, only the results of the overall violence will be shown.

ii. The 1985 Sample --Females

The female respondents in the 1985 sample are also responsive to the state excise tax on beer. Estimates in columns 1 and 2 in Table 5 show that the beer tax is effective in reducing severe violence committed by women, with an average elasticity of -0.13. However, the coefficient on the beer tax in column 2 is only significant at the 10 percent level. The results also show that severe violence by women in 1985 is sensitive to the price of cocaine (at the ten percent level), whereas the same did not hold true for females in 1976 (see section below on illegal drugs for a discussion of this result). Another contrast to the 1976 data is that in 1985, the availability and advertising measures appear to have no impact on the probability of severe violence committed by women in 1985. This result is surprising given the larger sample size in the 1985 data. However, caution must be exercised in comparing the 1985 and 1976 cross sections because of the different composition of the two samples. This issue is further addressed below.

Turning to the more general definition of violence, columns 3 and 4 of Table 5 show negative and significant tax effects on the probability of overall violence with elasticities of -0.07 and -0.06, respectively. The corresponding elasticity for 1976 is

about -0.15. Part of the discrepancy comes from the fact that the real tax on beer (in 1982-1984 dollars) fell almost by half over the 10 year period. The marginal effects of the beer tax are much closer in the two years. In 1976, a dollar increase in the beer tax would decrease the probability of violence by about 7 or 8 percentage points. The same number for 1985 is about 4 or 5 points, only a slight decrease. In 1985, none of the availability or advertising restrictions are significant in reducing overall violence, although the signs are generally as expected.

Because of the larger sample size in the 1985 survey, the results of the non-punitive severe violence indicator as shown in columns 1 and 2 of Table 6 are more precise than the corresponding models for 1976. Similarly to the severe violence indicator in Table 5, both the coefficients on the beer tax and cocaine price are negative and significant, and restrictions on the availability and advertising measures do not reduce the probability of non-punitive severe violence. However, since the corresponding results for 1976 are not as reliable, this measure will not be used in the rest of this study.

Finally, the estimates for the non-punitive overall violence in Table 6 are also very similar to those for the broader definition of overall violence. The magnitude and the significance of the coefficient on the state excise tax on beer in the model that includes all regulatory variables is almost identical in either definition. None of the drug prices, availability measures or advertising measures explain the variation in non-punitive overall violence, which is the same result found in the overall violence equation in Table 5. Since the two definitions of violence yield such similar results, further estimates of non-punitive violence will not be reported.

iii. The 1985 Samples of Married Females, Single Females and Females With No Infants

In order to make a more direct comparison to the 1976 cross section, certain observations were omitted from the 1985 data in order to reflect the same criteria for inclusion as 1976. Specifically, mothers with infants and mothers who are single parents are omitted because these two categories are not included in the 1976 survey. Fifteen percent of all females in the 1985 sample have infant children, while 24 percent are single mothers with children of any age. Three percent of the females are both single and have infant children. Table 7 shows the results of the reduced form model for both severe and overall violence. The coefficient on the beer tax is negative in both definitions of violence, but the magnitude of these are in general, too small to be considered statistically different from zero. This is in direct contrast to both the 1976 results and the 1985 full sample results.

One possible explanation for the observed inability of the beer tax to reduce violence in the limited 1985 sample is that it is inappropriate to restrict the sample. For example, it is possible that the 1976 sample may include people who share the same characteristics as the single parents in the 1985 sample. The national divorce rate was much higher in 1985 than in 1976. There were 128 divorced persons per 1,000 married persons versus 69 divorced persons per 1,000 married persons in 1976, (Bureau of the Census, 1989) so it is plausible that the 1976 sample includes women who would otherwise be divorced were it 1985. Since the probability of divorce was much lower in 1976, these women are more likely to be married and included in 1976 when during later

time period they may have been part of a single parent sample. Unfortunately, there is no way to test this hypothesis with these data.

Another explanation is that single women or woman with infants may in fact behave differently than married women. Looking at single women versus married women (without regard to the child's age), Table 8 shows that in 1985 single mothers get drunk more often than married females, and they drink more per sitting. However, Table 8 also shows that single parents are no more violent than their married counterparts.[12] By contrast, women with infants are much less violent but drink more than women with older children.

Limiting the 1985 sample to single mothers yields the results presented in Table 9 where the two models of severe and overall violence are shown. The coefficient on the beer tax is negative in all models, is significant at the 5 percent level in the most inclusive models and is significant at the 10 percent level in the least inclusive models. With the exception of the prohibition of consumer novelties in the overall violence equation, none of the advertising or availability measures have explanatory power.

Table 10 shows the effectiveness of the alcohol regulatory variables in reducing the probability of violence aimed at infants. According to the results shown, an increase in the beer tax will reduce the probability of severe violence (this result is significant at the 10 percent level), but the reduction in the probability of overall violence is less certain. A second interesting result that appears is that the marijuana decriminalization indicator is positive and significant in the severe violence equation. See the discussion below in the section on illegal drugs for the interpretation of this result. As for the availability and advertising measures, the number of outlets is positive and significant in

the overall violence equation, as is the coefficient on the prohibition of grocery store sales of beer in the severe violence equation. This last result is contrary to the predictions of the model.

Given that single women and women with infants are only included in one survey year and because of the small sample sizes, these conclusions about differences between the violence and drinking behaviors of single mothers should be taken merely as preliminary results. Future work may help shed some light on the observed differences in violence and drinking behaviors between married and single women and between women with infants and those with older children.

iv. Males 1976 and 1985

Tables 11 and 12 show results from the 1976 and 1985 cross sections for males. The issue of the presence of single men in the 1985 sample is not problematic because single fathers make up only 4.6 percent of the sample of males. There are 214 fathers of infants (20 percent) in the 1985 male sample, but the results are the same regardless of inclusion of these fathers.

Beginning with severe violence, in the 1976 cross section the coefficient on the beer tax is negative but not significant. The magnitude of this effect is greatly reduced when the other control variables are added. In addition, the tax on beer is negative but insignificant in the 1976 overall violence equations and in the least inclusive overall violence equation in 1985. The coefficients in rest of the models in the 1985 data are positive, and surprisingly significant in the severe violence equations. I have no explanation for this last result.

Even though the tax on beer seems to be ineffective in reducing the probabilities of violence committed by males, there is some evidence that the other regulatory variables may be effective. For example, in 1976, increases in the percentage of the state's population living in counties dry for beer and prohibitions on window displays will reduce the probability of overall violence. In 1985, prohibitions on price advertising in newspapers or magazines have the same effect at the 10 percent significance level.

B. 1976 and 1985 Pooled Results

There are two possible problems with the cross sectional analyses. The first is that small sample sizes may not allow for precise estimates of the coefficients. A second problem is that it is impossible to control for unobservable state effects or sentiments that may influence alcohol consumption or violence rates. Pooling the 1976 and 1985 cross sections allows both of these issues to be addressed. By pooling, sample sizes will increase, and unobserved time-invariant state effects can be controlled for by including dummy variables for all of the states except for one.

Tables 13 and 14 show the pooled results for females and males, respectively. It is unclear whether it is appropriate to make the 1985 female sample similar to the 1976 data in terms of demographics by omitting respondents with infants and respondents who are single mothers from the pooled samples. However, given the above results showing that the probability of violence from single parents is affected by the beer tax, and based on the argument that some women who were married in 1976 may not have been were it 1985, it seems more appropriate to leave the 1985 sample as is and not exclude any observations. Nevertheless, including the mothers of infants while excluding the single

women does not alter the results at all. Similarly, including single women while excluding mothers of infants does not alter the results. Only excluding both single women and women with infants in the pooled sample alters the findings slightly for women, for the beer tax is negative and significant in all models regardless of the inclusion or exclusion of the state dummy variables (results not shown). In this case, the magnitude of the tax effect is larger than that of the full sample.

A few words of caution must be put forth in relying on the pooled models. First of all, some observations had to be deleted from the regressions that include state dummies because certain states had only a few respondents in them. If it happens that those few respondents all have the same outcome for violence then the predicted probability of violence based on those states would have to be the same as the outcome. The probit coefficient must then approach plus or minus infinity. In order to eliminate this problem, individuals in states where the respondents all had the same response to the violence question were omitted from the regressions. Next, the indicator for whether grocery stores are allowed to sell beer is omitted from all models with state dummy variables because this variable is state-specific and does not change over time, making it collinear with the state dummies. Finally, one may question the validity of pooling two years ten years apart. It is quite plausible that the slope coefficients for many if not all of the variables had changed over the sample period. A likelihood ratio test for pooling is included in Tables 13 and 14. In all cases, the test reveals that the two years should not be pooled. Therefore, I do not rely heavily on the pooled results for magnitudes of the effect of increases of the beer tax on violence, rather I use these results as a piece of

evidence to show that the effects of the tax are not spurious results arising from some omitted state sentiment towards drinking.

i. Pooled Females

For females, the cross sectional analyses showed separately that increases in the beer tax would reduce the probability of both severe and overall violence. Not surprisingly then, the pooled sample exclusive of the state fixed effects shows the same results (see Table 13). It is interesting to note that pooling the sample and thereby increasing the sample size does not result in measurable effects of the advertising or availability measures on violence, even though in the 1976 cross section both the percent dry and the number of licensed outlets were statistically significant in the severe violence equation.

When the state dummies are added to the models in Table 13, the coefficients on the beer tax remain negative, but in general, lose significance. However, the magnitude of the coefficients are largely unaffected by the inclusion of the state dummies, particularly for the severe violence equations. Given that as a set, the state dummies are not significant, these results most likely reflect collinearity between the state dummy variables and the state-specific regulatory variables. In other words, state dummies act as irrelevant included variables. Green (1993, p. 248) shows that including irrelevant variables that are correlated with other independent variables results in coefficients that are unbiased but are inefficient. Here, the state dummies are correlated with the state excise tax on beer and do not explain the variation in violence by capturing any unobserved state sentiment towards drinking or violence.

ii. Pooled Males

For males, the results from the two cross sections show that an increase in the beer tax has no effect on the probability of either type of violence. The pooled results without the state dummies confirm this result for severe violence (columns 1 and 2 of Table 14), and for overall violence when the advertising and availability measures are included (see column 6). However, when these control variables are omitted, the beer tax does become significant in reducing the probability of overall violence for men (see column 5).[13]

A more interesting result that arises from the pooled sample of males occurs when the state dummies are included. For the severe violence equations in columns 3 and 4, including the state dummies results in negative and significant coefficients on the state excise tax. Increases in the percentage of a state living in counties dry for beer may also be effective in reducing severe violence by males. The prohibitions of price advertising in newspapers and magazines is significant in reducing the probability of severe violence. Both of these last two results hold only at the 10 percent level. However, because of the statistical inappropriateness of pooling the data it is difficult to draw conclusions about the propensity of increases in the beer tax to reduce violence aimed at children by their fathers. This is an area for further research.

C. Discussion of the Results of Illegal Drug Prices

One result from the 1985 cross section of women that does not appear in the 1976 sample is that the price of cocaine may play a role in determining the probability of

violence. However, this result disappears once the two years are pooled. Coefficients on the marijuana decriminalization variable are never statistically different from zero. Therefore, it would seem that neither increases in the price of marijuana or cocaine has any effect on the incidence of violence. However, because of the complex interaction of drugs, alcohol, and violence, there are many different ways of obtaining coefficients that are greater than, less than, or equal to zero. The effect of a change in the price of an illegal drug on violence works through two mechanisms. The first is the direct effect of consumption of the drug on violence. The second is the relationship between drug consumption, alcohol consumption, and violence. Depending on whether drugs and alcohol are substitutes or complements, a decrease in the price of a one substance may decrease or increase consumption of the other two substances, respectively. One can obtain a zero coefficient if the direct effect of the drug on violence is zero and the drug is neither a substitute or a complement with alcohol. This seems to be the likely scenario given the propensity of drugs to induce violence is still in question in the literature (see the discussion above on the links between alcohol, drugs and violence). The relationship between drug and alcohol consumption for adults is still for the most part unknown, while there is some evidence that alcohol and marijuana may be substitutes for youths and young adults (see Chaloupka and Laixuthai, 1997 and DiNardo and Lemieux, 1992). Even if alcohol and marijuana are substitutes, the effect of decriminalization on violence can be ambiguous because of increased marijuana use and decreased alcohol use.

D. Discussion of the Results of the Advertising Variables

It is not surprising that the effects of bans on certain types of advertising

have no effect on the probability of violence. Saffer (1995) shows that bans on only one source of advertising will increase the marginal productivity of advertising in the remaining media, and that a ban itself will not reduce the amount of advertising, rather it would induce a substitution to other sources or media. To highlight the possibility of switching to other sources, in the both the 1976 and 1985 data no state in included in the samples had enacted bans on all four of the advertising variables used. In fact, the mean number of bans in both years is under 1.

In order to see if more bans of any type results in less violence, models were tested that include a count of the number of bans in each state rather than dichotomous indicators for each of the four advertising variables. The count variable included not only bans on window displays, billboards, consumer novelties and price advertising in newspapers and magazines, but also includes bans on in-store displays (1976 only) and circulars. For both males and females in 1976, this count variable is negative, but never significant. In the 1985 data, this count variable is never significant, and the sign changes depending on the gender and the other included variables. In sum, the bans on advertising seem to have no effects on the probability of violence in either year.

E. Number Of Acts Of Violence Given Positive Violence

Tables 15 and 16 show the results of the log of the number of acts of overall violence towards children for respondents who had reported at least one violent incident in the past year. Only the models that include all price, availability and advertising variables are shown. As stated previously, I caution the meaning of these results because

of the problems of the interpretation of the survey question. Interestingly, the coefficient on the beer tax is negative, but never significant for females, while for males, the coefficient is negative in three of the four models and is statistically significant in two of the three. These results may reflect different pattern of violence by males and females. For example, a woman's decision to be violent or not may be affected by alcohol consumption, while the intensity rather than the propensity of violence may be sensitive to alcohol consumption for males.

F. Alternative Dependent Variables

One criticism of the dichotomous dependent variables used in this study so far is that there is no measure of less severe acts of violence only. Both the severe and overall violence indicators include people who commit acts that are considered severe violence. It may be interesting to see if the results of these previous models hold for people who only commit less severe violence. Therefore, as described above, two alternative dependent variables are evaluated.

Tables 17 and 18 show the results of the dichotomous indicator for mild violence only for 1976 and 1985, respectively. Beginning with Table 17, the coefficient on the beer tax is negative, but never significant. The coefficients on the illegal drug prices are never statistically different from zero, and neither is the number of outlets licensed to sell alcohol. Increases in the percent of the state's population living in dry counties may reduce mild violence for men. In addition, for males, many of the advertising variables are statistically significant, but often do not display the anticipated sign.

