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Alcohol Use and Crime: Findings from a Longitudinal Sample of U.S. Adolescents and Young Adults

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Abstract

Background—A positive relationship between alcohol use and criminal activity has been well documented among adults, but fewer studies explore this relationship among adolescents.

Methods—Using data from four waves of the National Longitudinal Study of Adolescent Health (Add Health), we examine alcohol use patterns and criminal activity from adolescence to young adulthood. Fixed-effects models partially address the potential endogeneity of alcohol use, and, because numerous studies indicate that males are more likely than females to engage in drinking and criminal activity, the analyses are segmented by gender.

Results—We find a strong positive relationship between alcohol consumption, the commission of crimes, and criminal victimization for both genders. Various sensitivity analyses and robustness checks support this core finding.

Conclusions—Our results have important policy implications, as public policy tools that aim to reduce drinking among adolescents could also reduce criminal activity. Moreover, effective alcohol abuse treatment may indirectly reduce delinquency and thus have greater long-term economic benefits than previously estimated.

Keywords

Alcohol Use; Crime; Adolescents; Young Adults; Fixed-Effects Analysis

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INTRODUCTION

Alcohol use is often connected with criminal activity for both perpetrators (Pihl and Peterson, 1995; Collins and Messerschmidt, 1993) and victims (Johnson et al., 1978; Wolfgang and Strohm, 1956). Greenfield and Henneberg (2001) surveyed probationers and prisoners and found that 38 percent reported drinking at the time of the crime. In addition, alcohol was involved more frequently in violent and public disorder crimes than in property crimes. A meta-analysis of medical examiner studies conducted between 1975 and 1995 estimated that 32 percent of homicide victims were intoxicated when they were killed (Smith et al., 1999). In a more recent study, heavy drinkers were 2.67 times more likely to be shot during an assault than nondrinkers (Branas et al., 2009).

Alcohol use, delinquency, criminal activity, and other risk-taking behaviors are more prevalent during adolescence (Arnett, 1992; Farrington, 1986), and adolescents and young adults contribute to a large proportion of all arrests. According to a report from the U.S. Department of Justice, 44.4 percent of all persons arrested for criminal offenses in the United States in 2006 were under 24 years of age (Pastore and Maguire, 2006). These behaviors occur more frequently among adolescents, who are still developing judgment and decision-making skills and may be limited in their ability to accurately assess risks. Moreover, adolescents have less impulse control and might be more vulnerable to problematic alcohol use than adults. Since the human brain continues to develop until an individual is in his or her early twenties, excessive alcohol use may have a more severe and long-lasting effect when consumed during adolescence. Given the risks that heavy drinking poses to adolescents and the overwhelming costs of criminal activity to society, it is important to identify the ways in which alcohol contributes to violence.

Several theories attempt to explain the co-occurrence of drinking and criminal activity. First, the pharmacological properties of alcohol might impair potential perpetrators' higher-level cognitive processes and increase the likelihood of aggressive behavior (Giancola, 2000; Hoaken et al., 1998). Individuals who consume alcohol may be more likely to place themselves or their property in situations that increase the likelihood of being victimized (Carpenter and Dobkin, 2010; Zimmerman and Benson, 2007). Second, expectations about alcohol's presumed effects could also lead to aggression, as seen in experimental studies in which the belief that one has consumed alcohol leads to violent behavior (Carpenter and Dobkin, 2010; Chermack and Taylor 1995). Third, offenders might drink to provide an excuse for their criminal behavior (Fagan, 1990). Finally, unobserved individual factors, such as a sensation-seeking lifestyle, may encourage both behaviors (alcohol consumption and criminal activity) (Fagan, 1990). Investigating these relationships empirically is challenging because estimates will be biased if alcohol use is endogenous (i.e., correlated with an unmeasured and/or unobserved factor(s) that is also related to criminal activity).

The present study analyzes data from the National Longitudinal Study of Adolescent Health (Add Health) to investigate several important questions regarding the effects of alcohol use on criminal activity among adolescents and young adults. Does alcohol use have different effects on being a victim or being a perpetrator of a crime? Is the likelihood of committing a property crime for drinkers relative to non-drinkers greater than that of being involved in other types of crime? How do these relationships differ for males and females? Are frequent binge drinkers more likely to be involved in criminal activity?

In answering these questions, the current analysis addresses many of the gaps in the growing body of literature on substance use and crime. First, to reduce the likelihood of endogeneity bias, we use fixed-effects models, a form of longitudinal data analysis that accounts for individual characteristics that are time-invariant, unobserved, and potentially correlated both

with drinking and criminal activity. This approach overcomes one of the key limitations of existing studies that do not adequately control for such characteristics. Second, our results are specific to adolescents and young adults, while the majority of previous work in the area has focused on adults.

Third, results from previous studies indicate that males are more likely than females to engage in drinking as well as criminal activity (Robbins and Martin, 1993; Steffensmeier and Allan, 1996). Rates of criminal activity for male respondents in the Add Health data are more than double those for females in all four waves. In light of these differences, we estimate separate models for males and females to identify gender differences in these relationships.

Finally, because most of the previous economic studies focus on violent crimes (Carpenter and Dobkin, 2010), less is known about victimization and property crimes even though these acts occur more frequently. The availability of more comprehensive measures of criminal activity (perpetrator of a property crime, perpetrator of a predatory crime, and victim of a predatory crime) is an advantage of using the Add Health data.

BACKGROUND

Cross-sectional studies have shown positive relationships between adolescent alcohol use and delinquency (Barnes, 1984; Swahn et al., 2004), between adolescent alcohol use and violent offenses (Dukarm et al., 1996; Fergusson et al., 1996), and between adolescent alcohol use and victimization (Carpenter et al., 1988). Others have examined whether the density of alcohol outlets (Scribner et al., 1995) or the proximity to college campuses with higher levels of binge drinking (Wechsler et al., 2002; Rees and Schnepel, 2009) are associated with more criminal activity. Mennis and Mason (2011) evaluated how substance use was associated with places perceived as safe or risky; characteristics of these places were especially important for girls compared to boys.

Despite evidence of a correlation between alcohol use and risky behaviors, the nature of these relationships is not clearly understood. If criminal activity and drinking co-occur as part of a range of deviant behaviors in adolescence (Jessor and Jessor, 1977) or as a result of an unobserved individual characteristic that influences both behaviors (Fagan, 1990), these cross-sectional associations could be spurious. Longitudinal data can offer greater insight into the nature of these mechanisms, but results have been mixed. Although some longitudinal studies have found that adolescent drinking predicts future delinquency (Newcomb and McGee, 1989; Welte and Wieczorek, 1999), others suggest the opposite is true (White et al., 1993; Windle, 1990).

