



Published in final edited form as:

Am J Drug Alcohol Abuse. 2014 May ; 40(3): 251–257. doi:10.3109/00952990.2014.901336.

THE LINK BETWEEN EARLY ONSET DRINKING AND EARLY ONSET ALCOHOL-IMPAIRED DRIVING IN YOUNG MALES

Lening Zhang, Ph.D.,

Department of Sociology and Criminal Justice, Saint Francis University, Loretto, PA 15940

William F. Wieczorek, Ph.D., and

Center for Health and Social Research, State University of New York College at Buffalo, 1300 Elmwood Ave., Buffalo, NY 14222

John W. Welte, Ph.D.

Research Institute on Addictions, University at Buffalo, 1021 Main Street, Buffalo, NY 14203

Abstract

Background—Young drivers represent a disproportionate number of the individuals involved in alcohol-impaired driving. Although there is a known association between drinking and alcohol-impaired driving in young drivers, the link between early onset drinking and early onset alcohol-impaired driving has not been explored.

Objectives—The present study aimed to assess this link along with potentially confounding factors.

Methods—The assessment used a proportional hazards model with data collected from the Buffalo Longitudinal Study of Young Men, a population based sample of 625 males at ages of 16–19 years old.

Results—Controlling for the effects of potentially relevant confounds, the early onset of drinking was the most influential factor in predicting the early onset of alcohol-impaired driving. Race and the early onset of other forms of delinquency also played a significant role in the early onset of alcohol-impaired driving.

Conclusion—Preventing an early start of drinking among adolescents may be the most critical factor to address in preventing an early start of alcohol-impaired driving.

Keywords

early onset drinking; early onset alcohol-impaired driving; young males

1. INTRODUCTION

A major public health concern is alcohol-impaired driving and related health and social consequences. Young drivers disproportionately represent a large percent that have been

involved in alcohol-impaired driving. The National Highway Traffic Safety Administration (2010) (1) reported that in 2009 the age group of 21 to 24 years old had the highest percentage of drivers in fatal crashes with BAC levels of .08 or higher, which accounted for 35 percent of the total fatal crashes in that year.

Because alcohol-impaired driving involves drinking behavior, studies have examined the possible association of adolescent daily drinking patterns with the risk of alcohol-impaired driving (2–10). Several studies have also assessed the potential effect of age onset of drinking on the risk of subsequent alcohol-impaired driving by young people (11–14). Unfortunately, no research has examined the potential link between early onset of drinking and early onset of alcohol-impaired driving. The present study is aimed to explore the potential link using data collected from the Buffalo Longitudinal Study of Young Men (BLSYM).

2. RESEARCH CONTEXT

Alcohol-impaired driving *per se* is criminal behavior and both drinking and driving have legal limits. Underage drinking or driving is illegal. Therefore, alcohol-impaired driving by adolescents is often considered as a form of delinquency. The literature on delinquency has consistently shown that an early age of onset in delinquency predicts a relatively long criminal career and chronic offenders commonly have an early onset of delinquency (15–18). Consequently, many researchers believe that it is important to understand the determinants and processes of early onset of delinquency for crime prevention and control. A few studies have examined the potentially influential factors (e.g., childhood behavioral problems and disadvantaged family environment) in the early onset of delinquency (19–21).

However, alcohol-impaired driving by adolescents represents a unique form of delinquency that involves drinking. Literature in the area of public health generally focuses on the role of adolescent drinking behavior in their alcohol-impaired driving (2–10). A few studies have also assessed the potential influence of early onset of drinking on adolescents' subsequent problems in alcohol-impaired driving (11–14). The general findings indicate that adolescent drinking patterns are significantly associated with their drinking-and-driving behaviors and that young people who start drinking at an early age are at heightened risks for subsequent alcohol-related driving risks.

Given the literature in delinquency and public health, it would be relevant to assess the association between early onset of drinking and early onset of alcohol-impaired driving among young people. As noted by Zhang et al. (2011) (22), alcohol-impaired driving by adolescents has a developmental trajectory that differs from those of adolescents' drinking and other forms of delinquency. Drinking and driving starts relatively late (the earliest age onset is 13 years old and the mean age is 16 years old according to the BLSYM data; also see [23–24], [9], [25]) because it depends more on factors such as the availability of alcoholic beverages, access to motor vehicles, driving ability and skills, and situational factors (e.g., participation in a party).