The results for mild violence in 1985 are similar to that in 1976. Here, the beer

tax is significant in reducing mild violence only in the sample of males when the drug, availability and advertising variables are omitted and only at the 10 percent level. Again, increases in the percentage in dry counties may reduce mild violence by males. Finally, restrictions on consumer novelties and price advertising in newspapers and magazines will reduce violence by males, while having no effects on violence by women.

In sum, there is much less evidence that violence classified as mild is affected by changes in the tax on beer. For males, making beer less available may reduce mild violence and restrictions on advertising may also affect violence, although the direction is not necessarily as desired. For females, there is little evidence that any of the alcohol control variables can affect the incidence of mild violence.

Tables 19 and 20 show the results from the trichotomous indicator of no violence, mild violence and severe violence. The effects of changes in the beer tax and of the other regulatory variables on the probability of being in one of the categories is not read straight from the output. For any outcome with three categories, one can say with certainty that if the coefficient is negative then the probability of being in the lowest category rises and the probability of being in the highest categories falls. The direction of the change in the probability of being in the middle category must be calculated. For both males and females in the 1976 sample and males in the 1985 sample, any negative coefficient will increase the probability of being in the middle category. In 1985, a negative coefficient will decrease the probability of being in the middle category for females.

Looking at the statistical significance of the coefficients in Tables 19 and 20, the results show the tax on beer is negative and significant for women and is not statistically

different from zero for men. The coefficient on the number of outlets is positive and significant at the 10 percent level for women in 1976, but has no effects on violence by women in 1985 or for men in either year. Similarly, the prohibition of window displays may have an effect on violence for women in 1976 (at the 10 percent significance level) but not in 1985. Finally, violence by males is not sensitive to any alcohol control or drug measures in either year.

G. Individual Characteristics

Tables 21 and 22 show the results of the socio-economic and demographic characteristics of the respondent on the different measures of the probability of violence towards children. The impacts of these variables are not sensitive to the inclusion or exclusion of the drug prices, alcohol advertising and availability measures, and therefore, results from the models which exclude the drug prices, availability and advertising variables are shown.

Table 21 shows the results for females in both years of the sample and for both definitions of violence. Primarily, if as a teenager, the respondent was physically punished by her parents, the probability of either definition of violence will increase in both years. Females may also learn to be violent by having watched their parents hit each other (see the 1985 results). These results support the theory that there is an intergenerational component to violence (see Gelles and Cornell, 1990). In other words, children may learn from their parents' behavior that it is acceptable to be violent towards other family members.

Race plays a role in that black women (in 1985) and Hispanic women (in 1976)

are more likely than white women to be violent. Gender plays a role in that female children are less likely to be hit by their mothers than male children. Employment status of the mother has no effect on the probability of either type of violence in either year, nor does occupation. Religion may play a role, except the significance and sign of the effects for the different religions vary across the two years. More self-reported stress will also increase the probability of violence by women in the 1985 sample.

The coefficient on the respondent's age is negative in both 1976 and 1985 for both definitions of violence, yet is only significant in 1976. Not shown are additional models that include the square of the respondent's age. This quadratic term is included in order to allow the effects of age to enter the model in a non-linear fashion. However, in either year, the coefficient on age-squared is negative but not significant, indicating that age is related to violence in a linear fashion.

Education and income both do not determine the incidence of violence. This result is confirmed by literature on domestic violence in other disciplines (see Gelles and Cornell, 1990). Adding a quadratic term for income has no effect on the results. In severe violence in 1976 and both definitions of violence in 1985, adding the quadratic term for education still results in no effect of education on the probability of violence. In these models, the coefficients on education and education squared are positive and insignificant, and negative and insignificant, respectively. Only for overall violence in 1976 are the coefficients on these two terms are positive and significant, and negative and significant, respectively.

With the exception of the overall violence in 1976, the results for income and education are not surprising. Turing back to the theoretical model of violence, an

increase in the wage rate (as proxied for by income) will have an ambiguous effect on violence. This occurs because a wage increase will increase the shadow price of violence and hence will decrease violence. But the increase in income from the wage increase will allow more violence to be purchased, leading to an ambiguous effect of a wage increase on violence. A similar story can be told for education if education is a proxy for higher wages.

In general, the variables that increase the probability of violence committed by women are the same as those for men (see Table 22). Primarily, if as a teenager, the respondent was hit by his parents, the probability of either definition of violence will increase in either year. Watching their parents hit each other does not have an effect on the probability of violence by males. Hispanic men are less likely to be violent than white men. The employment status of the father does not have much of an effect on violence nor do the religion variables. As with the females, age, education and income do not determine the incidence of violence and adding quadratics do not change these results any. Lastly, for men in either year and either definition of violence, having a female child or an older child will lower the probability of violence, while having more children at home will increase the probability.

VII. ALCOHOL CONSUMPTION

The theory on which this study is based rests on the assumption that alcohol consumption is positively related to violence. The Physical Violence in American Family surveys contain some measures of alcohol consumption, thus allowing for an estimation of this structural relationship. In the 1976 survey, the only question on alcohol

consumption asks how often the respondent gets drunk. The answers are categorized into never, rarely, occasionally, often, very often, or almost always. Note that this question does not put a time frame on the drunkenness question. Since violence and beer taxes are in regards to the past year, the question on drunkenness in 1976 may not be a good representation of alcohol consumption in the past year. In 1985, however, the same question is asked in regards to the past year, and this time, the answers are coded as the actual number of times the respondent got drunk. In addition, the 1985 survey also gathers information on the number of drinks a person has during a typical sitting.

Drunkenness may be a crude measure of alcohol consumption, but it is not necessarily a bad one. Recall that one of the reasons alcohol and violence may be linked is because of the pharmacological effects of alcohol. A person may have to physically feel the effects of alcohol before acting courageously or violently or simply differently than without alcohol. In other words, a person will probably be drunk before his or her behavior will change. Table 1 shows the means of the drunkenness variables for men and women in each year of the survey.

Estimates of the structural model as given by equation 2 are shown in Tables 23 through 30. In each table, the measure of alcohol consumption is treated as both exogenous and endogenous. The theory presented in the study strongly suggests that alcohol consumption should be treated as endogenous for the following reasons: First, equation 7 shows that alcohol consumption is partly determined by time spent in violence.[14] Intuitively, this reverse causality can be explained by the argument that if a person is planning on being violent, they may drink in order to lower the probability of facing monetary costs. Secondly, alcohol consumption may be correlated with the error

term in the violence equation if there are some unmeasured characteristics that makes people both drink and be violent. In this case, alcohol consumption would still be endogenous and should be instrumented for in the violence equations. Linear probability models with standard errors corrected for heteroskedasticity are used to estimate all structural equations.

As a first step in estimating the structural equation, the responses for how often a parent gets drunk is transformed into a dichotomous indicator in both years of the survey. This is done in order to allow the results for the 1976 data to be compared to and pooled with the 1985 data. A respondent in the 1976 data was given a zero if he or she reported getting drunk either never or rarely, and was given a one otherwise. A respondent in the 1985 data was given a zero if he or she reported getting drunk either zero, one, or two times in the past year and a one if the response was more than two times. Categorizing less than three incidents of drunkenness as approximate to never or rarely being drunk is an arbitrary assignment. However, increasing the number of times classified as never or rarely to three times in the past year does not alter the results presented.

Table 23 shows the results of the dichotomous indicator of drunkenness for both females and males in the 1976 data, the 1985 data and in pooled models. Columns 1 and 4 treat drunkenness as exogenous and columns 2, 3, 5, and 6 treat drunkenness as endogenous. In columns 2 and 5, the only instrument is the state excise tax on beer. In columns 3 and 6, the instruments include all of the price and regulatory variables: the state excise tax on beer; the marijuana decriminalization indicator; the price of cocaine; the three availability measures (the number of outlets licensed to sell beer, the percentage of a state's population living in dry counties, and an indicator for whether grocery stores

are prohibited from selling beer); and the four advertising variables (indicators for prohibition of billboards, window displays in liquor stores, consumer novelty giveaways and price advertising in newspapers and magazines).

Before discussing the results, I would like to point out that with the exception of the beer tax, all the regulatory variables as a set do not serve as good instruments. Bound et al. (1995) show that as the F-statistic on the instruments gets smaller, the bias in the TSLS estimates approaches that of OLS. Table 24 shows the first stage estimates for females and males for the 1976, 1985 and the pooled data. Here, none of the F-statistics on the more inclusive set of instruments for either males or females are significant except in the pooled models. In other words, in the cross sectional data, the TSLS models with all regulatory variables as instruments do not display reliable estimates. By contrast, the coefficients on the state excise tax on beer in the first stage estimates that omit the other regulatory variables are negative and statistically different from zero for females in the 1985 data and for both males and females in the pooled data, and are negative and significant at the 10 percent level for females in the 1976 data. For this reason, in discussing the results of Table 23, the TSLS models that include all the regulatory variables as instruments will be ignored.

Focusing first on women in Table 23, the results show that the dichotomous indicator of drunkenness is in general, positively related to the probability of violence in both years. The coefficients in the OLS estimates are positive but only statistically significant in the overall violence equation in 1985. The coefficients in the TSLS models (columns 2 and 5) are only significant at the 10 percent level in a one-tailed test in both years. However, the magnitude of the coefficients in columns 2 and 5 is much larger than

those in the OLS equations. A Hausman test reveals that exogenity can be rejected so the TSLS models are the proper ones to focus on. The pooled models for females reflect the results of the two cross sections in that the coefficient on drunkenness is positive and significant in all specifications, and again, exogenity is rejected. Table 24 also shows that the beer tax is a valid instrument for all females TSLS equations.

The story for males in Table 23 is slightly different from that of females. The coefficients on drunkenness are positive in both definitions of violence in 1976 and in the overall definition of violence in 1985, and are negative in the severe violence equations of 1985. However, none of the coefficients in the male equations are significant in any but the overall violence pooled models where the significance level is 10 percent in a one tailed test.

A. Alcohol Consumption in the 1976 Survey

The results just discussed focus on drunkenness as a dichotomous indicator. Because the classification into the two categories is done arbitrarily, drunkenness is also examined in the forms as specified on the survey forms. Beginning with the 1976 data, tables 25 and 25 present estimates of the effects of different frequencies of drunkenness on severe and overall violence for females and males, respectively. Columns 1 and 2 of each table treat drunkenness as exogenous and columns 3-6 treat drunkenness as endogenous. Since the drunkenness question in the 1976 survey has categorical responses, each response in the ordinary least squares models has been entered as a dummy variable. The models in Panel A use all 5 categories of drunkenness. Even though the initial question gives a choice of six responses, because of small number of

responses in the highest categories, the responses of very often and always are combined. Never is the omitted category. The models in Panel B use 3 categories: Never or rarely (the omitted category), occasionally or often, and very often or always. When a response to a category predicts violence perfectly, that response and the corresponding observations are omitted from the regressions. For example, the three women who said they drink very often or always also said they were never severely violent towards their children. Such observations have to be omitted in order to estimate the probit coefficient.

The two-stage estimates in columns 3-6 of Tables 25 and 27 are not comparable to the estimates in columns 1 and 2. The OLS models have dummies corresponding to each of the categories, while the technique for the two-stage least squares estimation requires an ordered probit in the first stage. The predicted index from the ordered probit is then used as an instrument in the second stage. In columns 3 and 5, the only instrument is the state excise tax on beer. In columns 4 and 6, the instruments include all of the price and regulatory variables. For females, the chi-squared on the price and regulatory variables as a set is significant at the 5 percent level when drunkenness is based on all 5 categories, indicating that including the full set of instruments may not bias the results towards the OLS results (see the first stage estimates in Table 26).

Beginning with the OLS results for women (Table 25, columns 1 and 2, panel A), only the category of rarely (for overall violence) is significant at the 10 percent level in increasing the probability of violence. All coefficients in the severe violence equations are positive, but none of these are significant. Collapsing the categories into three from five does not alter the results much (see panel B). However, treating drunkenness as endogenous in the 1976 data yields vastly different results. Table 25 shows that the index

is positive and significant in both panels A and B when severe violence is the dependent variable, and is positive and significant when the beer tax is the only instrument in the overall violence equations.

The results for the structural model for males as shown in Table 27 is consistent with the results from the reduced form where increases in the beer tax had no effects on violence. The measures of drunkenness, whether they are estimated by ordinary least squares or two-stage least squares are never statistically significant at conventional levels, and often display negative rather than positive signs. These results indicate that there is no observed relationship between frequency of drunkenness and the probability of violence for males in 1976. Table 28 shows the first stage results of the effect of the alcohol regulatory variables on the probability of the frequency of drunkenness. Although negative, the magnitude of the coefficients on the beer tax are too small to be considered statistically different from zero. In addition, none of the availability or advertising variables affect the frequency of drunkenness.

B. Alcohol Consumption in the 1985 Data

Table 29 shows the effects of alcohol consumption on the probability of violence in the 1985 data. Recall that the 1985 survey collected data on the actual number of times a respondent got drunk as well as the number of drinks in sitting. Both these measures of drinking are shown in Table 29 for females and males. As in the previous tables, the relevant measure of alcohol consumption is treated as both exogenous and endogenous with the beer tax as the only instrument as well as all regulatory variables as instruments. Ignoring for the moment the TSLS models that include all the regulatory

variables, the results for females are surprising in that the results show that the number of times the respondent gets drunk is positively related to both measures of violence , but this effect is only statistically different from zero in the OLS equation. Looking at both TSLS specifications, the sign of the coefficient on drunkenness changes in the severe violence equations depending on the set of instruments. The first stage results help to explain the results for Table 30 which shows that neither the beer tax nor any of the other regulatory variables explain the number of times a female gets drunk. The second part of Table 29 shows that violence by males is not affected by drunkenness and from Table 30, drunkenness by males is not affected by price or availability measures.

Finally, Table 29 also shows the propensity of the number of drinks per sitting to alter the probability of violence. Of all measures of alcohol consumption, for women, this measure best reflects what is expected a priori. The coefficients on number of drinks is positive and significant at at least the 10 percent level in five of the six equations, exogenity is rejected, and the first stage results in Table 30 are significant. Again, the story does not hold for males where the coefficients on number of drinks is not always positive, is rarely significant and the first stage results are not significant.