In a recent article, Carpenter and Dobkin (2010) reviewed the economics literature on the relationship between alcohol use and crime. Most studies in this area have evaluated whether state alcohol policies such as alcohol taxes (Cook and Moore, 1993; Markowitz, 2005; Zimmerman and Benson, 2007), minimum legal drinking age (MLDA) (Carpenter and Dobkin, 2008; Dee, 1999), and other alcohol restrictions (Miron, 1999) are associated with crime rates or violent behavior. A series of innovative studies conducted by Carpenter (2005, 2007) focuses on the driving policy known as zero-tolerance laws, which target young adults under age 21. Using variation in the adoption of this state policy and age-specific arrest data from police agencies, Carpenter concludes that zero tolerance laws decrease the proportion of nuisance and property crimes committed by 18–20 year old men, but not violent crimes. Arrests for males aged 22–24, a natural comparison group, did not change as a result of the passage of zero-tolerance laws. In another study based on MLDAs, Carpenter and Dobkin (2008) analyze individual-level data on alcohol consumption and

state-level data on criminal activity to assess how the relationship between alcohol use and criminal activity changes for individuals in California who are almost 21 as compared to those who have just turned 21. The authors assume that since access to alcohol changes dramatically during this time period, any increase in criminal activity is due to this change. Overall, they find that alcohol consumption (measured by recent drinking days) increases the likelihood of being arrested for violent and nuisance crimes.

Instrumental variables (IV) techniques can be used to control for the potential endogeneity of alcohol use when examining the relationship between drinking and crime (Markowitz, 2001; French and Maclean, 2006). Markowitz (2001) found that beer consumption by high school students was positively associated with the likelihood of getting into a physical fight, but not of carrying a gun or weapon. Even light drinking was strongly associated with delinquency and criminal activity for young males and females in an IV analysis by French and Maclean (2006). These approaches are limited, however, if an instrument(s) is not valid and reliable (French and Popovici, 2011)

DATA

We analyze data from Add Health, a nationally representative survey of adolescents in grades 7–12 starting at Wave 1. Four waves of Add Health data are currently available. The first wave was initiated in 1994 and included 134 middle and high schools. At the time, it was the largest, most comprehensive school-based survey of adolescents ever undertaken in the United States. Computer-assisted self-interviews were administered to 20,746 Wave 1 respondents in 1994. Wave 2 included only those Wave 1 respondents who were still attending school in 1995–1996 (N=14,738 or 71 percent of the Wave 1 sample). Wave 3 was collected in 2001 and 2002 and included 15,190 respondents (all original Wave 1 respondents who could be contacted and re-interviewed) between 18 and 26 years of age. The fourth in-home interview was conducted in 2007 and 2008. After excluding respondents who did not participate in all waves or did not answer questions about alcohol use and/or criminal activity, the analysis sample included 4,301 males and 5,275 females.

Variables

Alcohol Use—We construct dichotomous measures of binge drinking in the past 12 months. The survey asked how many days in the past 12 months respondents drank five or more drinks in a row. Respondents could choose from seven categories ranging from “never” to “every day or almost every day.” We use this information to create four categories for bingeing in the past year (never binge, monthly binge drinker, approaching weekly binge drinker, and weekly or more frequent binge drinker).

Criminal Activity—We classify involvement in specific criminal offenses in the past 12 months into three dichotomous measures: perpetrator of a property crime, perpetrator of a predatory crime, and victim of a predatory crime. Being a perpetrator of a property crime included deliberately damaging property belonging to someone else, stealing something worth more than \$50, and/or entering a house or building to steal something. Being a perpetrator of a predatory crime included using or threatening to use a weapon to take something from someone, pulling a knife or gun on someone, shooting or stabbing someone, and/or hurting someone so badly that he or she required care from a doctor or nurse. Being the victim of a predatory crime included being threatened with a gun or a knife, being shot, and/or being cut or stabbed. Each measure was set equal to one if the respondent was involved in at least one type of crime in the past 12 months and zero if otherwise.

Control Variables—Add Health provides detailed socioeconomic and demographic information on survey respondents. The control variables include years of schooling, age, health status, smoking status, any marijuana use in the past 30 days, any other illicit drug use in the past 30 days, labor market income, employment status, and marital status at Waves 1, 2, 3, and 4. Indicators for race, ethnicity, and being born outside the U.S. were measured at Wave 1.

METHODS

Because nationally representative panel data with good measures for substance use and related consequences are rare, most analysts are forced to estimate single-equation models (e.g., OLS, probit, Poisson) with cross-sectional data. The basic linear specification of our fixed-effects model is as follows:

$$C = \beta_0 + A' \beta_1 + X' \beta_2 + u + e \quad (1)$$

where C is a dichotomous measure of crime, A' is a vector of dichotomous measures of alcohol use, X' is a vector of control variables, u represents unobserved individual factors, e is a random error, and the β s are coefficients to be estimated. We assume e follows a normal distribution.

If u is correlated with the alcohol use and criminal activity measures, estimates of the β s will be biased. Some of the earlier studies have implemented IV methods to control for the potential endogeneity of alcohol use (French and Maclean, 2006). These studies, however, are often plagued by weak and/or overidentifying instruments (French and Popovici, 2011). The current study employs a fixed-effects technique. To demonstrate the fixed-effects transformation (Wooldridge, 2002), we average the dependent and explanatory variables over time:

$$\bar{C} = \beta_0 + \bar{A}' \beta_1 + \bar{X}' \beta_2 + u + \bar{e} \quad (2)$$

We then obtain the fixed-effects model by subtracting Equation (2) from Equation (1):

$$(C - \bar{C}) = (A' - \bar{A}') \beta_1 + (X' - \bar{X}') \beta_2 + (e - \bar{e}) \quad (3)$$

The unobservable and time-invariant characteristics contained in the disturbance term (u) drop out of the empirical model, generating a consistent estimate of the coefficients for alcohol use (Wooldridge, 2002). Because fixed-effects models cannot account for individual, unobservable factors that vary over time, time-varying unobservable factors remain a source of potential bias in our analyses (Wooldridge, 2002).

RESULTS

Descriptive Statistics

Table 1 reports descriptive statistics for all four waves. Among males, 29.03 percent committed a property crime(s) in Wave 1. By Wave 4, the percentage committing property crimes decreased to 7.64. The 29.17 percent who committed a predatory crime(s) in Wave 1 decreased to 12.36 percent by Wave 3, but increased slightly to 13.48 percent in Wave 4. We observed a similar trend for being the victim of a predatory crime: the percentage decreased from 19.99 percent in Wave 1 to 10.74 percent by Wave 3, but then increased to 15.60 percent in Wave 4.

For females, 15.45 percent committed a property crime(s) in Wave 1, whereas 3.33 percent committed a property crime(s) in Wave 4. The 13.27 percent who committed a predatory crime(s) and the 7.94 percent who were the victim of a predatory crime(s) in Wave 1 decreased in Wave 3 to 3.35 percent and 2.72 percent, respectively, but then increased in Wave 4 to 11.81 percent and 14.14 percent, respectively. The substantial Wave 4 increases in the predatory crime rates, especially for females, may be explained by the larger number of military respondents as well as the larger number of prison interviews conducted during Wave 4. On average, crime rates for males were two to three times higher than those for females. For males and females in all waves, the most common property crime was property damage, and the most common predatory crime was aggravated assault with injury.

With the exception of female perpetrators of predatory crimes, the proportions of males and females involved in criminal activity declined over time, as Wave 1 data were collected when respondents were in middle school and high school and Wave 4 data were collected thirteen to fourteen years later. As previous research on criminal careers suggests (Farrington, 1986), aggregate age-crime curves tend to peak in adolescence, reflecting a temporary influx in the number of people involved in criminal activity. It is interesting, therefore, that a sizable percentage of males (15.6 percent) and females (14.14 percent) reported being a victim of a predatory crime at Wave 4.