In contrast to drinking-and-driving behaviors, studies indicate that young people usually have an earlier initiation of drinking (26, 13, 14). The BLSYM data show that the age onset

of drinking is as early as 6 years old and the mean age is 14 among the surveyed young males. Also, other forms of delinquent acts, especially those minor and general delinquent acts start earlier (typically between ages 8 and 14; see [27–30]) than does drinking and driving. For the BLSYM data, the age onset of delinquent acts is also as early as 6 years old and the mean age is about 12 years old.

3. CURRENT STUDY

The differences in the age onsets of alcohol-impaired driving, drinking, and other forms of delinquent acts provide a logical basis to assess the potential link between early onset of drinking and early onset of alcohol-impaired driving. The assessment is important because adolescents who have an early start of alcohol-impaired driving are likely to experience a longer path in such driving behavior (22). The present study hypothesizes that young people who have an early start of drinking are likely to have an early start of alcohol-impaired driving.

Building upon the literature, the study includes several control variables that may have confounding effects on early onset of alcohol-impaired driving in analysis. These variables are: age onset of other forms of delinquency, childhood behavioral problems, parental drinking behavior, disadvantaged family environment, and race. The inclusion of these variables allows us to assess the independent effect of age of onset of drinking on age of onset of alcohol-impaired driving. As discussed above, the delinquency literature indicates that childhood behavioral problems, disadvantaged family environment, and race are significantly associated with early onset of delinquency, although no studies have specifically addressed the association between these factors and early onset of alcohol-impaired driving (19–21). In the delinquency literature, alcohol-impaired driving among adolescents is commonly studied with other forms of delinquency together. Based on the literature, it is would be logical to assume that childhood behavioral problems may have confounding impact on early onset of alcohol-impaired driving because such a drinking-driving behavior is an distinctive form of adolescent problem behaviors. Problem behaviors in childhood and adolescence may be related.

Early onset of other forms of delinquency, especially those relatively minor delinquent acts may also have impact on early onset of alcohol-impaired driving. Data and literature show that drinking and driving starts relatively late compared to other forms of delinquency (23–24, 9, 25), and different forms of delinquency including alcohol-impaired driving are commonly correlated highly (15–16).

Also, it has been widely studied and recognized that parental drinking behavior is significantly associated with adolescent drinking behavior, although no research has specifically addressed the possible correlation between parental drinking behavior and early onset of alcohol-impaired driving among adolescents (31–32). We speculate that parental drinking behavior may have a confounding effect on early onset of alcohol-impaired driving among adolescents. Alcohol-impaired driving among adolescents involves underage drinking and driving under the influence which both are illegal. If parents are heavy drinkers, adolescents may model their drinking behavior after their parents, implying that

they are likely to drink heavily as their parents do. Consequently, their heavy drinking may increase their chances to engage in drinking-driving. Therefore, controlling the potential effects of these variables helps identify the effect of early onset of drinking on early onset of alcohol-impaired driving.

4. DATA AND METHODS

4.1 Data

The data used for the present study came from the three waves of the Buffalo Longitudinal Survey of Young Men (BLSYM), which the first wave was conducted in 1993.¹ It collected data from both primary and family respondents which provide suitable information for the present study. The BLSYM was a panel study of adolescent substance use and delinquency with a probability sample of 625 males aged 16–19 from the Buffalo area, New York. Each primary respondent was interviewed in three waves of the study with 18 months apart between waves.²

The sample was recruited by random digit dial, with screening by a brief questionnaire (e.g., fewer parental rules than peers, attended many schools, got into fights when young, etc.) to over-sample young men with higher risk backgrounds. Those who scored 3 or more items in the delinquent direction were always invited to participate; the others were recruited at a random 1/3 of the time. The sample represents the full range of individuals from the general population that is enriched by oversampling those at greater risk for problem behaviors.³ Face-to-face structured interviews were conducted by trained interviewers at the Research Institute on Addictions. Only the first wave of BLSYM conducted face-to-face interviews with both primary and family respondents (see Table 1 for a brief demographic description of the primary respondents).

The BLSYM data provide a unique opportunity to assess the potential link between age onset of drinking and age onset of alcohol-impaired driving among adolescents. The survey selected a male sample with an age range of 16 to 19 years old at the first wave. As previous studies indicated, males commit far more delinquent acts than females, and commit particularly high proportions of the most physically threatening crimes (34). Young males also have much higher rates of alcohol-impaired driving and involvement in fatal crashes related to their alcohol-impaired driving (24). Face-to-face interviews with family respondents (usually mothers of the primary respondents) provide information on parental drinking behavior and the primary respondents' childhood experience before they were 12 years old.