Given that a consistent result in the reduced form models is that increases in the beer tax have strong negative effects on the probability of violence committed by women in both years, it is surprising that the structural equations do not consistently reflect a strong positive relationship between the different measures of alcohol consumption and violence committed by women. One explanation for this result is that drunkenness is not a good proxy for alcohol consumption that is a predecessor to violence. One could tell a story where too much alcohol decreases a perpetrators efficiency in the production of

violence (for example, a person is too drunk to stand much less hit a child with any accuracy). In this case, a more appropriate measure of alcohol consumption might be the number of drinks consumed prior to the act of violence. Another explanation may simply be that all measures of consumption are reported with error. This would lead to inconsistent estimators that are biased towards zero. Measurement error may be the culprit because previous research has show that alcohol consumption by both males and females is price sensitive (see Kenkel, 1993 and Moore and Cook, 1995). In the estimates presented here however, in almost all cases for males, the coefficients on the beer tax in the demand equations for drunkenness and number of drinks per sitting are negative, but are not statistically different from zero. A next step for future research is to get better data on alcohol consumption in order to examine the relationship between amounts of consumption and violence more closely.

The mechanism through which changes in the beer tax affects violence is through a change in consumption. In symbols this can be written as $\partial V/\partial T=\partial V/\partial C * \partial C/\partial T$. That is, the change in violence due to a change in the tax is the product of the change in violence due to a change in consumption and the change in consumption resulting from a change in the tax. This section provides estimates of $\partial V/\partial C$ and $\partial C/\partial T$. Earlier sections showed estimates of $\partial V/\partial T$. The product of $\partial V/\partial C$ and $\partial C/\partial T$ allows for a comparison with the reduced form estimates of $\partial V/\partial T$ in order to see if the estimates presented are realistic. Using the coefficients from the overall violence equations in Tables 29 and 30, the product of the change in violence with respect to the number of drinks per sitting and the change in number of drinks per sitting with respect to the tax equals –0.043 for females and –0.019 for males.[15] These number are rather similar to those from the

reduced form estimates of Table 5 for females and Table 12 for males. These tables show that a dollar increase in the beer tax will reduce the probability of violence by 0.051 for females and 0.023 for males.

VIII. DISCUSSION

The main conclusion from the results presented in this study is that increases in the state excise tax on beer will reduce the probability of violence committed by females, but have no effect on the propensity of men to be violent. For females, a 10 percent increase in the beer tax will decrease the probability of severe violence by about 3.3 percent in the 1976 data and 1.3 percent in the 1985 data. A 10 percent increase in the beer tax will decrease the probability of overall violence committed by women by 1.5 percent in 1976 and 0.65 percent in 1985. Increases in drug prices would have no effects on violence aimed at children committed by either parent, while restrictions on advertising and availability of alcohol have ambiguous effects.

From the analyses presented in this study, it is clear that there are inherent differences in violence committed by fathers and mothers. First, females are more likely to be violent towards their children then men. Secondly, the probability of violence by women is more sensitive to changes in the price of beer whereas the amount of violence does not seem to be price sensitive. The converse may be true for males, although because of the difficulty in the interpretation of the frequency measure used in this study, these claims should only be taken as preliminary. If it is true that the frequency of child violence committed by fathers decreases with increases in beer prices, then any policy which increases the price of beer will decrease violence aimed at children by either

parent. While increasing the tax on beer would lower violence, any policy decisions must weight the cost of raising the tax on beer versus the benefits of the reduction in child abuse. Raising the beer tax would serve to penalize people who consume alcohol but who are not violent.

Nevertheless, according to the Bureau of the Census (1977) there were 40 million children between the ages of 3 and 17 living with both parents in 1975. If 10 percent were the victims of severe violence by their mothers (4 million) then a 10 percent increase in the beer tax would have lowered the number of abused children by about 129,360. The same analysis for 1985 would result in a reduction of 57,300 children who were severely abused.

APPENDIX 1

There is sufficient statistical evidence against pooling the males and females together in the analyses of the incidence of violence against children. Nevertheless, it may be interesting to see the results when the genders are pooled. The following sections discuss the results of the dichotomous indicators of severe and overall violence (Table A1), and the number of acts of violence given positive violence (Table A2) for the 1976 data.

A. Overall Violence, Pooled Genders, 1976

Beginning with the overall violence indicator, the most striking finding in columns 1 and 2 of Table A1 is the negative and statistically significant coefficient of the excise tax on beer. That is, as the state excise tax on beer increases, the probability of overall violence towards children decreases. The statistical significance of this result is robust across both specifications. The tax elasticity is about -0.12 in either specification. Tax elasticities are calculated by multiplying the marginal effects by the ratio of the average tax ($0.80 per case) to the proportion of respondents who are violent.

The coefficient on the percentage of a state's population living in dry counties is negative and significant, indicating that as the percentage living in dry counties increases, the probability of violence towards children decreases. The coefficients on the indicator for whether grocery stores can sell beer and on the number of outlets licensed to sell liquor have the expected signs, but are not significant.

With the exception of the prohibition of window displays, the advertising variables in Table A1, column 2, are insignificant individually and do not have the expected signs. The prohibition of displays in liquor store windows lowers the

probability of violence towards children by about 16 percentage points. Multicollinearity among the advertising variables may make the individual effects of the variables indistinguishable from each other. Therefore, the last row in Table A3 reports a chi-squared test of the availability and advertising variables each as a set. However, the results indicate that the drug prices, availability and advertising measures as sets are not statistically different from zero.

Turning to more severe acts of violence, the results in columns 3 and 4 of Table A1 show negative and significant effects of the tax on beer. The ability of the state excise tax on beer to lower the probability of severe violence is greater than the effect on overall violence. The tax elasticities in columns 3 and 4 of Table A1 are -0.29 and -0.16, respectively. A simple average of these estimates yields a tax elasticity of -0.23 for severe violence as compared to an average of -0.12 for overall violence.

By contrast with the overall violence equation where a decrease in the number of outlets has no effect, a decrease in the number of outlets will decrease the probability of severe violence. The marginal effect of the number of outlets equals 0.04, and is statistically significant. This means that for every one less outlet per 1,000 people, the probability of severe violence will be reduced by 4 percentage points.

The two other availability measures, the percentage of a state's population living in dry counties and the indicator for whether beer is permitted to be sold in grocery stores, are not statistically significant, although the sign on the percent dry is as anticipated. Finally, the advertising variables in column 4 of Table A1 are never statistically significant individually or as a set.

The results of the socio-economic and demographic characteristics of the respondent on the three different measures of violence are shown in Table A3. The impact of these variables are not sensitive to the inclusion or exclusion of the alcohol advertising and availability measures. Factors that serve to increase both the probability of severe and overall violence include whether the respondent was hit by his/her parents as a teenager and having more children at home. The age and gender of the child also contribute significantly, with males and young children more likely to be the victim of violence. Being a female respondent serves to increase the probability of severe violence only. The results also show that older people are less likely to be violent toward their children as are those of certain religious faiths, and in the case of overall violence, those with higher incomes. These results are consistent with other studies on child abuse.

B. Number of Acts of Violence, Pooled Genders, 1976

Table A2 shows the results of the log of the number of acts of overall violence towards children for respondents who had reported at least one violent incident in the past year. As stated previously, I am cautious of the meaning of these results due to the problems of the interpretation of the survey question. Nevertheless, the results indicate that the state excise tax on beer is negatively and statistically significantly related to the number of acts of violence. Specifically, a 1 percent increase in the tax on beer will reduce the number of acts of overall violence by 0.10 percent in column 1 and 0.085 percent in column 2. The average elasticity is -0.093. The availability measures are not statistically significant, but two of the advertising variables--the prohibition of billboards and of window displays--are statistically significant. However, the coefficient on window displays are significant only at the 10 percent level, and does not display the

anticipated sign.

The socio-economic and demographic variables that are significant in explaining the frequency of violence are different from those that explain the probability of violence. (See Appendix Table A3.) Being female, having been hit as a teenager, and having a male child all increase the probability of violence. However, these factors are not significant in predicting the frequency of violence. The variables that are significant in reducing the frequency of violence are increases in the education of the respondent and the age of the child. In addition, respondents who are of no religious affiliation commit less violence than those of other religious faiths.

FOOTNOTES

[1] The term "child abuse" in Gil's study refers to physical violence only. This term is also commonly used to describe sexual abuse and neglect as well as physical abuse (this is the case in the next two studies cited). The terms "child abuse" and "violence towards children" are used in this study to represent physical violence only. Other types of abuse are not considered here.

[2] An alternative specification would be to have a good, Z, enter the utility function directly. Z would represent control over the child, stress relief, or the quality of the child. Z would be produced by violence (which could enter positively or negatively) and by other factors, such as verbal conflict resolution techniques in the case of control or the child's health and education in the case of child quality. The addition of Z would not change any of the predictions of the model.

[3] Drug use can also be considered here. Drugs will enter into the discussion in the same manner as alcohol and are therefore omitted.

[4] While technically an efficiency parameter, in the reduced form, α is indistinguishable from taste variables.

[5] The state oversampling was done to increase the minimum sample sizes of many states. Accounting for the state oversample by weighting does not alter the results. All results presented are unweighted.

[6] The omission of the item burned or scalded in the 1976 data is not problematic for comparison purposes because all respondents except for one who replied yes to burned or scaled had also responded positively to at least one other item in the severe violence scale.

[7] There are a few observations that report extremely high frequencies for very violent acts. For example, one respondent reported using a knife or gun 15 or more times in the past year on the child. The use of logs helps to give less weight to outliers.

[8] Drug stores can also sell beer and liquor in some states, but this variable is not used because it is highly collinear with the indicator for grocery store sales.

[9] The calculated test statistics in 1976 are 48.00 and 56.27 for severe and overall violence, respectively. The corresponding values for the 1985 data are 40.07 and 44.13. The critical value for a χ^2 with 24 degrees of freedom is 36.415 at the 5 percent level and 42.98 at the 1 percent level.

[10] Unless otherwise mentioned, statistical significance refers to a two-tailed test at the 5 percent level.

[11] The formula for the number of observations necessary to detect a difference at a 5 percent significance level is:

$N= (2*1.96^2 * p(1-p))/D^2$ where p is the proportion of the population who report the observed attribute, violence. Since p is never known in practice, the sample estimate is used instead. D is the difference in the proportion of violent people who live in high and low tax states.

[12] The proportions are not statistically different from each other.

[13] The sample sizes are larger without the state dummies, because including the state indicators results in some observations where the state dummies predicts violence perfectly. Such observations must be excluded in order to estimated coefficients. Limiting the models without the state dummies to the same observations as those with the state dummies does not alter the results any.

[14] The first term in equation 7 is the difference in utilities in the two states. This difference is simply the losses from violence, which are a function of time spent in violence.

[15] The coefficients used come from column 5 where the beer tax is the only instrument.

Table 1
Definitions, Means and Standard Deviations

Variable Name	Definition	Mean (Standard Deviation)			
		1976		1985	
		Female	Male	Female	Male
Indicator of severe violence	Dichotomous variable that equals 1 if the respondent had in the past year done any of the following acts of violence to the child: kicked, bit or hit with fist; hit or tried to hit with something; beat up; threaten to or used a knife or gun.	0.180 (0.384)	0.101 (0.302)	0.114 (0.318)	0.094 (0.292)
Indicator of overall violence toward children	Dichotomous variable that equals 1 if the respondent had in the past year done any of the following acts of violence to the child: threw something at the child; pushed, grabbed or shoved; kicked, bit or hit with fist; hit or tried to hit with something; beat up; threaten to or used a knife or gun.	0.385 (0.487)	0.323 (0.468)	0.333 (0.471)	0.305 (0.460)
Indicator of non-punitive severe violence	Dichotomous variable that equals 1 if the respondent had in the past year done any of the following acts of violence to the child: kicked, bit or hit with fist; beat up; threaten to or used a knife or gun.	0.047 (0.211)	0.027 (0.161)	0.024 (0.154)	0.020 (0.141)
Indicator of non-punitive overall violence toward children	Dichotomous variable that equals 1 if the respondent had in the past year done any of the following acts of violence to the child: threw something at the child; pushed, grabbed or shoved; kicked, bit or hit with fist; beat up; threaten to or used a knife or gun.	0.350 (0.477)	0.303 (0.460)	0.306 (0.461)	0.280 (0.449)
Number of acts of overall violence toward children given positive violence	Number of times in the past year the respondent had done any of the following acts of violence to the child: threw something at the child; pushed, grabbed or shoved; kicked, bit or hit with fist; hit or tried to hit with something; beat up; threaten to or used a knife or gun.	12.000 (16.626)	8.970 (10.909)	6.042 (7.463)	7.142 (9.295)

Table 1 (continued)

Drunkenness (1976)	How often the respondent gets drunk (0=never, 1=rarely, 2=occasionally, 3=often, 4=very often, 5=almost always).	0.273 (0.627)	0.614 (0.841)	--	--
Drunkenness (1985)	How many times in the past year the respondent got drunk.	--	--	0.716 (3.972)	2.253 (13.365)
Number of drinks per sitting	How many drinks are consumed when the respondent does drink.	--		1.33 (1.547)	2.023 (2.345)
State excise tax on beer	State excise tax rate on a case of beer (24 12-ounce cans.)	0.785 (0.859)	0.817 (0.807)	0.484 (0.518)	0.454 (0.484)
Marijuana decriminalization	Dichotomous variable that equals 1 if a state had decriminalized possession of marijuana for personal use.	0.020 (0.100)	0.021 (0.106)	0.302 (0.459)	0.299 (0.458)
Cocaine price	Price of one pure gram of cocaine	674.602 (102.355)	685.708 (113.032)	261.328 (55.050)	259.548 (54.891)
Number of outlets	Number of licensed retail outlets per 1,000 population for on or off premise consumption of liquor.	1.054 (0.548)	1.042 (0.597)	1.161 (0.619)	1.207 (0.616)
Percent dry	Percent of the state population living in counties dry for alcohol consumption.	5.884 (8.734)	6.631 (9.499)	5.176 (9.323)	4.996 (9.186)
Grocery sales of beer prohibited	Dichotomous variable that equals 1 if a state does not permit grocery stores to sell beer.	0.029 (0.168)	0.027 (0.161)	0.052 (0.223)	0.050 (0.218)
Billboards prohibited	Dichotomous variable that equals 1 if a state does not permit billboards advertising beer.	0.079 (0.241)	0.103 (0.274)	0.183 (0.283)	0.169 (0.274)
Window displays prohibited	Dichotomous variable that equals 1 if a state does not permit liquor stores to display products or signs in windows.	0.249 (0.433)	0.279 (0.449)	0.240 (0.422)	0.240 (0.423)
Consumer novelties prohibited	Dichotomous variable that equals 1 if a state does not permit consumer novelties.	0.148 (0.355)	0.170 (0.376)	0.045 (0.192)	0.048 (0.201)
Price advertising prohibited	Dichotomous variable that equals 1 if a state does not permit price advertising of beer in magazines or newspapers.	0.323 (0.468)	0.319 (0.466)	0.179 (0.337)	0.160 (0.318)