Males were more likely than females to consume alcohol weekly or more frequently, especially in Waves 3 and 4 where percentages for males were almost twice those for females. Moreover, males were more than twice as likely to binge drink weekly or more frequently and two to three times more likely to report being “drunk or very high on alcohol” weekly or more frequently.

Table 1 reveals some interesting patterns for the control variables. The percentage of respondents who were current smokers increased with each new wave, while the percentage who used any marijuana in the past 30 days increased until Wave 3 and then decreased at Wave 4. The proportion of male and female respondents with a full-time job increased between Waves 1 and 4, whereas the proportion with a part-time job decreased. Males earned more than females in all four waves, while females were more likely to be married. The remaining control variables in Table 1 (race, born outside the U.S.) drop out of the fixed-effects models, but we include them along with all of the time-varying controls in the comparative cross-sectional specifications.

Multivariate analyses

We present the results of specifications using the binge drinking measure as our core model. Table 2 presents selected estimation results for the effects of binge drinking on criminal activity using a logit model and pooled panel data. These estimates are presented as a benchmark for comparison purposes with the results of conditional fixed-effects logit models presented in Table 3. We focus our discussion on the latter results. Overall, when compared to no binge drinking in the past 12 months, all patterns of binge drinking are associated with significantly higher probabilities of committing property and predatory crime(s) as well as being the victim of predatory crime(s). With a few exceptions for being the victim of predatory crime(s), the estimated odds ratios are statistically significant at $p < 0.01$ or $p < 0.05$. For males, being a monthly binge drinker during the past year is associated with a 53 percent ($p < 0.01$) increase in the probability of committing a property crime, compared to no binge drinking episodes. In addition, approaching weekly binge drinking is associated with a 56 percent ($p < 0.01$) increase in the probability of committing a property crime. Weekly or more frequent binge drinking is associated with a 106 percent ($p < 0.01$) increase in the same probability. For females, we find that monthly binge drinking is associated with a 37 percent ($p < 0.01$) increase in the probability of committing a property

crime. Approaching weekly binge drinking (weekly or more frequent binge drinking) is associated with a 55 percent (42 percent) increase in the probability of committing a property crime ($p<.05$). For males (females), when compared to no binge drinking, binge drinking is associated with a 33 to 48 percent ($p<0.01$) (55 to 83 percent ($p<0.01$)) increase in the probability of committing a predatory crime. The odds-ratio estimates for “approaching weekly binge drinking” are not statistically significant, most likely due to a small number of adolescents in this category. Moreover, for males, weekly or more frequent binge drinking is associated with a 29 percent ($p<0.01$) higher probability of being the victim of a predatory crime. For females, approaching weekly binge drinking (weekly or more frequent binge drinking) is associated with a 71 percent ($p<0.01$) (70 percent ($p<0.01$)) increase in the likelihood of being the victim of a predatory crime.

Appendix Table A presents the full estimation results for the core specifications. The estimated odds ratios for the control variables follow our expectations in almost all cases. In most of the specifications, education decreases the odds of committing a property or predatory crime and being the victim of a predatory crime. Marijuana use and any other illicit drug use in the past 30 days and past year psychological or emotional counseling increase the odds of being involved in all three measures of criminal activity. For males, being married decreases the odds of being involved in all three measures of crime. Results for females show that being married increases the likelihood of committing a predatory crime and being the victim of one, but decreases the probability of committing a property crime. Surprisingly, results for religiosity show that it is positively associated with the chances of committing a predatory crime and being the victim of one.

Sensitivity Analyses

We conduct several sensitivity tests to examine the robustness of our findings. First, we re-estimate all models using two alternative measures for alcohol use: any drinking and being drunk or very high on alcohol during the past year. The Add Health survey included questions asking how many days in the past 12 months respondents drank alcohol and how many days they have been drunk or very high on alcohol. Respondents could choose from seven categories ranging from “never” to “every day or almost every day.” We use these to construct four categories for alcohol use and being drunk in the past year. Although the “drunk” alcohol use measure is more subjective than the others since people have different perceptions about being intoxicated, we expect this measure to be associated with higher levels of criminal activity. We present the results in Appendix Tables B and C.

As expected, alcohol use and being drunk are associated with increased probability of being involved in all three types of criminal activity for both males and females. Most of the estimated odds ratios are statistically significant at conventional levels. Quantitatively, drinking males have a 92 to 106 percent (38 to 61 percent) higher probability of committing a property (predatory) crime than males who report no drinking. These results are statistically significant at $p<.01$. Also, drinking is associated with a 25 ($p<0.05$) to 37 percent ($p<0.01$) higher likelihood of being the victim of a predatory crime for males. Drinking females have a 46 to 120 percent (11 to 49 percent) higher probability of committing a property (predatory) crime than females who report no drinking. In addition, drinking is associated with an increased probability of being the victim of a predatory crime for females. Overall, the results for drinking and drinking to intoxication are consistent with the core results.

Due to a lack of within-group variation in the dependent variable when using the conditional fixed effects logit model, we lose a large percentage of the observations in the main analysis. To account for this, we re-estimate all models with a fixed effects linear probability model (see Appendix Table D). The results are consistent in sign and statistical significance with

the core models. All coefficient estimates suggest a positive association between alcohol use and each of the criminal activity measures.

DISCUSSION AND CONCLUSION

Review of Main Findings

The present study makes an important and timely contribution to our understanding of the effects of alcohol use on criminal activity among adolescents and young adults in the U.S.. It is possible that time-invariant, unobserved individual characteristics (e.g., personal traits) related to both criminal activity and drinking have created bias in previous studies using cross-sectional data. We use fixed-effects models that control for any time-invariant, unobserved individual characteristic. The estimates from these models are generally smaller in magnitude than benchmark estimates from pooled-panel data models, offering evidence that the magnitude of the association between drinking and crime reported by previous studies may be overstated.

The results also indicate that alcohol use affects various types of criminal activity differently. In most specifications, the odds ratios for the likelihood of being the victim of a predatory crime for drinkers are smaller in magnitude than the odds ratios for being the perpetrator of a crime. In addition, the odds of committing a property crime for drinkers are greater than the odds of being involved in the other two measures of crime in all models. One possible explanation for this finding is that alcohol use in adolescence and young adulthood may contribute to participation in certain types of property crimes (e.g., vandalism, shoplifting) while predatory crimes may indicate more serious, long-term involvement in aggressive behavior that is less influenced by alcohol use (Eley et al., 1999).

We estimate gender-specific models to analyze the differential effects of alcohol use on criminal activity (Robbins and Martin, 1993; Steffensmeier and Allan, 1996). In the present study, the odds ratios for male drinkers are significantly larger in magnitude than the odds ratios for female drinkers. The development of antisocial behavior appears to follow different developmental pathways in girls and boys (Silverthorn and Frick, 1999). If this is true, factors other than alcohol use may be better predictors of involvement in criminal activity for females (Eley et al., 1999; Mocan and Rees, 2005). Given the differences in alcohol absorption for males and females (Mumenthaler et al., 1999), the pharmacological effects of alcohol may also affect behavior in males and females differently. The probabilities of being a victim of predatory crime for females who are weekly or more frequent drinkers are higher than those for males, which could reflect the fact that females, especially those who drink frequently, are more likely to be victims of various crimes.