¹The study has been approved by the Institutional Review Board from the Research Foundation, the State University of New York for the protection of human subjects.

²The sample attrition is 4.6% for the second wave and 7.6% for the third wave. The small attrition does not affect the nature and characteristics of the sample as we assessed (33). Also, the attrition is not likely to have a significant effect on our current analysis because the overall measures of age onset of alcohol-impaired driving, age onset of drinking, and age onset of other forms of delinquency counted any respondents who reported or did not report any age onsets of the behaviors in any of the waves.

³A total of 840 eligible households were recruited. Of the 840, 625 were interviewed and 215 were randomized out based on screening, availability, and agreement. As a result, the response rate was 74% for both young males and their parents, since the survey interviewed 625 complete pairs. Although the sample might not represent the general population of adolescents in the area because of oversampling of those who had higher risk backgrounds, it provides sufficient data in delinquency for analysis.

4.2 Measures

The dependent variable for the present study is age onset of alcohol-impaired driving. Because the BLSYM is a panel study using repeated measures across the three waves, we created a measure of the dependent variable using information from self-reports of primary respondents on a survey question in all three waves. The question asks “How old were you the first time you did this?” following a question “Have you ever in your lifetime driven a motor vehicle while feeling the effects of alcohol?” The main independent variable is the age onset of drinking. It is measured using a survey question “About how old were you when you began drinking alcoholic beverages, not counting small tastes?” The responses to the question from all the waves were also used to create the measure.

As described previously, the study also has several control variables to assess the net effect of age onset of drinking on age onset of alcohol-impaired driving. They include age onset of delinquency, childhood behavioral problems, parental drinking behavior, disadvantaged family environment, and race. Age onset of delinquency is measured by the age when respondents began engaging in any of the 33 types of delinquent acts such as begging for money or things from strangers or buy-sell-hold stolen goods (see Appendix 1 for a complete list of the items).⁴ The specific survey question asks “How old were you the first time you did this (i.e., the delinquent act mentioned in the prior question)?” Using responses from the primary respondents in all three waves, we calculated the minimum age when a respondent started any of the 33 types of delinquent acts.⁵

The variable of childhood behavioral problems is measured using 5 survey items asking family respondents to report whether the primary respondents had the following behavioral problems before age 12. They include: lying, fights, couldn't accept correction, destructive, and unresponsive to discipline. The response categories are: 1 = applied; 2 = did not apply. The responses to “applied” were counted to create an index to represent the level of primary respondents' childhood behavioral problems. The Cronbach's Alpha is 0.69 for the index.

The measure of parental drinking behavior was based on information provided by the family respondents. It was created using survey questions about frequency and quantity of drinking malt liquors, beers, wine coolers, fortified wines, wines, and liquors by parents in the past twelve months. We multiplied the frequency and quantity to calculate average alcohol consumption of parents (see Appendix 1 for a detailed description of the survey items).

Two items from the family respondent interviews are used to measure the variable of disadvantaged family environment. One item asks whether the family was on social welfare when the primary respondent was growing up. The second item indicates whether the family had received food stamps when the primary respondent was growing up. Responses to the items are summed to create an index to indicate the level of disadvantaged family environment. The Cronbach's Alpha is 0.83 for the index. Race is a dummy variable coded

⁴The 33 delinquency items were adopted from National Youth Survey developed and conducted by Elliott and his colleagues (1985) (35).

⁵The results from our correlation analysis indicate the reliability and stability of the survey items across waves which provide a foundation for the overall measures across waves (see Appendix 2).

in the direction of White (other racial categories, mainly Blacks, are coded as 0; see Table 2 for the descriptive statistics of the variables).

4.3 Analytical Strategy

Given that the dependent variable is the time (i.e., the age) to start alcohol-impaired driving and 51.4% of the respondents had not reported any alcohol-impaired driving at the third wave of the survey, we conduct survival analysis using the method of Cox Regression. Cox Regression is a survival analysis method for modeling time-to-event data in the presence of censored cases. It allows the inclusion of multiple covariates in the model while handling the censored cases correctly. The basic model offered by the Cox Regression procedure is the proportional hazards model in which the hazard function measures the potential for the event to occur at a particular time point, given that the event may not yet occur.