Parents hit respondent	Dichotomous variable that equals 1 if the respondent's parents hit him/her as a teenager.	0.612 (0.450)	0.718 (0.410)	0.478 (0.496)	0.585 (0.490)
Parents hit each other	Dichotomous variable that equals 1 if the respondent's parents hit each other	0.177 (0.349)	0.167 (0.339)	0.176 (0.378)	0.159 (0.363)
Black	Dichotomous variables for race: The omitted category pertains to white.				
	Black: equals 1 if the respondent is black, not Hispanic	0.065 (0.242)	0.071 (0.253)	0.102 (0.300)	0.062 (0.237)
Hispanic	Hispanic: equals 1 if the respondent is Hispanic.	0.039 (0.189)	0.039 (0.192)	0.066 (0.245)	0.044 (0.202)
Other race	Other race: equals 1 if the respondent indicated American Indian, Oriental or another race.	0.012 (0.105)	0.012 (0.106)	0.054 (0.224)	0.082 (0.274)
Education	Respondent's education.	12.079 (2.639)	12.589 (3.226)	12.838 (2.452)	13.492 (2.791)
Age	Respondent's age.	36.217 (8.767)	39.477 (9.368)	34.887 (8.054)	37.110 (8.944)
Income	Family income in thousands of 1982-1984 dollars.	31.403 (15.822)	33.872 (17.072)	24.381 (13.668)	28.712 (13.439)
Female child	Dichotomous variable that equals 1 if the child is female.	0.489 (0.496)	0.483 (0.495)	0.506 (0.500)	0.493 (0.500)
Age of child	Age of child.	9.751 (4.441)	10.107 (4.469)	8.891 (5.322)	8.030 (5.424)
Number children at home	Number of children living at home.	2.592 (1.324)	2.454 (1.152)	1.891 (0.978)	1.947 (1.002)
Part-time	Dichotomous variable that equals 1 if the respondent works part-time.	0.167 (0.373)	0.0003 (0.006)	0.155 (0.362)	0.032 (0.175)
Unemployed	Dichotomous variable that equals 1 if the respondent is unemployed.	0.018 (0.132)	0.044 (0.205)	0.109 (0.312)	0.039 (0.195)
Not employed	Dichotomous variable that equals 1 if the respondent is a student, retired, a homemaker, disabled or otherwise not employed.	0.590 (0.492)	0.045 (0.206)	0.308 (0.462)	0.054 (0.226)
Blue collar	Dichotomous variable that equals 1 if the respondent holds a blue collar job.	0.373 (0.457)	0.531 (0.496)	0.629 (0.471)	0.317 (0.463)

Table 1 (continued)

Catholic	Dichotomous indicators for respondent's religious preference. The omitted category pertains to other minority religions. Catholic: equals 1 if the respondent is Roman Catholic.	0.279 (0.448)	0.226 (0.418)	0.283 (0.445)	0.266 (0.435)
Jewish	Jewish: equals 1 if the respondent is Jewish.	0.039 (0.193)	0.059 (0.236)	0.011 (0.101)	0.011 (0.102)
Protestant	Protestant: equals 1 if the respondent is Protestant.	0.564 (0.496)	0.549 (0.498)	0.627 (0.478)	0.610 (0.481)
No religion	No religion: equals 1 if the respondent reports no religious affiliation.	0.037 (0.189)	0.084 (0.278)	0.063 (0.240)	0.089 (0.282)
Frequency of religious services	How often the respondent attends religious services (1976 only).	5.030 (2.441)	4.222 (2.539)		
Talks with others	Dichotomous variable that equals 1 if a respondent talks to relatives or friends when a family problem arises.	0.589 (0.476)	0.306 (0.445)	0.282 (0.450)	0.133 (0.339)
Stress	1976: Number of major stressful events in the past year.	2.098 (1.908)	2.595 (2.075)	--	--
	1985: How often the respondent felt stressed in the past year.	--	--	1.935 (1.081)	1.589 (1.062)
Single parent	Dichotomous variable that equals 1 if the respondent is a single parent (1985 only)	--	--	0.241 (0.428)	0.046 (0.210)

Table 2
Percentage of Respondents Committing Specific Acts of Violence

	Females		Males	
	1976	1985	1976	1985
Threw something at the other one	6.8 %	3.2 %	3.6 %	1.7 %
Pushed, grabbed, or shoved the other one	33.4 %	29.1 %	29.8 %	27.4 %
Slapped or spanked the other one (Not included as violence)	62.5 %	57.9 %	53.3 %	53.7 %
Kicked, bit or hit with fist	4.0 %	1.5 %	2.5 %	1.4 %
Hit or tried to hit with something	16.7 %	10.0 %	9.4 %	8.4 %
Beat up the other one	1.8 %	0.7 %	0.6 %	0.6 %
Burned or scalded him/her (1985 survey only)	NA	0.5 %	NA	0.6 %
Threatened with a gun or knife	0.0 %	0.2 %	0.2 %	0.1 %
Used a knife or gun	0.0 %	0.2 %	0.2 %	0.1 %

Table 3
1976 Females
Probit Estimates
(N=623)

	Severe Violence		Overall Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.347	-0.282	-0.187	-0.204
	(-3.36)	(-2.43)	(-2.54)	(-2.32)
	-0.082	***-0.065***	***-0.071***	***-0.077***
Marijuana decriminalization		0.307		0.128
		(0.54)		(0.23)
		0.082		***0.049***
Cocaine price		0.0005		0.001
		(0.53)		(0.95)
		0.0001		***0.0003***
Number of outlets		0.262		0.182
		(1.75)		(1.41)
		0.061		***0.068***
Percent dry		-0.021		-0.010
		(-1.86)		(-1.06)
		-0.005		***-0.004***
Grocery sales of beer prohibited		0.117		-0.253
		(0.30)		(-0.72)
		0.029		***-0.091***
Billboards prohibited		0.168		0.042
		(0.47)		(0.14)
		0.042		***0.016***
Window displays prohibited		-0.478		-0.398
		(-1.76)		(-1.73)
		-0.098		***-0.143***
Consumer novelties prohibited		0.327		0.331
		(1.10)		(1.31)
		0.085		***0.128***
Price advertising prohibited		0.115		0.206
		(0.73)		(1.58)
		0.027		***0.078***
Log likelihood	-254.678	-249.102	-364.371	-360.338
Chi-squared on illegal drug prices		0.62		0.97
		[0.732]		[0.615]
Chi-squared on availability variables		7.89		3.97
		[0.048]		[0.265]
Chi-squared on advertising variables		3.36		5.38
		[0.500]		[0.251]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 4
1976 Females
Probit Estimates
(N=623)

	Non-punitive Severe Violence		Non-punitive Overall Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.167	-0.333	-0.158	-0.207
	(-1.05)	(-1.23)	(-2.11)	(-2.31)
	-0.013	***-0.015***	***-0.057***	***-0.075***
Marijuana decriminalization		-4.453		-0.123
		(-1.70)		(-0.22)
		-0.022		***-0.043***
Cocaine price		0.003		0.001
		(1.95)		(1.08)
		0.0001		***0.0003***
Number of outlets		0.589		0.124
		(2.27)		(0.95)
		0.026		***0.045***
Percent dry		0.008		-0.009
		(0.35)		(-1.00)
		0.0004		***-0.003***
Grocery sales of beer prohibited		-0.435		-0.165
		(-0.73)		(-0.47)
		-0.013		***-0.058***
Billboards prohibited		-2.732		0.033
		(-0.92)		(0.11)
		-0.030		***0.012***
Window displays prohibited		-0.608		-0.385
		(-1.41)		(-1.64)
		-0.020		***-0.132***
Consumer novelties prohibited		0.851		0.374
		(1.79)		(1.46)
		0.070		***0.142***
Price advertising prohibited		0.282		0.269
		(1.09)		(2.05)
		0.014		***0.099***
Log likelihood	-98.928	-90.363	-357.874	-353.880
Chi-squared on illegal drug prices		5.79 [0.055]		1.19 [0.552]
Chi-squared on availability variables		5.36 [0.147]		2.39 [0.500]
Chi-squared on advertising variables		7.16 [0.127]		6.97 [0.138]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 5
1985 Females
Probit Estimates
(N=1,638)

	Severe Violence		Overall Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.211	-0.189	-0.143	-0.121
	(-2.19)	(-1.68)	(-2.09)	(-1.48)
	-0.034	***-0.030***	***-0.051***	***-0.043***
Marijuana decriminalization		-0.008		0.095
		(-0.08)		(1.18)
		-0.001		***0.034***
Cocaine price		-0.002		-0.001
		(-1.67)		(-1.45)
		-0.0003		***-0.0004***
Number of outlets		-0.057		0.035
		(-0.59)		(0.50)
		-0.009		***0.013***
Percent dry		0.001		-0.002
		(0.18)		(-0.45)
		0.0002		***-0.001***
Grocery sales of beer prohibited		0.357		-0.115
		(1.38)		(-0.56)
		0.070		***-0.040***
Billboards prohibited		-0.081		0.157
		(-0.37)		(1.01)
		-0.013		***0.057***
Window displays prohibited		-0.015		-0.011
		(-0.11)		(-0.10)
		-0.002		***-0.004***
Consumer novelties prohibited		0.135		-0.117
		(0.43)		(-0.51)
		0.023		***-0.041***
Price advertising prohibited		-0.065		0.032
		(-0.33)		(0.23)
		-0.010		***0.012***
Log likelihood	-516.697	-511.923	-962.019	-958.334
Chi-squared on illegal drug prices		2.79		3.63
		[0.247]		[0.163]
Chi-squared on availability variables		2.42		1.09
		[0.490]		[0.779]
Chi-squared on advertising variables		0.33		1.26
		[0.988]		[0.868]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 6
1985 Females
Probit Estimates
(N=1,638)

	Non-punitive Severe Violence		Non-punitive Overall Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.683	-0.768	-0.152	-0.122
	(-2.36)	(-2.13)	(-2.18)	(-1.48)
	-0.014	***-0.011***	***-0.052***	***-0.042***
Marijuana decriminalization		-0.218		0.061
		(-0.95)		(0.76)
		-0.003		***0.021***
Cocaine price		-0.005		-0.001
		(-2.00)		(-0.72)
		-0.0001		***-0.0002***
Number of outlets		0.092		0.044
		(0.48)		(0.62)
		0.001		***0.015***
Percent dry		0.015		-0.002
		(1.15)		(-0.38)
		0.0002		***-0.001***
Grocery sales of beer prohibited		0.078		-0.037
		(0.14)		(-0.18)
		0.001		***-0.012***
Billboards prohibited		0.371		0.194
		(0.81)		(1.24)
		0.007		***0.069***
Window displays prohibited		0.155		-0.027
		(0.53)		(-0.26)
		0.002		***-0.009***
Consumer novelties prohibited		-1.358		-0.280
		(-0.89)		(-1.19)
		-0.006		***-0.089***
Price advertising prohibited		0.415		-0.023
		(0.87)		(-0.16)
		0.009		***-0.008***
Single parent	0.145	0.195	0.029	0.026
	(0.71)	(0.92)	(0.31)	(0.28)
	0.003	***0.003***	***0.010***	***0.009***
Log likelihood	-147.240	-140.220	-942.555	-939.998
Chi-squared on illegal drug prices		4.18		1.13
		[0.124]		[0.568]
Chi-squared on availability variables		1.47		0.85
		[0.689]		[0.837]
Chi-squared on advertising variables		2.31		1.97
		[0.679]		[0.741]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 7
1985 Married Females With Children Ages 3-17
Probit Estimates
(N=1,033)

	Severe Violence		Overall Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.081	-0.062	-0.067	-0.042
	(-0.67)	(-0.41)	(-0.76)	(-0.39)
	-0.012	***-0.009***	***-0.024***	***-0.015***
Marijuana decriminalization		-0.019		0.089
		(-0.13)		(0.87)
		-0.003		***0.032***
Cocaine price		-0.002		-0.001
		(-1.41)		(-1.24)
		-0.0003		***-0.0004***
Number of outlets		-0.056		0.059
		(-0.44)		(0.67)
		-0.008		***0.021***
Percent dry		0.001		-0.001
		(0.08)		(-0.14)
		0.0001		***-0.0002***
Grocery sales of beer prohibited		0.279		-0.203
		(0.82)		(-0.79)
		0.047		***-0.070***
Billboards prohibited		-0.215		0.152
		(-0.80)		(0.80)
		-0.028		***0.056***
Window displays prohibited		-0.134		-0.120
		(-0.73)		(-0.93)
		-0.018		***-0.043***
Consumer novelties prohibited		0.628		0.072
		(1.67)		(0.26)
		0.131		***0.026***
Price advertising prohibited		-0.027		0.037
		(-0.10)		(0.21)
		-0.004		***0.014***
Log likelihood	-307.109	-301.733	-605.682	-601.516
Chi-squared on illegal drug prices		1.97		2.34
		[0.373]		[0.311]
Chi-squared on availability variables		0.92		1.22
		[0.821]		[0.749]
Chi-squared on advertising variables		3.79		2.86
		[0.436]		[0.581]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 8
Means of Violence and Drinking
1985

VIOLENCE	Married Women (n=1,238)	Single Women (n=407)	Women without infants (n=2,011)	Women with infants (n=251)
Severe violence	0.107	0.135	0.137	0.092
Non-punitive severe violence	0.021	0.034	0.030	0.032
Overall violence	0.321	0.369	0.364[b]	0.215
Non-punitive overall violence	0.296	0.337	0.334[b]	0.187
DRINKING				
Number of times respondent got drunk in past year	0.427[a]	1.776	0.661[b]	1.315
Number of drinks per sitting	1.261[a]	1.560	1.315	1.414

[a]Means or proportions are statistically different for married and single women at the 5 percent level.
[b]Means or proportions are statistically different for women with infants and women without infants at the 5 percent level.