Our findings strongly suggest that, *ceteris paribus*, consuming more alcohol is associated with higher odds of engaging in criminal activity and being the victim of a predatory crime, all of which result in staggering costs to society. On average, a career criminal imposes over \$645,000 in costs to society by the age of 16; over a lifetime, these costs can total almost \$5.7 million (2007 dollars; Cohen and Piquero, 2007). According to recent crime-cost estimates, the total cost per offense for property crimes can range from \$3,532 per larceny/theft to \$10,772 per motor vehicle theft (in 2008 dollars; McCollister et al., 2010). Predatory offenses have a much higher societal cost, ranging from \$42,310 per robbery to more than \$107,020 per aggravated assault (in 2008 dollars; McCollister et al., 2010). In addition to the pain, suffering, and direct monetary costs associated with being the victim of a crime, victimization is also a risk factor for future offenses (Shaffer and Ruback, 2002).

Limitations

This research is not without limitations. First, although the fixed-effects estimation approach is an efficient way to control for unobserved time-invariant-omitted variables, results from these models may still be biased if individual unobservable factors that vary over time affect the choice to consume alcohol and engage in criminal activity. In addition, the analysis cannot fully eliminate the possibility of reverse causality (Wooldridge, 2002). Although an instrumental variable estimation technique is superior to a fixed-effects analysis, the Add Health data do not include state identifiers, hence the models cannot include state-specific policy variables that could serve as good instrumental variables. Nevertheless, the results of the present study are highly robust to the use of different measures of criminal activity and alcohol use, and they are consistent in direction and significance across different empirical specifications.

Second, although the Add Health survey has many redeeming features, the respondents self-reported their alcohol use. While we cannot resolve the extent (if any) of misreporting in this area, the published literature on this topic indicates that self-reported substance use measures are generally reliable for use in statistical analyses (Del Boca and Darkes, 2003).

Third, the conditional fixed-effects logit models do not use the observations that lack within-group variation in the dependent variable. Nevertheless, results of fixed-effects linear probability models that use the entire sample of respondents are consistent with our core results.

Fourth, it would be interesting to analyze the effect of alcohol use on criminal activity measured as a count variable. Inconsistency in the structure of the criminal activity questions across the four waves of Add Health data, however, makes it impossible to construct such a count variable.

Policy Implications and Recommendations for Future Research

These results have important policy implications. Effective alcohol abuse treatment programs may indirectly reduce delinquency and thus have greater long-term economic benefits than previously estimated (French et al., 2002). Moreover, public policy tools such as alcohol taxation, purchasing age limits, and penalties for drunk driving that aim to reduce drinking among this age group could also reduce criminal activity (Carpenter and Dobkin, 2010). This premise has been supported by previous research findings that increasing the beer tax or price of alcohol can reduce the rates of robbery, assault, and homicide (Chaloupka and Saffer, 1992; Cook and Moore, 1993; Markowitz, 2001, 2005).

We close this paper with a few recommendations for future research investigating the nature of the relationship between alcohol use and crime. Future research should take advantage of the longitudinal nature of the Add Health survey and analyze subsequent waves to understand how patterns of the effect of alcohol use on crimes affects respondents later in adulthood. Second, studies using datasets that offer the opportunity to analyze criminal activity measured as count variables are encouraged. Finally, it is important to examine how alcohol use interacts with other addictive substance use in its impact on criminal activity and delinquency.

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References

- Arnett J. Reckless behavior in adolescence: a developmental perspective. *Dev Rev.* 1992; 12:339–373.
- Barnes GM. Adolescent alcohol abuse and other problem behaviors: their relationships and common parental influences. *J Youth Adolesc.* 1984; 13:329–348.
- Branas CC, Elliott MR, Richmond TS, Culhane D, Ten Have TR, Wiebe D. Alcohol consumption, alcohol outlets, and the risk of being assaulted with a gun. *Alcohol Clin Exp Res.* 2009; 11(4):906–915. [PubMed: 19320627]
- Carpenter C. Heavy alcohol use and the commission of nuisance crimes: evidence from underage drunk driving laws. *Am Econ Rev.* 2005; 95(2):267–272.
- Carpenter C. Heavy alcohol use and crime: evidence from underage drunk driving laws. *J Law Econ.* 2007; 50:539–557.
- Carpenter, C.; Dobkin, C. Working Paper. University of California; Irvine, CA: 2008. The drinking age, alcohol consumption, and crime.
- Carpenter, C.; Dobkin, C. NBER Working Paper 15828. National Bureau of Economic Research; Cambridge, MA: 2010. Alcohol regulation and crime.
- Carpenter, C.; Glassner, B.; Johnson, DD.; Loughlin, J. Kids, Drugs, and Crime. Lexington Books; Lexington, MA: 1988.
- Chaloupka, FJ.; Saffer, H. Alcohol, illegal drugs, public policy, and crime. Presented at the annual meeting of the Western Economic Association; San Francisco, California. 1992 July.
- Chermack ST, Taylor S. Alcohol and human physical aggression: pharmacological versus expectancy effects. *J Stud Alcohol.* 1995; 56:449–456. [PubMed: 7674681]
- Cohen, MA.; Piquero, AR. [Accessed March 12, 2008] New evidence on the monetary value of saving a high risk youth. Vanderbilt Law and Economics Research Paper No. 08-07. 2007. Available at: <http://ssrn.com/abstract=1077214>
- Collins JJ, Messerschmidt MA. Epidemiology of alcohol related violence. *Alcohol Health and Res World.* 1993; 17:93–100.
- Cook, PJ.; Moore, MJ. Economic perspectives on reducing alcohol-related violence. In: Martin, SE., editor. *Alcohol and Interpersonal Violence: Fostering Multidisciplinary Perspectives*. U.S. Government Printing Office; Washington, DC: 1993. p. 193–211. National Institute on Alcohol Abuse and Alcoholism Research Monograph 24 (NIH Publication No. 93-3469)
- Dee T. State alcohol policies, teen drinking and traffic fatalities. *J Public Econ.* 1999; 72:289–315.
- Del Boca FK, Darkes J. The validity of self-reports of alcohol consumption: state of the science and challenges for research. *Addiction.* 2003; 98(Suppl 2):1–12. [PubMed: 14984237]
- Dukarm CP, Byrd RS, Auinger P, Weitzman M. Illicit substance use, gender, and the risk of violent behavior among adolescents. *Arch of Pediatr Adolesc Med.* 1996; 150:797–801. [PubMed: 8704884]
- Eley TC, Lichtenstein P, Stevenson J. Sex differences in the etiology of aggressive and nonaggressive antisocial behavior: results from two twin studies. *Child Dev.* 1999; 70:155–168. [PubMed: 10191520]
- Fagan, J. Intoxication and aggression. In: Michael, T.; Wilson, JQ., editors. *Drugs and Crime: Crime and Justice, a Review of Research*. Vol. 13. The University of Chicago Press; Chicago, IL: 1990. p. 241–320.
- Farrington DP. Age and crime. *Crim Justice.* 1986; 7:189–250.