5. RESULTS

The Cox Regression results are reported in Table 3. Consistent with our hypothesis, the results in Table 3 indicate that age onset of drinking has a significant effect on age onset of alcohol-impaired driving for the data of three waves ($b = -0.17$).⁶ Respondents who had an early start of drinking was likely to have a higher probability of initiating an earlier start in alcohol-impaired driving than those who had a later start of drinking.

The results also show that age onset of other forms of delinquency has a significant effect on age onset of alcohol-impaired driving ($b = -0.06$), although the effect is weaker than that of age onset of drinking. Respondents who started delinquent acts in an early age were likely to have an early start of alcohol-impaired driving. Race is also a significant factor in age onset of alcohol-impaired driving ($b = 0.24$). White respondents were more likely to have an early start of alcohol-impaired driving than respondents in other racial categories (mostly the racial category of Blacks). A possible interpretation is that White adolescents might have easier access to alcoholic beverages and motor vehicles given their advantaged social and economic status.

However, the measures of childhood behavioral problems and disadvantaged family environment have no significant effects on age onset of alcohol-impaired driving which are contradictory to the delinquency literature (20, 36).⁷ Finally, parental drinking behavior is not a significant factor in age onset of alcohol-impaired driving among adolescents.

6. DISCUSSION AND CONCLUSION

Building upon the literature in delinquency and public health, the present study assesses the potential link between early onset of drinking and early onset of alcohol-impaired driving. Although alcohol-impaired driving among adolescents is commonly studied as a form of

⁶The Cox Regression procedure is the proportional hazards model which estimates the probability of the event to occur. The negative sign of the coefficient in our Cox Regression analysis is in the predicted direction of the relationship between early onset of drinking and early onset of alcohol-impaired driving. Early onset of drinking was measured in age. The negative relationship indicates that respondents who started drinking at lower age were likely to have a higher probability of an early start of alcohol-impaired driving.

⁷There is minimal multicollinearity among the independent variables as examined. The highest correlation is 0.35 between age onset of drinking and age onset of delinquency.

delinquency, it has unique characteristics. Its onset is directly related to adolescents' capacity to obtain and access alcoholic beverages and motor vehicles, with some level of driving skills. Also, because drinking is involved in alcohol-impaired driving, studies in the field of public health have extensively examined the roles of adolescent drinking behavior and age onset of drinking in their alcohol-impaired driving respectively. However, it may also be important to assess the association between age onset of drinking and age onset of alcohol-impaired driving given that drinking and other forms of delinquency usually have an earlier start than alcohol-impaired driving among adolescents. The current analysis of the association reveals several interesting findings.

The data indicate a significant link between age onset of drinking and age onset of alcohol-impaired driving. Respondents who started drinking early were likely to start alcohol-impaired driving early. Age onset of other delinquent acts also has a significant influence on age onset of alcohol-impaired driving, although the effect is weaker than that of age onset of drinking.

A finding on the effect of race is contradictory to the delinquency literature. White respondents were more likely to have an early start of alcohol-impaired driving than respondents in other racial categories (mostly in the racial category of Blacks). A possible interpretation is that White adolescents might have easier access to alcoholic beverages and motor vehicles given their advantaged social and economic status. Consequently, they would likely encounter situations where an early start of alcohol-impaired driving might be initiated.

In sum, the data show that early onset of drinking is an important factor in early onset of alcohol-impaired driving. This finding implies that preventing an early start of drinking among adolescents may be critical in preventing an early start of alcohol-impaired driving. Also, it appears that early onset of alcohol-impaired driving is more common for White adolescents than that in other racial categories of adolescents for this urban and suburban sample.