Table 9
1985 Single Females
Probit Estimates

	Severe Violence (N=401)		Overall Violence (N=401)	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.311	-0.479	-0.256	-0.357
	(-1.59)	(-2.00)	(-1.79)	(-2.09)
	-0.043	***-0.057***	***-0.096***	***-0.133***
Marijuana decriminalization		-0.255		-0.034
		(-1.16)		(-0.20)
		-0.029		***-0.013***
Cocaine price		-0.001		0.001
		(-0.54)		(0.49)
		-0.0001		***0.0003***
Number of outlets		-0.205		-0.160
		(-0.98)		(-1.03)
		-0.024		***-0.060***
Percent dry		-0.004		-0.010
		(-0.38)		(-1.09)
		-0.001		***-0.004***
Grocery sales of beer prohibited		0.119		-0.164
		(0.20)		(-0.35)
		0.015		***-0.060***
Billboards prohibited		0.692		0.589
		(1.45)		(1.62)
		0.116		***0.229***
Window displays prohibited		0.019		0.144
		(0.06)		(0.65)
		0.002		***0.055***
Consumer novelties prohibited		-4.141		-0.904
		(-0.80)		(-1.68)
		-0.081		***-0.264***
Price advertising prohibited		-0.085		-0.114
		(-0.17)		(-0.36)
		-0.010		***-0.042***
Log likelihood	-139.973	-135.664	-233.793	-230.137
Chi-squared on illegal drug prices		1.49		0.30
		[0.476]		[0.861]
Chi-squared on availability variables		0.96		2.32
		[0.811]		[0.509]
Chi-squared on advertising variables		2.30		3.92
		[0.681]		[0.417]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 10
1985 Women with Infants
Probit Estimates
(N=251)

	Severe Violence		Overall Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.842	-1.133	-0.259	-0.019
	(-1.72)	(-1.51)	(-1.13)	(-0.07)
	-0.036	***-0.007***	***-0.055***	***-0.004***
Marijuana decriminalization		1.233		0.438
		(2.50)		(1.58)
		0.021		***0.090***
Cocaine price		0.0004		-0.004
		(0.09)		(-1.43)
		0.000002		***-0.001***
Number of outlets		0.539		0.494
		(1.26)		(2.14)
		0.003		***0.091***
Percent dry		0.015		-0.012
		(0.49)		(-0.65)
		0.0001		***-0.002***
Grocery sales of beer prohibited		2.917		-0.018
		(2.84)		(-0.03)
		0.463		***-0.003***
Billboards prohibited		1.110		0.006
		(0.83)		(0.01)
		0.023		***0.001***
Window displays prohibited		1.033		0.296
		(1.62)		(0.78)
		0.017		***0.060***
Consumer novelties prohibited		-0.728		-0.476
		(-0.29)		(-0.28)
		-0.002		***-0.066***
Price advertising prohibited		-1.704		0.258
		(-1.62)		(0.49)
		-0.004		***0.053***
Log Likelihood	-51.277	-41.424	-94.345	-88.544
Chi-squared on illegal drug prices		6.24		4.84
		[0.044]		[0.089]
Chi-squared on availability variables		10.75		6.18
		[0.013]		[0.103]
Chi-squared on advertising variables		5.64		0.78
		[0.22]		[0.941]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 11
1976 Males
Probit Estimates
(N=499)

	Severe Violence		Overall Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.190	-0.004	-0.078	-0.055
	(-1.29)	(-0.02)	(-0.86)	(-0.48)
	-0.023	***-0.0005***	***-0.027***	***-0.019***
Marijuana decriminalization		-0.232		-0.521
		(-0.28)		(-0.86)
		-0.021		***-0.149***
Cocaine price		-0.002		-0.0001
		(-1.51)		(-0.13)
		-0.0002		***-0.00003***
Number of outlets		0.261		-0.004
		(1.50)		(-0.03)
		0.029		***-0.001***
Percent dry		0.010		-0.021
		(0.66)		(-2.01)
		0.001		***-0.007***
Grocery sales of beer prohibited		-0.171		-0.224
		(-0.25)		(-0.49)
		-0.017		***-0.071***
Billboards prohibited		0.059		0.401
		(0.13)		(1.28)
		0.007		***0.147***
Window displays prohibited		0.268		-0.624
		(0.80)		(-2.38)
		0.033		***-0.193***
Consumer novelties prohibited		-0.331		0.325
		(-0.78)		(1.09)
		-0.031		***0.116***
Price advertising prohibited		-0.145		-0.059
		(-0.68)		(-0.38)
		-0.015		***-0.020***
Log likelihood	-137.576	-134.551	-277.363	-272.164
Chi-squared on illegal drug prices		2.36		0.76
		[0.307]		[0.684]
Chi-squared on availability variables		2.43		4.59
		[0.488]		[0.204]
Chi-squared on advertising variables		1.49		6.67
		[0.829]		[0.154]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 12
1985 Males
Probit Estimates
(N=1,037)

	Severe Violence		Overall Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	0.228	0.296	-0.067	0.002
	(2.04)	(2.17)	(-0.71)	(0.02)
	0.017	***0.019***	***-0.023***	***0.001***
Marijuana decriminalization		0.110		-0.011
		(0.78)		(-0.10)
		0.007		***-0.004***
Cocaine price		-0.001		0.001
		(-0.55)		(0.64)
		-0.0001		***0.0002***
Number of outlets		0.138		-0.045
		(1.06)		(-0.48)
		0.009		***-0.015***
Percent dry		0.012		-0.006
		(1.62)		(-0.99)
		0.001		***-0.002***
Grocery sales of beer prohibited		-0.067		0.245
		(-0.17)		(0.82)
		-0.004		***0.088***
Billboards prohibited		-0.464		0.077
		(-1.38)		(0.35)
		-0.023		***0.026***
Window displays prohibited		-0.075		-0.211
		(-0.39)		(-1.52)
		-0.005		***-0.069***
Consumer novelties prohibited		0.830		-0.217
		(2.09)		(-0.75)
		0.106		***-0.069***
Price advertising prohibited		-0.022		-0.403
		(-0.08)		(-1.88)
		-0.001		***-0.124***
Single parent	0.256	0.282	0.342	0.321
	(1.01)	(1.09)	(1.65)	(1.53)
	0.023	***0.023***	***0.125***	***0.116***
Log likelihood	-301.479	-297.365	-575.65	-572.391
Chi-squared on illegal drug prices		0.97		0.42
		[0.615]		[0.809]
Chi-squared on availability variables		2.97		1.25
		[0.396]		[0.740]
Chi-squared on advertising variables		4.73		5.44
		[0.317]		[0.245]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 13
Pooled Females, Probit Estimates

	Severe Violence				Overall Violence			
	Without State Dummies (N=2,261)		With State Dummies (N=2,231)		Without State Dummies (N=2,261)		With State Dummies (N=2,246)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
State excise tax on beer	-0.247	-0.202	-0.256	-0.257	-0.163	-0.135	-0.270	-0.174
	(-3.71)	(-2.71)	(-1.22)	(-1.09)	(-3.38)	(-2.45)	(-1.70)	(-0.99)
	-0.047	*-0.038*	*-0.047*	**-0.047**	*-0.060*	*-0.049*	*-0.099*	*-0.064*
Marijuana decriminalization		0.014		-0.040		0.083		-0.044
		(0.14)		(-0.21)		(1.11)		(-0.28)
		0.003		**-0.007**		*0.031*		*-0.016*
Cocaine price		-0.001		0.001		-0.001		0.001
		(-1.31)		(0.63)		(-1.28)		(0.70)
		-0.0001		**0.0002**		*-0.0002*		*0.0003*
Number of outlets		-0.010		0.665		0.045		1.022
		(-0.13)		(1.18)		(0.79)		(2.14)
		-0.002		**0.122**		*0.017*		*0.374*
Percent dry		-0.003		0.028		-0.002		-0.004
		(-0.70)		(0.88)		(-0.65)		(-0.16)
		-0.001		**0.005**		*-0.001*		*-0.002*
Grocery sales of beer prohibited		0.376				-0.100		
		(2.05)				(-0.63)		
		0.086				*-0.036*		
Billboards prohibited		-0.044		-0.512		0.073		-0.255
		(-0.28)		(-1.59)		(0.62)		(-0.94)
		-0.008		**-0.075**		*0.027*		*-0.089*
Window displays prohibited		-0.025		0.588		-0.013		0.111
		(-0.24)		(1.77)		(-0.16)		(0.41)
		-0.005		**0.129**		*-0.005*		*0.041*
Consumer novelties prohibited		-0.087		-0.323		-0.078		-0.013
		(-0.53)		(-1.13)		(-0.61)		(-0.06)
		-0.016		**-0.050**		*-0.028*		*-0.005*
Price advertising prohibited		0.004		0.072		0.073		0.135
		(0.03)		(0.37)		(0.82)		(0.85)
		0.001		**0.014**		*0.027*		*0.050*
1976	0.371	0.695	0.349	-0.006	0.122	0.391	0.151	-0.143
	(4.02)	(2.65)	(3.05)	(-0.01)	(1.62)	(1.84)	(1.63)	(-0.30)
	0.078	*0.157*	*0.071*	**-0.001**	*0.045*	*0.147*	*0.056*	*-0.052*
Log likelihood	-806.828	-801.445	-785.069	-781.912	-1381.35	-1377.83	-1351.625	-1347.289
LR test for pooling	40.51	51.49			41.27	49.07		
Chi-squared on state dummy variables			32.05 [0.867]	31.41 [0.884]			40.59 [0.659]	42.83 [0.564]
Chi-squared on illegal drug prices		1.73 [0.422]		0.40 [0.820]		2.83 [0.243]		0.50 [0.778]
Chi-squared on availability variables		4.43 [0.218]		1.62 [0.446]		1.88 [0.598]		5.70 [0.058]
Chi-squared on advertising variables		0.61 [0.961]		4.74 [0.315]		1.48 [0.829]		1.36 [0.851]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex. The critical values of a chi-squared with 22 degrees of freedom (columns 1 and 5) and 31 degrees of freedom (columns 2 and 6) at the 5 percent significance level are 33.93 and 44.70, respectively.

Table 14
Pooled Males, Probit Estimates

	Severe Violence				Overall Violence			
	Without State Dummies (N=1,561)		With State Dummies (N=1,479)		Without State Dummies (N=1,561)		With State Dummies (N=1,548)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
State excise tax on beer	-0.013	0.032	-0.944	-0.632	-0.111	-0.067	-0.324	-0.175
	(-0.17)	(0.34)	(-2.84)	(-1.78)	(-1.78)	(-0.93)	(-1.49)	(-0.71)
	-0.002	***0.005***	***-0.136***	***-0.089***	***-0.038***	***-0.023***	***-0.110***	***-0.059***
Marijuana decriminalization		0.011		-0.013		-0.032		-0.058
		(0.09)		(-0.05)		(-0.33)		(-0.30)
		0.002		***-0.002***		***-0.011***		***-0.020***
Cocaine price		-0.001		0.001		-0.0004		0.001
		(-1.61)		(0.41)		(-0.69)		(0.51)
		-0.0002		***0.0001***		***-0.0001***		***0.0002***
Number of outlets		0.063		-0.407		-0.018		0.068
		(0.70)		(-0.49)		(-0.26)		(0.12)
		0.010		***-0.057***		***-0.006***		***0.023***
Percent dry		0.006		-0.090		-0.004		-0.039
		(1.09)		(-1.70)		(-0.99)		(-1.17)
		0.001		***-0.013***		***-0.002***		***-0.013***
Grocery sales of beer prohibited		-0.066				-0.105		
		(-0.24)				(-0.50)		
		-0.010				***-0.035***		
Billboards prohibited		0.073		-0.406		0.083		-0.288
		(0.36)		(-0.81)		(0.55)		(-0.81)
		0.012		***-0.046***		***0.029***		***-0.092***
Window displays prohibited		-0.016		0.012		-0.167		-0.129
		(-0.12)		(0.03)		(-1.65)		(-0.39)
		-0.002		***0.002***		***-0.056***		***-0.043***
Consumer novelties prohibited		-0.101		-0.249		-0.151		-0.161
		(-0.50)		(-0.74)		(-1.00)		(-0.62)
		-0.015		***-0.030***		***-0.050***		***-0.053***
Price advertising prohibited		-0.103		-0.443		-0.143		-0.168
		(-0.70)		(-1.77)		(-1.26)		(-0.88)
		-0.015		***-0.052***		***-0.048***		***-0.055***
1976	0.094	0.656	0.453	0.205	0.043	0.245	0.117	-0.122
	(0.84)	(1.85)	(2.89)	(0.22)	(0.50)	(0.95)	(1.04)	(-0.20)
	0.015	***0.117***	***0.073***	***0.030***	***0.015***	***0.085***	***0.040***	***-0.041***
Log likelihood	-467.958	-465.048	-434.376	-428.822	-878.867	-873.785	-849.429	-846.157
LR test for pooling	53.41	62.03			33.96	42.85		
Chi-squared on state dummy variables			37.96 [0.426]	41.61 [0.242]			46.29 [0.300]	43.24 [0.418]
Chi-squared on illegal drug prices		2.62 [0.270]		0.17 [0.919]		0.58 [0.747]		0.28 [0.870]
Chi-squared on availability variables		1.33 [0.722]		2.90 [0.235]		1.41 [0.703]		1.75 [0.416]
Chi-squared on advertising variables		0.95 [0.918]		6.91 [0.141]		6.44 [0.169]		3.65 [0.456]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex. The critical values of a chi-squared with 22 degrees of freedom (columns 1 and 5) and 31 degrees of freedom (columns 2 and 6) at the 5 percent significance level are 33.93 and 44.70, respectively.