- Fergusson DM, Lynskey MT, Horwood LJ. Alcohol misuse and juvenile offending in adolescence. *Addiction*. 1996; 91:483–494. [PubMed: 8857370]
- French MT, Maclean JC. Underage alcohol use, delinquency, and criminal activity. *Health Econ*. 2006; 15:1261–1281. [PubMed: 16786500]
- French MT, McCollister KE, Cacciola J, Durell J, Stephens RL. Benefit-cost analysis of addiction treatment in Arkansas: specialty and standard residential programs for pregnant and parenting women. *Subst Abuse*. 2002; 23:31–51.
- French MT, Popovici I. That instrument is lousy! In search of agreement when using instrumental variables estimation in substance use research. *Health Econ*. 2011; 20:127–146. [PubMed: 20029936]
- Giancola PR. Executive functioning: a conceptual framework for alcohol-related aggression. *Exp Clin Psychopharmacol*. 2000; 8:576–597. [PubMed: 11127429]
- Greenfield L, Henneberg M. Victim and offender self-reports of alcohol involvement in crime. *Alcohol Research & Health*. 2001; 25(1):20–31. [PubMed: 11496963]
- Hoaken PNS, Giancola PR, Pihl RO. Executive cognitive functions as mediators of alcohol-related aggression. *Alcohol Alcoholism*. 1998; 33:47–54.
- Jessor, R.; Jessor, SL. The social-psychological framework. In: Jessor, R.; Jessor, SL., editors. *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth*. Academic Press; New York: 1977. p. 17-42.
- Johnson SD, Gibson L, Linden R. Alcohol and rape in Winnipeg, 1966–1975. *J Stud Alcohol*. 1978; 39:1887–1894. [PubMed: 739769]
- Markowitz S. The role of alcohol and drug consumption in determining physical violence and weapon carrying by teenagers. *Eastern Econ J*. 2001; 27:409–32.
- Markowitz S. Alcohol, drugs, and violent crime. *International Review of Law and Economics*. 2005; 25:20–44.
- McCollister KE, French MT, Fang H. The cost of crime to society: new crime-specific estimates for policy and program evaluation. *Drug Alcohol Depend*. 2010; 108:98–109. [PubMed: 20071107]
- Mennis J, Mason M. People, places, and adolescent substance use: integrating activity space and social network data for analyzing health behavior. *Annals of the Association of American Geographers*. 2011; 101(2):272–291.
- Miron J. Violence and the U.S. prohibitions of drugs and alcohol. *American Law and Economics Review*. 1999; 1:78–114.
- Mocan HN, Rees DI. Economic conditions, deterrence and juvenile crime: evidence from micro data. *American Law and Economics Review*. 2005; 7(2):319–349.
- Mumenthaler MS, Taylor JL, O'Hara R, Yesavage JA. Gender differences in moderate drinking effects. *Alcohol Res Health*. 1999; 23:55–64. [PubMed: 10890798]
- Newcomb MD, McGee L. Adolescent alcohol use and other delinquent behaviors: a one-year longitudinal analysis controlling for sensation seeking. *Crim Justice Behav*. 1989; 16:345–369.
- Pastore, AL.; Maguire, K., editors. [Accessed March 12, 2008] Estimated percent distribution of U.S. resident population and persons arrested for all offenses. *Sourcebook of Criminal Justice Statistics Online*, Table 4.4.2006. 2006. Available at: <http://www.albany.edu/sourcebook/pdf/t442006.pdf>
- Pihl RO, Peterson J. Drugs and aggression: correlations, crime and human manipulative studies and some proposed mechanisms. *J Psychiatry Neurosci*. 1995; 20:141–149. [PubMed: 7703223]
- Rees D, Schnepel K. College football games and crime. *J Sports Econ*. 2009; 10:68–87.
- Robbins CA, Martin SS. Gender, styles of deviance, and drinking problems. *J Health Soc Behav*. 1993; 34(4):302–321. [PubMed: 8034948]
- Scribner R, MacKinnon D, Dwyer J. The risk of assaultive violence and alcohol availability in Los Angeles County. *Am J Public Health*. 1995; 85:335–340. [PubMed: 7892915]
- Shaffer, JN.; Ruback, RB. *OJJDP Juvenile Justice Bulletin*. U.S. Department of Justice, Office of Juvenile Justice and Delinquency Prevention; Washington, D.C: 2002. Violent victimization as a risk factor for violent offending among juveniles.
- Silverthorn P, Frick PJ. Developmental pathways to antisocial behavior: the delayed-onset pathway in girls. *Dev Psychopathol*. 1999; 11:101–126. [PubMed: 10208358]

- Smith GS, Branas CC, Miller TR. Fatal nontraffic injuries involving alcohol: a meta-analysis. *Ann Emerg Med.* 1999; 33:659–668. [PubMed: 10339681]
- Steffensmeier D, Allan E. Gender and crime: toward a gendered theory of female offending. *Annu Rev Sociol.* 1996; 22:459–487.
- Swahn MH, Simon TR, Hammig BJ, Guerrero JL. Alcohol-consumption behaviors and risk for physical fighting and injuries among adolescent drinkers. *Addict Behav.* 2004; 29(5):959–963. [PubMed: 15219342]
- Wechsler H, Lee JE, Hall J, Wagenaar A, Lee H. Secondhand effects of student alcohol use reported by neighbors of colleges: the role of alcohol outlets. *Soc Sci Med.* 2002; 55:425–435. [PubMed: 12144150]
- Welte JW, Wieczorek WF. Alcohol, intelligence and violent crime in young males. *J Subst Abuse.* 1999; 10:309–319. [PubMed: 10689662]
- White HR, Brick J, Hansell S. A longitudinal investigation of alcohol use and aggression in adolescence. *J Stud Alcohol.* 1993; 11:62–77.
- Windle M. A longitudinal study of antisocial behaviors in early adolescence as predictors of late adolescent substance use: gender and ethnic group differences. *J Abnorm Psychol.* 1990; 99:86–91. [PubMed: 2307771]
- Wolfgang ME, Strohm RB. The relationship between alcohol and criminal homicide. *Q J Stud Alcohol.* 1956; 17:411–425. [PubMed: 13359662]
- Wooldridge, J. *Econometric Analysis of Cross Section and Panel Data.* The MIT Press; Cambridge, MA: 2002.
- Zimmerman PR, Benson BL. Alcohol and rape: an ‘economics of crime’ perspective. *International Review of Law and Economics.* 2007; 27(4):442–473.