We close with a few remarks on the limitations of the present study. First, the data used for this study were collected in 1993–1996. At that time, the legal drinking age in New York State was 21 years old, but the state did not have a zero tolerance law that made it illegal for individuals under age 21 to drive after any drinking until 1996.⁸ Although the data provide a unique opportunity to assess the possible effect of age onset of drinking on age onset of alcohol-impaired driving as we discussed above, there is still a need to assess the effect using more recent data because of the change of social and legal environment and the difference across states. It is a common scientific call for research to test and retest theoretical models. Second, the BLSYM over-sampled respondents who were likely to have problem behaviors in order to collect sufficient information on delinquency and other adolescent problem behaviors for analysis. Cautions should be made in generalizing the results to the general adolescent population. Thirdly, the measures of early onset of drinking

⁸Also, New York State does not have a use/lose law for drivers under age 21. The state has a junior license for those under 18. During the day from 5 AM to 9 PM, the junior license holder must be accompanied by an adult driver, and at night they must be accompanied by a parent.

and early onset of alcohol-impaired drinking were built upon the respondents' retrospective reports which may not be accurate and may be complicated with their current perceptions and behaviors in drinking and driving. Consequently, some retrospective bias may be involved in the analysis. Any interpretation of the results should be cautious. Finally, the current analysis is based on a sample of young males. There is a need to replicate the analysis for females. We call for further research.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

This research is supported by Grant R01AA016161 from the National Institute on Alcohol Abuse and Alcoholism.

References

1. National Highway Traffic Safety Administration. State alcohol-impaired driving estimates. Traffic Safety Facts, 2009 data. 2010. <http://www-nrd.nhtsa.dot.gov/Pubs/811398.pdf> (retrieved on 02/28/11)
2. Barnes GM, Welte JW. Predictors of driving while intoxicated among teenagers. *The Journal of Drug Issues*. 1988; 18:367–384.
3. Berger DE, Snortum JR. A structural model of drinking and driving: Alcohol consumption, social norms, and moral commitments. *Criminology*. 1986; 24:139–152.
4. Bingham CR, Shop JT. Adolescent problem behavior and problem driving in young adulthood. *Journal of Adolescent Research*. 2004; 19:205–223.
5. Calvert WJ, Bucholz KK. Adolescent risky behaviors and alcohol use. *Western Journal of Nursing Research*. 2008; 30:147–148.
6. Copeland LA, Shope JT, Waller PF. Factors in adolescent drinking/driving: Binge drinking, cigarette smoking, and gender. *Journal of School Health*. 1996; 66:254–260. [PubMed: 8884665]
7. Donovan JE. Young adult drinking-driving: Behavioral and psychosocial correlates. *Journal of Studies on Alcohol*. 1993; 54:600–613. [PubMed: 8412150]
8. Lapham SC, C' de Baca J, McMillan GP, Lapidus J. Psychiatric disorder in a sample of repeat impaired-driving offenders. *Journal of Studies on Alcohol and Drugs*. 2006; 67:707–713.
9. Usdan SL, Moore CG, Schumacher JE, Talbott LL. Drinking locations prior to impaired driving among college students: implications for prevention. *Journal of American College Health*. 2005; 54:69–75. [PubMed: 16255317]
10. Valencia-Martin JL, Galan I, Rodriguez-Artalejo F. The joint association of average volume of alcohol and binge drinking with hazardous driving behavior and traffic crashes. *Addiction*. 2008; 103:749–757. [PubMed: 18412753]
11. Hingson R, Heeren T, Jamanka A, Howland J. Age of drinking onset and unintentional injury involvement after drinking. *JAMA*. 2000; 284:1527–1533. [PubMed: 11000646]
12. Hingson R, Heeren T, Levenson S, Jamanka A, Voas R. Age of drinking onset, driving after drinking, and involvement in alcohol related motor-vehicle crashes. *Accident Analysis & Prevention*. 2002; 34:85–92. [PubMed: 11789578]
13. Hingson R, Edwards EM, Heeren T, Rosenbloom D. Age of drinking onset and injuries, motor vehicle crashes, and physical fights after drinking and when not drinking. *Alcoholism: Clinical & Experimental Research*. 2009; 33:783–790.
14. Lynskey MT, Bucholz KK, Madden PAF, Heath AC. Early-onset alcohol-use behaviors and subsequent alcohol-related driving risks in young women: a twin study. *Journal of Studies on Alcohol and Drugs*. 2007; 68:798–804. [PubMed: 17960297]