Table 15
Females
OLS Estimates
Dependent Variable=Log of Number of Acts of Overall Violence

	1976 (N=240)	1985 (N=546)	Pooled Without State Dummies (N=786)	Pooled With State Dummies (N=786)
State excise tax on beer	-0.054	-0.086	-0.074	-0.094
	(-0.41)	(-0.80)	(-0.97)	(-0.40)
Marijuana decriminalization	-0.106	-0.076	-0.051	0.208
	(-0.13)	(-0.79)	(-0.52)	(1.06)
Cocaine price	-0.001	0.001	-0.0003	-0.0004
	(-0.92)	(0.95)	(-0.46)	(-0.25)
Number of outlets	0.101	-0.054	0.053	0.960
	(0.58)	(-0.62)	(0.71)	(1.66)
Percent dry	0.004	-0.005	-0.001	0.083
	(0.27)	(-0.85)	(-0.13)	(2.44)
Grocery sales of beer prohibited	0.180	0.080	0.106	
	(0.37)	(0.32)	(0.51)	
Billboards prohibited	-0.366	0.038	-0.070	-0.331
	(-0.83)	(0.20)	(-0.45)	(-0.88)
Window displays prohibited	0.594	-0.210	0.051	0.529
	(1.68)	(-1.64)	(0.49)	(1.55)
Consumer novelties prohibited	-0.181	-0.334	0.026	-0.013
	(-0.51)	(-1.16)	(0.15)	(-0.04)
Price advertising prohibited	0.071	0.118	0.177	0.368
	(0.39)	(0.65)	(1.56)	(1.79)
1976			0.597	0.610
			(2.14)	(0.90)
R-squared	0.17	0.12	0.13	0.11
F-statistic on regression	1.28	2.20	3.65	2.28
F-statistic on illegal drug prices	0.48	0.76	0.26	0.56
	[0.618]	[0.467]	[0.771]	[0.569]
F-statistic on availability variables	0.22	0.28	0.33	3.34
	[0.884]	[0.843]	[0.801]	[0.036]
F-statistic on advertising variables	1.23	1.21	0.69	1.72
	[0.298]	[0.307]	[0.599]	[0.144]

Note: T-statistics in parenthesis, p-values in brackets for F tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 16
Males
OLS Estimates
Dependent Variable=Log of Number of Acts of Overall Violence

	1976 (N=169)	1985 (N=316)	Pooled Without State Dummies (N=485)	Pooled With State Dummies (N=485)
State excise tax on beer	-0.489	0.254	-0.159	-0.969
	(-2.50)	(1.63)	(-1.50)	(-2.50)
Marijuana decriminalization	-1.066	0.079	-0.079	-0.370
	(-1.55)	(0.58)	(-0.61)	(-1.45)
Cocaine price	0.001	-0.0003	0.001	0.002
	(1.15)	(-0.21)	(0.85)	(1.06)
Number of outlets	-0.120	0.027	-0.113	-1.132
	(-0.77)	(0.22)	(-1.27)	(-1.44)
Percent dry	0.013	0.003	-0.004	-0.061
	(0.84)	(0.32)	(-0.74)	(-1.31)
Grocery sales of beer prohibited	-0.333	0.013	-0.151	
	(-0.52)	(0.04)	(-0.54)	
Billboards prohibited	-0.855	-0.280	-0.305	-0.622
	(-1.94)	(-1.00)	(-1.52)	(-1.35)
Window displays prohibited	0.195	-0.057	-0.186	-0.451
	(0.51)	(-0.29)	(-1.30)	(-1.01)
Consumer novelties prohibited	-0.194	0.849	0.220	-0.012
	(-0.45)	(2.23)	(1.05)	(-0.03)
Price advertising prohibited	-0.139	-0.116	-0.068	-0.058
	(-0.68)	(-0.41)	(-0.46)	(-0.24)
1976			-0.079	-0.578
			(-0.23)	(-0.70)
R-squared	0.22	0.13	0.10	0.21
F-statistic on regression	1.29	1.34	1.71	1.49
F-statistic on illegal drug prices	1.97	0.19	0.54	1.25
	[0.144]	[0.828]	[0.584]	[0.287]
F-statistic on availability variables	0.58	0.04	0.78	1.37
	[0.629]	[0.988]	[0.504]	[0.255]
F-statistic on advertising variables	1.33	1.38	1.32	1.81
	[0.262]	[0.242]	[0.263]	[0.127]

Note: T-statistics in parenthesis, p-values in brackets for F tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 17
1976
Probit Estimates
Dependent Variable=Mild Violence

	Females (N=511)		Males (N=469)	
State excise tax on beer	-0.063	-0.151	-0.018	-0.065
	(-0.76)	(-1.46)	(-0.18)	(-0.54)
	-0.019	***-0.044***	***-0.005***	***-0.018***
Marijuana decriminalization		-0.241		-0.473
		(-0.28)		(-0.69)
		-0.064		***-0.107***
Cocaine price		0.001		0.001
		(0.94)		(0.77)
		0.0002		***0.0002***
Number of outlets		0.067		-0.087
		(0.43)		(-0.60)
		0.020		***-0.025***
Percent dry		0.001		-0.034
		(0.13)		(-2.85)
		0.0004		***-0.010***
Grocery sales of beer prohibited		-0.629		-0.264
		(-1.40)		(-0.52)
		-0.140		***-0.066***
Billboards prohibited		-0.003		0.673
		(-0.01)		(1.86)
		-0.001		***0.225***
Window displays prohibited		-0.235		-1.021
		(-0.84)		(-3.14)
		-0.065		***-0.233***
Consumer novelties prohibited		0.257		0.693
		(0.84)		(2.00)
		0.080		***0.226***
Price advertising prohibited		0.273		0.035
		(1.75)		(0.21)
		0.083		***0.010***
Log likelihood	-248.271	-245.435	-225.779	-218.549
Chi-squared on illegal drug prices		0.96		0.96
		[0.619]		[0.620]
Chi-squared on availability variables		1.99		10.12
		[0.798]		[0.039]
Chi-squared on advertising variables		4.02		10.18
		[0.404]		[0.038]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 18
1985
Probit Estimates
Dependent Variable=Mild Violence

	Females (N=1,451)		Males (N=940)	
State excise tax on beer	-0.085	-0.063	-0.216	-0.170
	(-1.14)	(-0.70)	(-1.84)	(-1.22)
	-0.026	***-0.019***	***-0.061***	***-0.048***
Marijuana decriminalization		0.114		-0.065
		(1.28)		(-0.54)
		0.035		***-0.018***
Cocaine price		-0.001		0.001
		(-0.71)		(1.08)
		-0.0002		***0.0003***
Number of outlets		0.064		-0.096
		(0.83)		(-0.94)
		0.019		***-0.027***
Percent dry		-0.003		-0.013
		(-0.63)		(-1.97)
		-0.001		***-0.004***
Grocery sales of beer prohibited		-0.351		0.303
		(-1.46)		(0.88)
		-0.094		***0.095***
Billboards prohibited		0.222		0.235
		(1.31)		(0.99)
		0.071		***0.070***
Window displays prohibited		-0.035		-0.227
		(-0.31)		(-1.47)
		-0.011		***-0.061***
Consumer novelties prohibited		-0.207		-0.621
		(-0.82)		(-1.84)
		-0.059		***-0.134***
Price advertising prohibited		0.054		-0.457
		(0.34)		(-1.84)
		0.017		***-0.112***
Log likelihood	-765.844	-760.571	-454.992	-449.600
Chi-squared on illegal drug prices		2.17		1.55
		[0.338]		[0.462]
Chi-squared on availability variables		4.08		4.02
		[0.253]		[0.260]
Chi-squared on advertising variables		2.27		8.34
		[0.686]		[0.080]

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 19
1976
Ordered Probit Estimates
Dependent Variable=None, Mild or Severe Violence

	Females (N=623)		Males (N=524)	
State excise tax on beer	-0.224	-0.210	-0.103	-0.043
	(-3.21)	(-2.54)	(-1.18)	(-0.39)
Marijuana decriminalization		0.314		-0.448
		(0.61)		(-0.82)
Cocaine price		0.001		-0.0004
		(0.74)		(-0.58)
Number of outlets		0.217		0.072
		(1.82)		(0.61)
Percent dry		-0.013		-0.013
		(-1.46)		(-1.34)
Grocery sales of beer prohibited		-0.147		-0.189
		(-0.45)		(-0.44)
Billboards prohibited		0.109		0.303
		(0.39)		(1.03)
Window displays prohibited		-0.400		-0.404
		(-1.85)		(-1.65)
Consumer novelties prohibited		0.317		0.176
		(1.35)		(0.63)
Price advertising prohibited		0.165		-0.115
		(1.37)		(-0.81)
Intercept 1	-1.047	-0.768	-0.691	-1.134
Intercept 2	-0.347	-0.058	0.264	-0.169
Chi-squared on illegal drug prices		0.99		1.04
		[0.610]		[0.593]
Chi-squared on availability variables		6.51		3.19
		[0.164]		[0.527]
Chi-squared on advertising variables		4.94		4.30
		[0.293]		[0.367]

Note: T-statistics in parenthesis, and p-values in brackets for chi-squared tests. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 20
1985
Ordered Probit Estimates
Dependent Variable=None, Mild or Severe Violence

	Females (N=1,638)		Males (N=1,037)	
State excise tax on beer	-0.159	-0.139	0.023	0.087
	(-2.42)	(-1.78)	(0.26)	(0.82)
Marijuana decriminalization		0.078		0.012
		(1.04)		(0.13)
Cocaine price		-0.001		0.0001
		(-1.67)		(0.09)
Number of outlets		0.011		0.005
		(0.16)		(0.05)
Percent dry		-0.001		-0.001
		(-0.27)		(-0.11)
Grocery sales of beer prohibited		0.037		0.141
		(0.19)		(0.51)
Billboards prohibited		0.102		-0.041
		(0.69)		(-0.20)
Window displays prohibited		-0.013		-0.149
		(-0.14)		(-1.14)
Consumer novelties prohibited		-0.065		0.049
		(-0.30)		(0.18)
Price advertising prohibited		0.025		-0.286
		(0.18)		(-1.43)
Intercept 1	1.511	1.242	0.679	0.627
Intercept 2	2.358	2.092	1.550	1.500
Chi-squared on illegal drug prices		3.99		0.02
		[0.134]		[0.989]
Chi-squared on availability variables		0.18		0.29
		[0.980]		[0.962]
Chi-squared on advertising variables		0.67		2.79
		[0.956]		[0.593]

Note: T-statistics in parenthesis, and p-values in brackets for chi-squared tests. Other regressors include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 21
Individual Characteristics for Females

	Severe Violence 1976	Overall Violence 1976	Severe Violence 1985	Overall Violence 1985
State excise tax on beer	-0.347	-0.187	-0.211	-0.143
	(-3.36)	(-2.54)	(-2.19)	(-2.09)
	-0.082	***-0.071***	***-0.034***	***-0.051***
Parents hit respondent	0.248	0.347	0.299	0.297
	(1.59)	(2.68)	(3.17)	(4.19)
	0.057	***0.129***	***0.049***	***0.106***
Parents hit each other	-0.048	0.117	0.433	0.258
	(-0.26)	(0.71)	(4.20)	(2.91)
	-0.011	***0.045***	***0.084***	***0.095***
Black	0.269	0.082	0.557	0.210
	(0.98)	(0.34)	(4.00)	(1.79)
	0.071	***0.031***	***0.119***	***0.078***
Hispanic	0.636	0.620	0.206	-0.037
	(2.07)	(2.06)	(1.16)	(-0.24)
	0.193	***0.243***	***0.038***	***-0.013***
Other race	-0.145	0.337	-0.053	-0.381
	(-0.23)	(0.64)	(-0.27)	(-2.40)
	-0.032	***0.132***	***-0.008***	***-0.124***
Education	-0.0004	0.044	0.020	0.010
	(-0.01)	(1.68)	(0.99)	(0.66)
	-0.0001	***0.017***	***0.003***	***0.004***
Age	-0.040	-0.012	-0.005	-0.004
	(-3.44)	(-1.41)	(-0.64)	(-0.66)
	-0.009	***-0.004***	***-0.001***	***-0.001***
Income	-0.005	-0.008	-0.005	0.000005
	(-1.06)	(-1.89)	(-1.18)	(0.002)
	-0.001	***-0.003***	***-0.001***	***0.000002***
Female child	-0.126	-0.353	-0.092	-0.204
	(-0.96)	(-3.16)	(-1.05)	(-3.05)
	-0.030	***-0.132***	***-0.015***	***-0.073***
Age of child	-0.007	-0.034	-0.003	0.007
	(-0.36)	(-2.12)	(-0.24)	(0.84)
	-0.002	***-0.013***	***-0.0004***	***0.003***
Number children at home	0.088	0.030	0.146	0.140
	(1.72)	(0.69)	(3.38)	(4.05)
	0.021	***0.011***	***0.024***	***0.050***
Part-time	-0.170	-0.100	0.078	0.104
	(-0.81)	(-0.55)	(0.59)	(1.05)
	-0.038	***-0.037***	***0.013***	***0.038***
Unemployed	-0.170	-0.120	0.072	-0.052
	(-0.34)	(-0.29)	(0.49)	(-0.44)
	-0.037	***-0.044***	***0.012***	***-0.018***
Not employed	-0.222	-0.185	0.089	-0.051
	(-1.27)	(-1.27)	(0.81)	(-0.61)
	-0.054	***-0.070***	***0.015***	***-0.018***
Blue collar	0.091	-0.156	0.081	0.029
	(0.59)	(-1.15)	(0.85)	(0.40)
	0.022	***-0.058***	***0.013***	***0.010***
Catholic	-0.616	-0.844	0.751	0.182
	(-2.54)	(-3.74)	(1.55)	(0.67)
	-0.127	***-0.288***	***0.151***	***0.066***

Table 21 (continued)

Jewish		-0.365	0.722	0.868
		(-1.08)	(1.13)	(2.08)
		-0.128	***0.177***	***0.335***
Protestant	-0.301	-0.731	0.631	0.242
	(-1.36)	(-3.45)	(1.31)	(0.91)
	-0.073	***-0.274***	***0.093***	***0.085***
No religion	-0.496	-0.609	0.944	0.402
	(-1.25)	(-1.76)	(1.88)	(1.36)
	-0.091	***-0.199***	***0.243***	***0.153***
Frequency of religious services	-0.010	-0.032		
	(-0.33)	(-1.27)		
	-0.002	***-0.012***		
Talks with others	0.223	0.469	0.264	0.306
	(1.55)	(3.88)	(2.69)	(3.90)
	0.052	***0.173***	***0.046***	***0.112***
Stress	-0.029	-0.011	0.151	0.157
	(-0.83)	(-0.39)	(3.52)	(4.69)
	-0.007	***-0.004***	***0.024***	***0.056***
Single parent			-0.125	-0.0001
			(-1.05)	(-0.00)
			-0.019	***-0.00002***