Table 1

Mean Values and Percentages for Analysis Variables

	Males (N=4,301)				Females (N=5,275)			
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 1	Wave 2	Wave 3	Wave 4
<i>Criminal activity variables (past year)</i>								
Perpetrator of a property crime (%) ¹	29.03	22.50	17.87	7.64	15.45	11.67	6.42	3.33
Perpetrator of a predatory crime (%) ²	29.17	16.36	12.36	13.48	13.27	6.36	3.35	11.81
Victim of a predatory crime (%) ³	19.99	16.57	10.74	15.60	7.94	6.00	2.72	14.14
<i>Alcohol consumption variables (past year)</i>								
Any drinking	44.68	44.89	75.48	76.89	44.28	44.57	71.32	69.71
Monthly drinker (%) ⁴	27.49	23.17	21.73	19.41	30.99	29.30	34.93	31.43
Approaching weekly drinker (%) ⁵	7.17	7.75	15.90	17.15	7.26	7.61	17.02	16.60
Weekly or more frequent drinker (%) ⁶	10.02	13.85	37.85	40.33	6.03	7.66	19.37	21.68
Any binge drinking (%) ⁷	26.65	31.34	58.21	56.79	20.89	24.61	40.69	41.13
Monthly binge drinker (%) ⁸	14.57	15.41	26.22	29.55	13.91	15.54	27.10	27.20
Approaching weekly binge drinker (%) ⁹	4.69	5.81	11.95	10.64	3.33	4.07	6.50	7.41
Weekly or more frequent binge drinker (%) ¹⁰	7.39	10.11	20.04	16.60	3.65	5.00	7.09	6.52
Drunk at least once (%) ¹¹	27.21	31.05	57.42	57.82	24.39	27.30	46.12	41.39
Drunk monthly (%) ¹²	16.55	16.67	30.69	37.20	17.28	19.26	33.30	32.53
Drunk approaching weekly (%) ¹³	4.60	5.69	11.92	9.60	3.82	3.46	7.10	5.09
Drunk weekly or more frequently (%) ¹⁴	6.06	8.69	14.81	11.02	3.29	4.58	5.72	3.77
<i>Control variables and demographics</i>								
Years of schooling	9.34 (1.48)	10.18 (1.42)	13.05 (1.88)	13.98 (2.15)	9.26 (1.49)	10.10 (1.43)	13.28 (1.90)	14.45 (2.17)
Age	15.86 (1.62)	16.86 (1.63)	22.87 (1.63)	28.87 (1.63)	15.65 (1.60)	16.65 (1.63)	22.65 (1.61)	28.65 (1.61)
Categorical health status ¹⁵	3.97 (0.88)	4.00 (0.88)	4.09 (0.83)	3.70 (0.91)	3.80 (0.92)	3.82 (0.90)	3.92 (0.88)	3.62 (0.92)
Current smoker (%)	18.72	20.14	41.73	45.97	17.72	19.81	35.67	38.76
Any marijuana use in past 30 days (%)	16.98	18.83	30.84	21.52	13.25	15.38	20.37	12.15
Any other illicit drug use in past 30 days (%)	5.51	4.41	8.67	7.90	4.26	3.41	4.98	4.15
Labor market income, past year	2,460 (3,468)	3,952 (5,042)	12,035 (14,231)	39,035 (36,818)	1,731 (2,827)	2,694 (3,821)	8,600 (11,520)	27,544 (29,745)

	Males (N=4,301)				Females (N=5,275)			
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 1	Wave 2	Wave 3	Wave 4
Currently part-time employed (%)	30.34	29.96	18.64	10.36	30.65	32.89	25.38	19.09
Currently full-time employed (%)	3.41	8.11	52.84	88.42	1.72	4.72	41.55	79.67
Currently married (%)	0.09	0.46	11.83	33.66	0.43	0.92	18.04	40.20
Religiosity scale ¹⁶	1.69 (0.78)	1.76 (0.82)	2.69 (0.92)	2.57 (0.91)	1.57 (0.71)	1.61 (0.75)	2.53 (0.91)	2.38 (0.86)
Past year psychological or emotional counseling (%)	9.79	7.39	5.09	6.86	12.87	10.10	8.76	11.43
Race								
White, not Hispanic (%)			57.73				56.44	
African American (%)			18.25				22.60	
Asian or Pacific Islander (%)			6.49				5.36	
Hispanic			15.95				14.42	
Other race/ethnicity (%)			1.58				1.18	
Born outside the US (%)			6.99				6.52	

Note: Standard deviations are reported in parenthesis.

- ¹ A respondent involved in at least one of the following types of crime in the past year: deliberately damaging property belonging to someone else, stealing something worth more than \$50, or entering a house or building to steal something.
- ² A respondent involved in at least one of the following types of crime in the past year: using or threatening to use a weapon to take something from someone, pulling a knife or gun on someone, shooting or stabbing someone, or hurting someone so badly that he or she required care from a doctor or nurse.
- ³ A respondent being the victim of at least one of the following types of crime in the past year: being threatened with a gun or a knife, being shot, or being cut or stabbed.
- ⁴ A monthly drinker is an individual who reported drinking 1 to 12 days during the past 12 months.
- ⁵ An approaching weekly drinker is an individual who reported drinking 2 or 3 days a month during the past 12 months.
- ⁶ A weekly or more frequent drinker is an individual who reported drinking 1 to 7 days a week during the past 12 months.
- ⁷ A binge drinker is an individual who reported drinking five or more drinks in a row at least once during the past 12 months.
- ⁸ A monthly binge drinker is an individual who reported drinking five or more drinks in a row on 1 to 12 days during the past 12 months.
- ⁹ An approaching weekly binge drinker is an individual who reported drinking five or more drinks in a row on 2 or 3 days a month during the past 12 months.
- ¹⁰ A weekly or more frequent binge drinker is an individual who reported drinking five or more drinks in a row on 1 to 7 days a week during the past 12 months.
- ¹¹ An individual who reported being drunk or "very high on alcohol" at least once during the past 12 months.

- I*² An individual who reported being drunk or “very high on alcohol” monthly during the past 12 months.
- I*³ An individual who reported being drunk or “very high on alcohol” 2 or 3 days a month during the past 12 months.
- I*⁴ An individual who reported being drunk or “very high on alcohol” 1 to 7 days a week during the past 12 months.
- I*⁵ Health status is measured from 1 (poor) to 5 (excellent).
- I*⁶ Religiosity is measured on a scale where religious is 1=very important, 2=fairly important, 3=fairly unimportant, or 4=not important at all for the respondent.

Table 2

Selected Estimation Results for the Effects of Binge Drinking on Criminal Activity Using Pooled Panel Data and Logit Models

	Males	Females
Dependent Variable = Perpetrator of a Property Crime ¹		
Number of observations	14,188	17,705
Monthly binge drinker	1.709 (1.463 to 1.996) **	1.532 (1.275 to 1.840) **
Approaching weekly binge drinker	1.811 (1.524 to 2.151) **	1.887 (1.503 to 2.371) **
Weekly or more frequent binge drinker	2.232 (1.866 to 2.669) **	1.805 (1.382 to 2.356) **
Dependent Variable = Perpetrator of a Predatory Crime ²		
Number of observations	14,188	17,705
Monthly binge drinker	1.443 (1.259 to 1.654) **	1.401 (1.209 to 1.622) **
Approaching weekly binge drinker	1.519 (1.211 to 1.904) **	1.388 (1.078 to 1.786) *
Weekly or more frequent binge drinker	1.788 (1.482 to 2.158) **	1.944 (1.521 to 2.484) **
Dependent Variable = Victim of Predatory Crime ³		
Number of observations	14,188	17,705
Monthly binge drinker	1.171 (1.034 to 1.326) *	1.190 (1.027 to 1.380) *
Approaching weekly binge drinker	1.286 (1.079 to 1.533) **	1.249 (0.977 to 1.596)
Weekly or more frequent binge drinker	1.392 (1.174 to 1.651) **	1.477 (1.138 to 1.916) **

*
p<.05;

**
p<.01.

Notes: Control variables include age, race/ethnicity, born outside U.S., years of schooling, smoking status, any marijuana use in the past 30 days, any other illicit drug use in the past 30 days, health status, labor market income, marital status, employment status, wave, past year psychological or emotional counseling, and religiosity. Odds ratios reported. Robust standard errors are clustered at the school level. 95% confidence intervals reported in parentheses.

¹ A dichotomous measure for committing any property crime is the dependent variable.

² A dichotomous measure for committing any predatory crime is the dependent variable.

³ A dichotomous measure for being the victim of a predatory crime is the dependent variable.

Table 3

Selected Estimation Results for the Effects of Binge Drinking on Criminal Activity Using Conditional Fixed-Effects Logit Models

	Males	Females
Dependent Variable = Perpetrator of a Property Crime ¹		
Number of observations	5,568	3,674
Monthly binge drinker	1.534 (1.265 to 1.860) **	1.372 (1.091 to 1.727) **
Approaching weekly binge drinker	1.558 (1.201 to 2.020) **	1.547 (1.077 to 2.222) *
Weekly or more frequent binge drinker	2.063 (1.636 to 2.601) **	1.422 (1.010 to 2.002) *
Dependent Variable = Perpetrator of a Predatory Crime ²		
Number of observations	5,450	4,126
Monthly binge drinker	1.331 (1.115 to 1.587) **	1.545 (1.271 to 1.878) **
Approaching weekly binge drinker	1.239 (0.972 to 1.577)	1.279 (0.910 to 1.798)
Weekly or more frequent binge drinker	1.483 (1.205 to 1.825) **	1.833 (1.340 to 2.508) **
Dependent Variable = Victim of Predatory Crime ³		
Number of observations	5,033	3,805
Monthly binge drinker	1.095 (0.917 to 1.307)	1.226 (0.996 to 1.509)
Approaching weekly binge drinker	1.192 (0.933 to 1.524)	1.711 (1.181 to 2.480) **
Weekly or more frequent binge drinker	1.287 (1.043 to 1.587) *	1.704 (1.219 to 2.383) **

* p<.05;

** p<.01.

Notes: Time to varying control variables include: age, years of schooling, smoking status, any marijuana use in the past 30 days, any other illicit drug use in the past 30 days, health status, labor market income, marital status, employment status, past year psychological or emotional counseling, and religiosity. Odds ratios reported. 95% confidence intervals reported in parentheses.

¹ A dichotomous measure for committing any property crime is the dependent variable.

² A dichotomous measure for committing any predatory crime is the dependent variable.

³ A dichotomous measure for being the victim of a predatory crime is the dependent variable.

Appendix Table A

Full Estimation Results for the Effects of Binge Drinking on Criminal Activity Using a Conditional Fixed-Effects Logit Model

	Males	Females
Dependent Variable = Perpetrator of a Property Crime ¹		
Number of observations	5,568	3,674
Monthly binge drinker	1.534 (1.265 to 1.860) **	1.372 (1.091 to 1.727) **
Approaching weekly binge drinker	1.558 (1.201 to 2.020) **	1.547 (1.077 to 2.222) *
Weekly or more frequent binge drinker	2.063 (1.636 to 2.601) **	1.422 (1.010 to 2.002) *
Years of schooling	1.011 (0.964 to 1.061)	0.843 (0.793 to 0.896) **
Age	0.875 (0.850 to 0.901) **	0.943 (0.910 to 0.976) **
Categorical health status	0.909 (0.827 to 0.999) *	0.909 (0.817 to 1.012)
Current smoker	1.086 (0.883 to 1.334)	1.224 (0.947 to 1.583)
Any marijuana use in past 30 days	2.156 (1.781 to 2.610) **	1.461 (1.147 to 1.860) **
Any other illicit drug use in past 30 days	1.546 (1.210 to 1.975) **	1.804 (1.332 to 2.443) **
Labor market income, past year (in \$10,000s)	0.930 (0.883 to 0.979) **	0.940 (0.864 to 1.022)
Currently part-time employed	0.953 (0.804 to 1.131)	0.912 (0.745 to 1.118)
Currently full-time employed	0.839 (0.669 to 1.054)	0.919 (0.695 to 1.216)
Currently married	0.678 (0.497 to 0.926) *	0.483 (0.329 to 0.710) **
Religiosity scale	1.053 (0.955 to 1.161)	1.104 (0.977 to 1.248)
Past year psychological or emotional counseling	1.859 (1.435 to 2.408) **	1.388 (1.072 to 1.797) *
Dependent Variable = Perpetrator of a Predatory Crime ²		
Number of observations	5,450	4,126
Monthly binge drinker	1.331 (1.115 to 1.587) **	1.545 (1.271 to 1.878) **
Approaching weekly binge drinker	1.239 (0.972 to 1.577)	1.279 (0.910 to 1.798)
Weekly or more frequent binge drinker	1.483 (1.205 to 1.825) **	1.833 (1.340 to 2.508) **
Years of schooling	0.954 (0.914 to 0.996) *	0.861 (0.820 to 0.905) **
Age	0.945 (0.923 to 0.968) **	1.057 (1.030 to 1.086) **
Categorical health status	0.955 (0.879 to 1.038)	0.914 (0.836 to 0.998) *
Current smoker	1.029 (0.852 to 1.242)	0.754 (0.594 to 0.956) *
Any marijuana use in past 30 days	1.382 (1.161 to 1.644) **	1.502 (1.193 to 1.892) **
Any other illicit drug use in past 30 days	1.737 (1.368 to 2.207) **	1.598 (1.168 to 2.187) **
Labor market income, past year (in \$10,000s)	1.044 (1.010 to 1.079) *	1.093 (1.041 to 1.148) **
Currently part-time employed	0.922 (0.781 to 1.088)	0.944 (0.781 to 1.141)
Currently full-time employed	0.928 (0.757 to 1.138)	0.970 (0.767 to 1.227)
Currently married	0.944 (0.747 to 1.194)	1.493 (1.191 to 1.871) **
Religiosity scale	0.916 (0.838 to 1.002)	0.820 (0.739 to 0.910) **
Past year psychological or emotional counseling	1.909 (1.497 to 2.435) **	1.676 (1.339 to 2.097) **

	Males	Females
Dependent Variable = Victim of Predatory Crime ³		
Number of observations	5,033	3,805
Monthly binge drinker	1.095 (0.917 to 1.307)	1.226 (0.996 to 1.509)
Approaching weekly binge drinker	1.192 (0.933 to 1.524)	1.711 (1.181 to 2.480) **
Weekly or more frequent binge drinker	1.287 (1.043 to 1.587) *	1.704 (1.219 to 2.383) **
Years of schooling	1.021 (0.978 to 1.066)	0.892 (0.846 to 0.939) **
Age	0.985 (0.963 to 1.008)	1.138 (1.107 to 1.170) **
Categorical health status	0.972 (0.894 to 1.056)	0.956 (0.870 to 1.052)
Current smoker	1.131 (0.936 to 1.368)	0.836 (0.650 to 1.077)
Any marijuana use in past 30 days	1.355 (1.139 to 1.612) **	1.370 (1.069 to 1.757) *
Any other illicit drug use in past 30 days	1.383 (1.087 to 1.760) **	1.597 (1.135 to 2.246) **
Labor market income, past year (in \$10,000s)	1.010 (0.979 to 1.042)	1.047 (0.998 to 1.098)
Currently part-time employed	1.110 (0.933 to 1.322)	1.052 (0.852 to 1.298)
Currently full-time employed	1.066 (0.871 to 1.305)	0.926 (0.721 to 1.188)
Currently married	0.825 (0.657 to 1.036)	1.361 (1.071 to 1.729) *
Religiosity scale	0.815 (0.745 to 0.891) **	0.812 (0.726 to 0.908) **
Past year psychological or emotional counseling	1.939 (1.515 to 2.481)	1.490 (1.165 to 1.904) **

* p<.05;

** p<.01.

Notes: Odds ratios reported. 95% confidence intervals reported in parentheses.