Table 22
Individual Characteristics for Males

	Severe Violence 1976	Overall Violence 1976	Severe Violence 1985	Overall Violence 1985
State excise tax on beer	-0.190	-0.078	0.228	-0.067
	(-1.29)	(-0.86)	(2.04)	(-0.71)
	-0.023	*-0.027*	*0.017*	*-0.023*
Parents hit respondent	0.271	0.483	0.313	0.459
	(1.19)	(2.94)	(2.51)	(4.94)
	0.029	*0.154*	*0.022*	*0.151*
Parents hit each other	0.070	-0.058	0.149	0.206
	(0.29)	(-0.31)	(1.02)	(1.78)
	0.009	*-0.020*	*0.012*	*0.072*
Black	0.136	-0.371	0.193	-0.161
	(0.39)	(-1.29)	(0.86)	(-0.87)
	0.018	*-0.114*	*0.016*	*-0.052*
Hispanic	-0.671	-0.223	-0.620	-0.775
	(-1.38)	(-0.65)	(-1.72)	(-2.93)
	-0.049	*-0.072*	*-0.027*	*-0.201*
Other race		-0.591	-0.146	-0.393
		(-0.93)	(-0.64)	(-2.25)
		-0.165	*-0.010*	*-0.119*
Education	0.059	0.025	-0.026	0.009
	(1.38)	(0.89)	(-1.12)	(0.52)
	0.007	*0.009*	*-0.002*	*0.003*
Age	-0.006	-0.029	0.011	-0.002
	(-0.49)	(-3.19)	(1.42)	(-0.26)
	-0.001	*-0.010*	*0.001*	*-0.001*
Income	-0.001	-0.003	-0.007	-0.003
	(-0.17)	(-0.54)	(-1.34)	(-0.91)
	-0.0001	*-0.001*	*-0.0005*	*-0.001*
Female child	-0.565	-0.658	-0.349	-0.433
	(-3.04)	(-5.00)	(-2.98)	(-4.95)
	-0.067	*-0.221*	*-0.026*	*-0.146*
Age of child	-0.120	-0.038	-0.021	-0.017
	(-4.36)	(-2.13)	(-1.59)	(-1.63)
	-0.014	*-0.013*	*-0.002*	*-0.006*
Number children at home	0.169	0.076	0.085	0.186
	(2.11)	(1.34)	(1.54)	(4.38)
	0.020	*0.026*	*0.006*	*0.063*
Part-time			-0.137	0.052
			(-0.38)	(0.22)
			-0.009	*0.018*
Unemployed	0.008	-0.060	-0.565	0.140
	(0.02)	(-0.20)	(-1.59)	(0.63)
	0.001	*-0.020*	*-0.026*	*0.049*
Not employed	0.745	0.288	-0.273	-0.123
	(1.93)	(0.91)	(-0.98)	(-0.59)
	0.143	*0.105*	*-0.016*	*-0.040*
Blue collar	0.379	-0.098	-0.083	0.106
	(1.65)	(-0.63)	(-0.68)	(1.15)
	0.044	*-0.034*	*-0.006*	*0.036*
Catholic	0.443	-0.250	0.198	-0.342
	(1.26)	(-1.01)	(0.56)	(-1.23)
	0.064	*-0.082*	*0.016*	*-0.110*

Table 22 (continued)

Jewish	0.221	-0.291	-41.939	0.238
	(0.45)	(-0.86)	(-0.95)	(0.49)
	0.030	*-0.092*	*-0.082*	*0.085*
Protestant	0.175	-0.480	0.046	-0.336
	(0.53)	(-2.07)	(0.13)	(-1.25)
	0.020	*-0.165*	*0.003*	*-0.116*
No religion	-0.603	-0.891	0.277	-0.437
	(-1.22)	(-2.81)	(0.72)	(-1.44)
	-0.048	*-0.231*	*0.025*	*-0.131*
Frequency of religious services	-0.046	-0.040		
	(-1.18)	(-1.46)		
	-0.005	*-0.014*		
Talks with others	0.016	0.182	0.177	0.321
	(0.08)	(1.29)	(1.06)	(2.53)
	0.002	*0.063*	*0.015*	*0.115*
Stress	0.037	0.058	0.037	0.054
	(0.94)	(1.91)	(0.70)	(1.29)
	0.004	*0.020*	*0.003*	*0.018*
Single parent			0.256	0.342
			(1.01)	(1.65)
			0.023	*0.125*

Table 23
Structural Equations
Measure of Alcohol Consumption = Dichotomous Indicator of Drunkenness

	Severe Violence			Overall Violence		
	OLS (1)	TSLS (2)	TSLS (3)	OLS (4)	TSLS (5)	TSLS (6)
		Beer tax is only instrument	All regulatory variables as instruments		Beer tax is only instrument	All regulatory variables as instruments
1976						
FEMALES (N=608)						
Dichotomous indicator of drunkenness	0.072 (0.89)	4.546 (1.67)	0.675 (1.23)	0.060 (0.62)	4.709 (1.49)	0.539 (0.90)
Hausman test for exogenity		3.610	1.906		2.639	1.174
MALES (N=516)						
Dichotomous indicator of drunkenness	0.029 (0.64)	0.830 (0.96)	0.102 (0.40)	0.009 (0.16)	0.820 (0.72)	0.102 (0.30)
Hausman test for exogenity		1.412	0.151		0.881	0.391
1985						
FEMALES (N=1,636)						
Dichotomous indicator of drunkenness	0.053 (1.27)	1.582 (1.54)	-0.182 (-0.43)	0.106 (2.06)	2.288 (1.43)	0.697 (1.03)
Hausman test for exogenity		2.162	0.278		1.968	1.202
MALES (N=1,033)						
Dichotomous indicator of drunkenness	0.036 (1.21)	-1.288 (-1.15)	-0.373 (-1.08)	0.036 (0.86)	0.622 (0.72)	0.367 (0.83)
Hausman test for exogenity		-1.968	-0.958		0.693	1.002
POOLED						
FEMALES (N=2,244)						
Dichotomous indicator of drunkenness	0.057 (1.55)	2.077 (2.65)	0.852 (2.17)	0.108 (2.39)	2.755 (2.43)	0.958 (1.77)
Hausman test for exogenity		3.915	2.861		3.481	2.161
MALES (N=1,549)						
Dichotomous indicator of drunkenness	0.040 (1.61)	0.075 (0.22)	0.119 (0.52)	0.047 (1.39)	0.913 (1.57)	0.848 (2.24)
Hausman test for exogenity		0.098	0.008		1.768	2.126

Note: T-statistics in parenthesis, and intercept not shown. Critical values for Hausman test are 1.96 at 5 percent and 2.57 at 1 percent. Other regressions include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 24
First Stage Estimates
Dichotomous Indicator of Drunkenness

FEMALES	1976		1985		Pooled	
State excise tax on beer	-0.014	-0.014	-0.019	-0.017	-0.020	-0.015
	(-1.68)	(-1.18)	(-2.00)	(-1.45)	(-3.12)	(-2.01)
Marijuana decriminalization		0.007		0.0005		0.006
		(0.06)		(0.03)		(0.43)
Cocaine price		0.0001		0.0001		0.0001
		(1.14)		(0.78)		(0.80)
Number of outlets		-0.005		0.003		0.006
		(-0.24)		(0.24)		(0.60)
Percent dry		-0.002		-0.001		-0.001
		(-1.06)		(-1.83)		(-2.14)
Grocery sales of beer prohibited		0.182		0.008		0.035
		(1.85)		(0.21)		(1.11)
Billboards prohibited		-0.044		0.029		-0.0005
		(-1.05)		(1.15)		(-0.03)
Window displays prohibited		0.009		0.011		0.017
		(0.23)		(0.62)		(1.23)
Consumer novelties prohibited		0.051		-0.033		0.021
		(1.13)		(-0.80)		(0.92)
Price advertising prohibited		-0.006		-0.006		-0.006
		(-0.33)		(-0.24)		(-0.44)
F on instruments		1.18		1.08		1.93
		[0.305]		[0.378]		[0.037]
R-squared	0.080	0.104	0.091	0.095	0.068	0.072
N	608	608	1,636	1,636	2,244	2,244
MALES						
State excise tax on beer	-0.027	-0.003	-0.032	-0.025	-0.036	-0.018
	(-1.33)	(-0.10)	(-1.56)	(-0.96)	(-2.58)	(-1.06)
Marijuana decriminalization		0.298		0.013		0.032
		(1.67)		(0.46)		(1.22)
Cocaine price		-0.0002		-0.0001		-0.0001
		(-1.20)		(-0.47)		(-0.66)
Number of outlets		-0.012		0.023		0.011
		(-0.39)		(0.90)		(0.57)
Percent dry		-0.003		-0.001		-0.002
		(-1.27)		(-0.65)		(-1.93)
Grocery sales of beer prohibited		0.077		-0.088		-0.017
		(0.72)		(-1.10)		(-0.34)
Billboards prohibited		0.022		0.010		0.002
		(0.27)		(0.19)		(0.05)
Window displays prohibited		0.034		-0.005		-0.007
		(0.56)		(-0.14)		(-0.28)
Consumer novelties prohibited		0.032		-0.041		0.010
		(0.42)		(-0.61)		(0.27)
Price advertising prohibited		-0.032		0.042		-0.018
		(-0.90)		(0.75)		(-0.60)
F on instruments		0.97		0.83		1.65
		[0.472]		[0.604]		[0.089]
R-squared	0.127	0.143	0.089	0.094	0.067	0.072
N	516	516	1,033	1,033	1,549	1,549

Note: T-statistics in parenthesis, p-values in brackets for F-tests, and intercept not shown. Other regressions include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 25
1976 Females
Structural Equations
Measure of Alcohol Consumption = How Often the Respondent Gets Drunk
(N=608)

	Severe Violence	Overall Violence	Severe Violence	Severe Violence	Overall Violence	Overall Violence
	OLS	OLS	TSLS	TSLS	TSLS	TSLS
	(1)	(2)	(3)	(4)	(5)	(6)
			Beer tax is only instrument	All regulatory variables as instruments	Beer tax is only instrument	All regulatory variables as instruments
PANEL A						
Rarely	0.171	0.287				
	(0.95)	(1.79)				
	0.044	***0.111***				
Occasionally	0.272	0.249				
	(0.85)	(0.86)				
	0.075	***0.097***				
Often	0.932	0.398				
	(1.36)	(0.63)				
	0.316	***0.156***				
Very Often/Always		-0.038				
	--	(-0.05)				
		-0.014				
Chi-squared on drunk categories	2.98 [0.394]	3.84 [0.428]				
Predicted drunk index			1.310	0.627	0.708	0.269
			(3.36)	(2.92)	(2.54)	(1.49)
			0.310	***0.151***	***0.267***	***0.102***
PANEL B						
Occasionally/Often	0.330	0.193				
	(1.14)	(0.73)				
	0.093	***0.075***				
Very Often/Always		-0.139				
	--	(-0.18)				
		-0.051				
Chi-squared on drunk categories	--	0.58 [0.750]				
Predicted drunk index			1.308	0.351	0.707	0.191
			(3.36)	(2.41)	(2.54)	(1.52)
			0.309	***0.085***	***0.266***	***0.072***

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressions include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 26
1976 Females
First Stage Estimates (Ordered Probits)
Dependent Variable=Drunkeness
(N=608)

	Drunkenness Based on 5 Categories	Drunkenness Based on 5 Categories	Drunkenness Based on 3 Categories	Drunkenness Based on 3 Categories
State excise tax on beer	-0.264	-0.239	-0.265	-0.397
	(-2.57)	(-2.01)	(-1.45)	(-1.54)
Marijuana decriminalization		-0.148		-0.675
		(-0.29)		(-0.75)
Cocaine price		0.0001		0.002
		(0.13)		(1.51)
Number of outlets		-0.197		-0.012
		(-1.28)		(-0.05)
Percent dry		-0.025		-0.021
		(-2.09)		(-1.04)
Grocery sales of beer prohibited		1.052		1.531
		(2.82)		(2.95)
Billboards prohibited		-0.161		-0.191
		(-0.50)		(-0.34)
Window displays prohibited		0.036		-0.167
		(0.15)		(-0.43)
Consumer novelties prohibited		0.041		0.700
		(0.15)		(1.56)
Price advertising prohibited		-0.036		-0.060
		(-0.24)		(-0.22)
Intercept 1	0.336	0.074	0.854	2.166
Intercept 2	1.331	1.095	1.938	3.314
Intercept 3	1.984	1.760		
Intercept 4	2.389	2.172		
Intercept 5	2.817	2.627		
Chi-squared on instruments		18.44		15.63
		[0.048]		[0.111]

Note: T-statistics in parenthesis, p-values in brackets for chi-squared tests, and intercept not shown. Other regressions include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 27
1976 Males
Structural Equations
Measure of Alcohol Consumption = How Often the Respondent Gets Drunk
(N=514)

	Severe Violence	Overall Violence	Severe Violence	Severe Violence	Overall Violence	Overall Violence
	OLS (1)	OLS (2)	TSLS (3)	TSLS (4)	TSLS (5)	TSLS (6)
			Beer tax is only instrument	All regulatory variables as instruments	Beer tax is only instrument	All regulatory variables as instruments
PANEL A						
Rarely	-0.333	-0.051				
	(-1.48)	(-0.34)				
	-0.036	***-0.018***				
Occasionally	-0.027	-0.040				
	(-0.11)	(-0.21)				
	-0.003	***-0.014***				
Often		-0.327				
	--	(-0.52)				
		-0.102				
Very Often/Always	0.337	1.141				
	(0.43)	(1.50)				
	0.053	***0.432***				
Chi-squared on drunk categories	2.70 [0.440]	2.72 [0.606]				
Predicted drunk index			3.490	-0.144	1.435	-0.481
			(1.29)	(-0.25)	(0.86)	(-1.15)
			0.413	***-0.017***	***0.491***	***-0.164***
PANEL B						
Occasionally/Often	0.059	-0.036				
	(0.26)	(-0.20)				
	0.007	***-0.012***				
Very Often/Always	0.468	1.157				
	(0.61)	(1.53)				
	0.081	***0.437***				
Chi-squared on drunk categories	0.41 [0.815]	2.42 [0.299]				
Predicted drunk index			1.406	0.195	0.578	0.089
			(1.29)	(0.44)	(0.86)	(0.28)
			0.166	***0.024***	***0.198***	***0.031***

Note: T-statistics in parenthesis, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressions include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 28
1976 Males
First Stage Estimates (Ordered Probits)
Dependent Variable=Drunkeness
(N=514)

	Drunkenness Based on 5 Categories	Drunkenness Based on 5 Categories	Drunkenness Based on 3 Categories	Drunkenness Based on 3 Categories
State excise tax on beer	-0.054	-0.041	-0.135	-0.045
	(-0.69)	(-0.41)	(-1.24)	(-0.34)
Marijuana decriminalization		0.105		0.556
		(0.21)		(0.99)
Cocaine price		0.000		-0.001
		(0.27)		(-0.95)
Number of outlets		0.015		-0.099
		(0.14)		(-0.64)
Percent dry		-0.007		-0.014
		(-0.84)		(-1.23)
Grocery sales of beer prohibited		0.045		0.454
		(0.12)		(0.93)
Billboards prohibited		-0.039		0.034
		(-0.15)		(0.10)
Window displays prohibited		0.214		0.205
		(0.99)		(0.69)
Consumer novelties prohibited		0.179		0.092
		(0.72)		(0.28)
Price advertising prohibited		0.038		-0.150
		(0.29)		(-0.84)
Intercept 1	-0.623	-0.453	0.128	-0.610
Intercept 2	0.309	0.488	1.790	1.077
Intercept 3	1.588	1.782		
Intercept 4	1.926	2.122		
Intercept 5	2.195	2.390		
Chi-squared on instruments		8.20		7.74
		[0.609]		[0.655]

Note: T-statistics in parenthesis, p-values in brackets for chi-squared tests, and intercept not shown. Other regressions include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 29
1985
Structural Equations
Measures of Alcohol Consumption = Number of Times the Respondent Got Drunk in the Past Year and Number of Drinks per Sitting

	Severe Violence			Overall Violence		
	OLS (1)	TSLS (2)	TSLS (3)	OLS (4)	TSLS (5)	TSLS (6)
		Beer tax is only instrument	All regulatory variables as instruments		Beer tax is only instrument	All regulatory variables as instruments
FEMALES (N=1,637)						
Number of times respondent got drunk in past year	0.006 (2.53)	3.558 (0.05)	-0.037 (-1.14)	0.007 (2.84)	5.145 (0.05)	0.022 (0.58)
Hausman test for exogenity		2.229	-1.035		2.061	0.878
Number of drinks per sitting	0.011 (1.96)	0.129 (1.92)	0.008 (0.21)	0.029 (3.35)	0.187 (1.84)	0.125 (2.03)
Hausman test for exogenity		2.031	0.376		1.734	1.709
MALES (N=1,037)						
Number of times respondent got drunk in past year	0.001 (0.63)	-0.068 (-1.07)	-0.010 (-1.01)	-0.0005 (-0.42)	0.033 (0.65)	0.002 (0.15)
Hausman test for exogenity		-1.926	-1.322		0.747	0.825
Number of drinks per sitting	0.009 (1.85)	-4.531 (-0.06)	0.028 (0.74)	0.009 (1.39)	2.220 (0.06)	-0.013 (-0.24)
Hausman test for exogenity		-1.945	0.355		0.754	0.168

Note: T-statistics in parenthesis, and intercept not shown. Critical values for Hausman test are 1.96 at 5 percent and 2.57 at 1 percent. Other regressions include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Table 30
First Stage Estimates, 1985

NUMBER OF TIMES RESPONDENT GOT DRUNK IN PAST YEAR	Females		Males	
State excise tax on beer	-0.009	-0.124	-0.604	-0.468
	(-0.05)	(-0.61)	(-1.27)	(-0.83)
Marijuana decriminalization		-0.413		-1.417
		(-1.85)		(-1.79)
Cocaine price		-0.0003		0.001
		(-0.30)		(0.13)
Number of outlets		-0.047		1.345
		(-0.31)		(1.03)
Percent dry		-0.010		0.012
		(-1.20)		(0.28)
Grocery sales of beer prohibited		-0.559		-2.639
		(-1.40)		(-1.35)
Billboards prohibited		0.908		-0.356
		(1.42)		(-0.20)
Window displays prohibited		-0.247		0.564
		(-1.08)		(0.34)
Consumer novelties prohibited		-1.130		-0.559
		(-1.76)		(-0.49)
Price advertising prohibited		-0.030		0.550
		(-0.11)		(0.43)
F-statistic on regulatory variables		1.06		1.14
		[0.394]		[0.326]
R-squared	0.072	0.078	0.053	0.060
N	1,636	1,636	1,033	1,033
NUMBER OF DRINKS PER SITTING				
State excise tax on beer	-0.234	-0.182	-0.009	0.167
	(-3.55)	(-2.58)	(-0.06)	(0.91)
Marijuana decriminalization		0.088		0.092
		(0.96)		(0.58)
Cocaine price		-0.0001		-0.0002
		(-0.09)		(-0.14)
Number of outlets		0.190		0.307
		(2.55)		(1.96)
Percent dry		-0.005		-0.010
		(-1.30)		(-1.23)
Grocery sales of beer prohibited		-0.454		-0.272
		(-2.40)		(-0.63)
Billboards prohibited		-0.102		-0.741
		(-0.60)		(-2.26)
Window displays prohibited		0.053		0.128
		(0.56)		(0.52)
Consumer novelties prohibited		0.249		0.986
		(1.10)		(1.85)
Price advertising prohibited		0.232		0.220
		(1.59)		(0.67)
F-statistic on regulatory variables		3.19		1.72
		[0.001]		[0.071]
R-squared	0.095	0.105	0.087	0.098
N	1,630	1,630	1,029	1,029

Note: T-statistics in parenthesis, p-values in brackets for F-tests, and intercept not shown. Other regressions include family history of violence, the respondent's age, income, race, employment status, religion and measures of stress, and the child's age and sex.

Appendix Table A1
1976 Full Sample, Overall and Severe Violence
Probit Estimates[a]
(N=1,147)

	Overall Violence		Severe Violence	
	(1)	(2)	(3)	(4)
State excise tax on beer	-0.151	-0.147	-0.274	-0.157
	(-2.67)	(-2.16)	(-3.44)	(-1.71)
	-0.055	***-0.054***	***-0.052***	***-0.029***
Marijuana decriminalization		-0.076		0.226
		(-0.19)		(0.52)
		-0.027		***0.048***
Cocaine price		0.0003		-0.0004
		(0.54)		(-0.54)
		0.0001		***-0.0001***
Number of outlets		0.107		0.228
		(1.20)		(2.11)
		0.039		***0.043***
Percent dry		-0.013		-0.007
		(-1.96)		(-0.84)
		-0.005		***-0.001***
Grocery sales of beer prohibited		-0.227		0.069
		(-0.84)		(0.22)
		-0.078		***0.013***
Billboards prohibited		0.239		0.101
		(1.13)		(0.39)
		0.090		***0.020***
Window displays prohibited		-0.465		-0.119
		(-2.74)		(-0.59)
		-0.159		***-0.021***
Consumer novelties prohibited		0.285		0.021
		(1.52)		(0.09)
		0.107		***0.004***
Price advertising prohibited		0.096		-0.039
		(0.99)		(-0.33)
		0.035		***-0.007***
Chi-squared on availability variables		6.84		6.15
		[0.077]		[0.104]
Chi-squared on advertising variables		8.31		0.76
		[0.081]		[0.944]

[a]T-statistics in parentheses, marginal effects in bold italics, p-values in brackets for chi-squared tests, and intercept not shown. Other regressors include family history of violence, respondent's age, sex, income, race, employment status, religion and measures of stress, and the child's age and sex.

Appendix Table A2
1976 Full Sample
OLS Estimates[a]
Dependent Variable=Log of Number of Acts of Overall Violence Given Positive Violence
(N=409)

	(1)	(2)
State excise tax on beer	-0.218	-0.186
	(-2.61)	(-1.84)
Marijuana decriminalization		-0.597
		(-1.19)
Cocaine price		0.0002
		(0.22)
Number of outlets		0.017
		(0.15)
Percent dry		0.004
		(0.39)
Grocery sales of beer prohibited		0.029
		(0.08)
Billboards prohibited		-0.686
		(-2.29)
Window displays prohibited		0.448
		(1.83)
Consumer novelties prohibited		-0.251
		(-0.98)
Price advertising prohibited		0.041
		(0.32)
R-squared	0.13	0.15
F-statistic on regression	2.35	1.98
F-statistic on availability variables		0.06
		[0.982]
F-statistic on advertising variables		1.67
		[0.157]

[a]T-statistics in parentheses, p-value on F-statistic in brackets and intercept not shown. The F-statistics on the regression are always significant at the 1 percent level. Other regressors include family history of violence, respondent's age, sex, income, race, employment status, religion and measures of stress, and the child's age and sex.

Appendix Table A3[a]
Individual Characteristics, 1976 Full Sample

	Probability of Severe Violence	Probability of Overall Violence	Number of acts of Overall Violence Given Positive Violence
State excise tax on beer	-0.274	-0.151	-2.654
	(-3.44)	(-2.67)	(-2.36)
	-0.052	***-0.055***	
Parents hit respondent	0.205	0.362	-2.402
	(1.66)	(3.64)	(-1.30)
	0.037	***0.128***	
Parents hit each other	0.025	0.047	-0.733
	(0.18)	(0.39)	(-0.36)
	0.005	***0.017***	
Black	0.237	-0.085	-1.226
	(1.14)	(-0.47)	(-0.34)
	0.051	***-0.030***	
Hispanic	0.292	0.230	4.669
	(1.21)	(1.06)	(1.35)
	0.065	***0.087***	
Other race	-0.313	-0.054	0.806
	(-0.55)	(-0.15)	(0.12)
	-0.049	***-0.020***	
Education	0.019	0.032	-0.626
	(0.79)	(1.74)	(-1.70)
	0.004	***0.012***	
Age	-0.025	-0.019	-0.087
	(-3.09)	(-3.15)	(-0.78)
	-0.005	***-0.007***	
Female	0.322	0.132	2.197
	(2.12)	(1.07)	(0.99)
	0.060	***0.048***	
Income	-0.004	-0.005	-0.040
	(-1.00)	(-1.73)	(-0.74)
	-0.001	***-0.002***	
Female child	-0.260	-0.466	-1.459
	(-2.57)	(-5.61)	(-0.96)
	-0.049	***-0.168***	
Age of child	-0.039	-0.033	-0.497
	(-2.66)	(-2.82)	(-2.27)
	-0.007	***-0.012***	
Number children at home	0.101	0.044	0.599
	(2.48)	(1.30)	(0.95)
	0.019	***0.016***	
Part-time	-0.057	-0.034	0.522
	(-0.29)	(-0.20)	(0.18)
	-0.011	***-0.012***	
Unemployed	-0.148	-0.115	-3.262
	(-0.50)	(-0.49)	(-0.76)
	-0.026	***-0.041***	

Not employed	-0.064	-0.103	0.459
	(-0.43)	(-0.82)	(0.20)
	-0.012	***-0.037***	
Blue collar	0.121	-0.138	-2.005
	(0.99)	(-1.39)	(-1.09)
	0.023	***-0.050***	
Catholic	-0.272	-0.591	-1.066
	(-1.44)	(-3.60)	(-0.42)
	-0.047	***-0.198***	
Jewish	-0.676	-0.383	-0.219
	(-1.99)	(-1.63)	(-0.06)
	-0.086	***-0.127***	
Protestant	-0.139	-0.614	-0.738
	(-0.79)	(-3.98)	(-0.32)
	-0.027	***-0.224***	
No religion	-0.561	-0.765	-6.941
	(-1.93)	(-3.36)	(-1.81)
	-0.077	***-0.226***	
Frequency of religious services	-0.019	-0.034	-0.242
	(-0.85)	(-1.87)	(-0.77)
	-0.004	***-0.012***	
Talks with others	0.158	0.340	-1.099
	(1.45)	(3.81)	(-0.68)
	0.030	***0.124***	
Number of stressful events	0.010	0.026	0.477
	(0.41)	(1.27)	(1.36)
	0.002	***0.009***	

[a]T-statistics in parentheses, marginal effects in bold italics for probit estimates, and intercept not shown.

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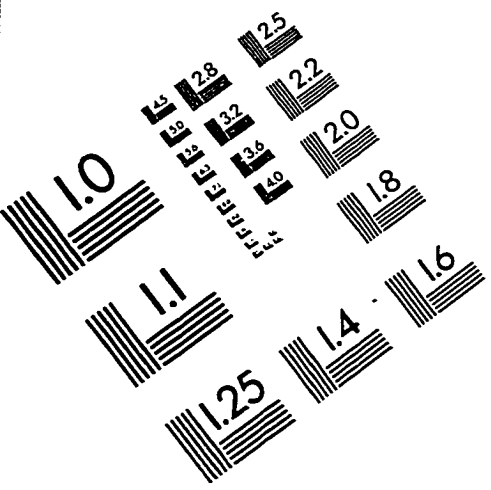
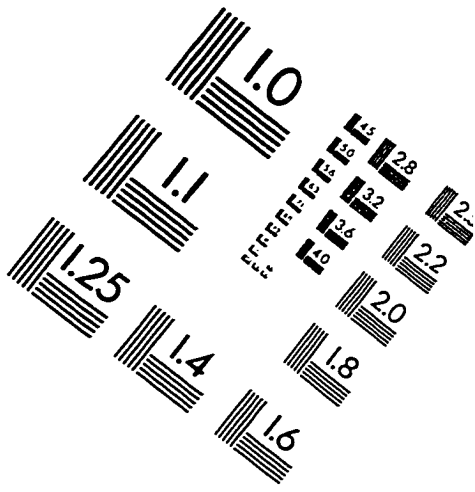
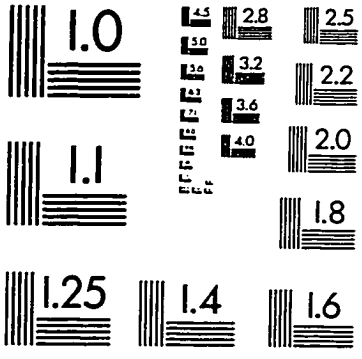
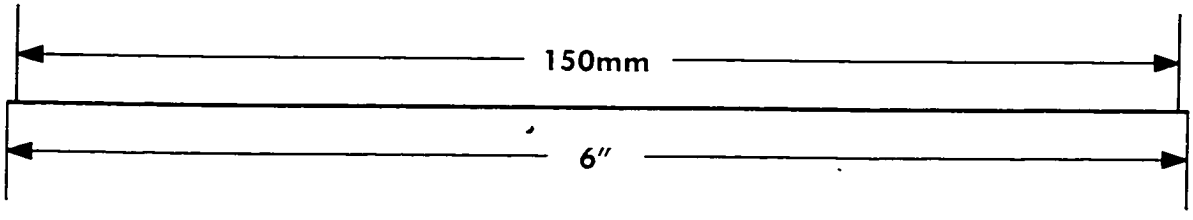
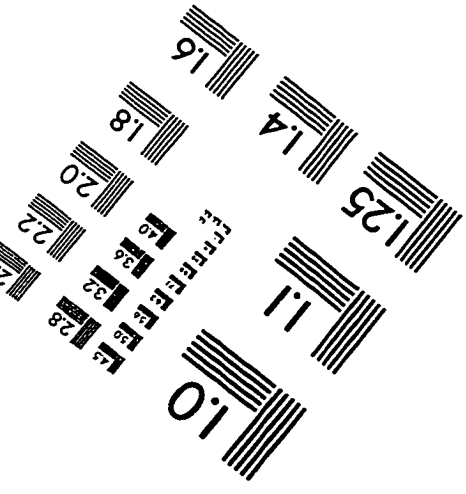
IMAGE EVALUATION TEST TARGET (QA-3)

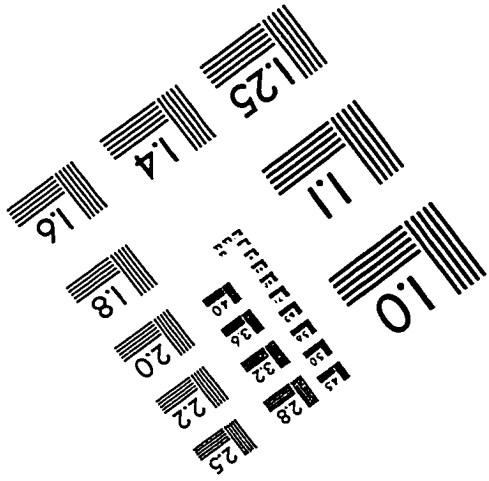












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