¹ A dichotomous measure for committing any property crime is the dependent variable.

² A dichotomous measure for committing any predatory crime is the dependent variable.

³ A dichotomous measure for being the victim of a predatory crime is the dependent variable.

Appendix Table B**Selected Estimation Results for the Effects of Drinking on Criminal Activity Using Conditional Fixed-Effects Logit Models**

	Males	Females
Dependent Variable = Perpetrator of a Property Crime ¹		
Number of observations	5,564	3,674
Monthly drinker	1.940 (1.600 to 2.352) **	1.463 (1.172 to 1.827) **
Approaching weekly drinker	1.923 (1.507 to 2.455) **	2.199 (1.631 to 2.965) **
Weekly or more frequent drinker	2.266 (1.809 to 2.839) **	1.511 (1.107 to 2.062) **
Dependent Variable = Perpetrator of a Predatory Crime ²		
Number of observations	5,446	4,124
Monthly drinker	1.380 (1.158 to 1.645) **	1.113 (0.925 to 1.340)
Approaching weekly drinker	1.596 (1.276 to 1.997) **	1.309 (1.010 to 1.695) *
Weekly or more frequent drinker	1.614 (1.322 to 1.970) **	1.485 (1.151 to 1.916) **
Dependent Variable = Victim of Predatory Crime ³		
Number of observations	5,030	3,803
Monthly drinker	1.254 (1.049 to 1.498) *	1.180 (0.967 to 1.440)
Approaching weekly drinker	1.282 (1.026 to 1.600) *	1.404 (1.066 to 1.850) *
Weekly or more frequently drinker	1.376 (1.129 to 1.676) **	1.599 (1.218 to 2.099) **

*
p<.05;

**
p<.01.

Notes: Time-varying control variables include: age, years of schooling, smoking status, any marijuana use in the past 30 days, any other illicit drug use in the past 30 days, health status, labor market income, marital status, employment status, past year psychological or emotional counseling, and religiosity. Odds ratios reported. 95% confidence intervals reported in parentheses.

¹ A dichotomous measure for committing any property crime is the dependent variable.

² A dichotomous measure for committing any predatory crime is the dependent variable.

³ A dichotomous measure for being the victim of a predatory crime is the dependent variable.

Appendix Table C

Selected Estimation Results for the Effects of Being Drunk on Criminal Activity Using Conditional Fixed-Effects Logit Models

	Males	Females
Dependent Variable = Perpetrator of a Property Crime ¹		
Number of observations	5,568	3,674
Drunk monthly	1.539 (1.277 to 1.855) **	1.460 (1.168 to 1.825) **
Drunk approaching weekly	1.841 (1.417 to 2.392) **	1.775 (1.233 to 2.554) **
Drunk weekly or more frequently	2.342 (1.822 to 3.010) **	1.395 (0.968 to 2.012)
Dependent Variable = Perpetrator of a Predatory Crime ²		
Number of observations	5,450	4,126
Drunk monthly	1.334 (1.127 to 1.580) **	1.339 (1.108 to 1.619) **
Drunk approaching weekly	1.299 (1.007 to 1.677) *	1.464 (1.030 to 2.081) *
Drunk weekly or more frequently	1.707 (1.360 to 2.142) **	1.590 (1.118 to 2.262) *
Dependent Variable = Victim of Predatory Crime ³		
Number of observations	5,033	3,805
Drunk monthly	1.235 (1.043 to 1.462) *	1.225 (0.997 to 1.505)
Drunk approaching weekly	0.959 (0.742 to 1.241)	1.638 (1.123 to 2.391) *
Drunk weekly or more frequently	1.478 (1.170 to 1.866) **	1.839 (1.263 to 2.679) **

* p<.05;

** p<.01.

Notes: Time-varying control variables include: age, years of schooling, smoking status, any marijuana use in the past 30 days, any other illicit drug use in the past 30 days, health status, labor market income, marital status, employment status, past year psychological or emotional counseling, and religiosity. Odds ratios reported. 95% confidence intervals reported in parentheses.

¹ A dichotomous measure for committing any property crime is the dependent variable.

² A dichotomous measure for committing any predatory crime is the dependent variable.

³ A dichotomous measure for being the victim of a predatory crime is the dependent variable.

Appendix Table D

Selected Estimation Results for the Effects of Binge Drinking on Criminal Activity Using Fixed Effects Linear Probability Models

	Males	Females
Dependent Variable = Perpetrator of a Property Crime ¹		
Number of observations	14,188	17,705
Monthly binge drinker	0.045 (0.026 to 0.064) **	0.018 (0.005 to 0.031) **
Approaching weekly binge drinker	0.039 (0.009 to 0.069) *	0.028 (0.004 to 0.052) *
Weekly or more frequent binge drinker	0.080 (0.051 to 0.109) **	0.020 (−0.010 to 0.051)
Dependent Variable = Perpetrator of a Predatory Crime ²		
Number of observations	14,188	17,705
Monthly binge drinker	0.041 (0.022 to 0.060) **	0.035 (0.021 to 0.048) **
Approaching weekly binge drinker	0.034 (0.004 to 0.065) *	0.019 (−0.006 to 0.044)
Weekly or more frequent binge drinker	0.059 (0.030 to 0.087) **	0.055 (0.022 to 0.088) **
Dependent Variable = Victim of Predatory Crime ³		
Number of observations	14,188	17,705
Monthly binge drinker	0.013 (−0.005 to 0.032)	0.014 (−0.001 to 0.029)
Approaching weekly binge drinker	0.021 (−0.007 to 0.050)	0.027 (0.002 to 0.051) *
Weekly or more frequent binge drinker	0.033 (0.004 to 0.063) *	0.039 (0.008 to 0.070) *

* p<.05;

** p<.01.

Notes: Time-varying control variables include: age, years of schooling, smoking status, any marijuana use in the past 30 days, any other illicit drug use in the past 30 days, health status, labor market income, marital status, employment status, past year psychological or emotional counseling, and religiosity. Coefficient estimates reported. Robust standard errors are clustered at the school level. 95% confidence intervals reported in parentheses.

¹ A dichotomous measure for committing any property crime is the dependent variable.

² A dichotomous measure for committing any predatory crime is the dependent variable.

³ A dichotomous measure for being the victim of a predatory crime is the dependent variable.