15. Farrington DP. Developmental and life-course criminology: Key theoretical and empirical issues – the 2002 Sutherland Award Address. *Criminology*. 2003; 41:221–256.
16. Farrington DP, Lambert S, West DJ. Criminal careers of two generations of family members in the Cambridge study in delinquent development. *Studies on Crime and Crime Prevention*. 1998; 7:85–106.
17. LeBlanc, M.; Frechette, M. Male criminal activity from childhood through youth. New York: Springer-Verlag; 1989.
18. Piquero, AR.; Farrington, DP.; Blumstein, A. Key issues in criminal career research: New analyses of the Cambridge study in delinquent development. New York: Cambridge University Press; 2007.
19. Farrington DP, Hawkins JD. Predicting participation, early onset, and later persistence in officially recorded offending. *Criminal Behavior and Mental Health*. 1991; 1:1–33.
20. Patterson G, Crosby L, Vuchinich S. Predicting risk for early police arrest. *Journal of Quantitative Criminology*. 1992; 8:335–355.
21. Tibbetts SG, Piquero AR. The influence of gender, low birth weight, and disadvantaged environment in predicting early onset of offending: A test of Moffitt’s international hypothesis. *Criminology*. 1999; 37:843–878.
22. Zhang L, Wieczorek WF, Welte JW. Early onset of delinquency and the trajectory of alcohol-impaired driving among young males. *Addictive Behaviors*. 2011; 36:1154–1159. [PubMed: 21831528]
23. Hingson R, Winter M. Epidemiology and consequences of drinking and driving. *Alcohol Research and Health*. 2003; 27:63–78. [PubMed: 15301401]
24. National Highway Traffic Safety Administration. Young drivers. Traffic Safety Facts, 2007 Data. 2008. <http://www.nhtsa.dot.gov/> (retrieved on 12/22/08)
25. Williams AF. Alcohol-impaired driving and its consequences in the United States: The past 25 years. *Journal of Safety Research*. 2006; 37:123–138. [PubMed: 16647085]
26. Donovan JE, Molina BSG. Childhood risk factors for early-onset drinking. *Journal of Studies on Alcohol and Drugs*. 2011; 72:741–751. [PubMed: 21906502]
27. Blumstein A, Cohen J, Farrington DP. Criminal career research: Its value for criminology. *Criminology*. 1988; 26:1–3.
28. Farrington, DP. Age and crime. In: Tonry, M.; Morris, N., editors. *Crime and justice*. Vol. 8. Chicago: University of Chicago Press; 1986. p. 189-250.
29. Hirschi T, Gottfredson MR. Age and the explanation of crime. *American Journal of Sociology*. 1983; 89:552–584.
30. Wolfgang, ME.; Figlio, RM.; Sellin, JT. *Delinquency in a birth cohort*. Chicago: University of Chicago Press; 1972.
31. Barnes, GM. Impact of the family on adolescent drinking patterns. In: Collins, RL.; Leonard, KE.; Searles, JS., editors. *Alcohol and the family: Research and clinical perspectives*. New York: Guilford Press; 1990. p. 137-161.
32. Zhang L, Welte JW, Wieczorek WF. The influence of parental drinking and closeness on adolescent drinking. *Journal of Studies on Alcohol*. 1999; 60:245–251. [PubMed: 10091963]
33. Zhang L, Welte JW, Wieczorek WF. Underlying common factors of adolescent problem behaviors. *Criminal Justice and Behavior*. 2002; 20:161–182.
34. Farrington, DP. Offending from 10 to 25 years of age. In: Van Dusen, KT.; Mednick, SA., editors. *Prospective studies of crime and delinquency*. Boston: Klewer & Nijhoff Publishers; 1983. p. 17-38.
35. Elliott, DS.; Huizinga, D.; Ageton, SS. *Explanation of delinquency and drug abuse*. Beverly Hills, CA: Sage; 1985.
36. Taylor J, Lacono WG, McGue M. Evidence for genetic etiology of early-onset delinquency. *Journal of Abnormal Psychology*. 2000; 109:634–643. [PubMed: 11195987]

Table 1

Brief demographic characteristics of respondents at Wave 1

Variable	Frequency	%
Age:		
16	180	28.8
17	159	25.4
18	155	25.8
19	131	21.0
Race:		
White	290	46.4
Non-white	335	53.6
Education:		
Less than high school graduate	105	16.8
Enrolled in high school	348	55.7
High school graduate	68	10.9
Enrolled in post high school trade	27	4.3
Enrolled in college	77	12.3
Family on welfare:		
No	488	78.0
Yes	137	22.0

Table 2

Descriptive statistics of variables

Variable	Mean	Std. deviation
Age onset of alcohol-impaired driving	20.21	3.08
Age onset of drinking	16.13	2.35
Age onset of delinquency	11.13	3.65
Childhood behavioral problems	1.44	1.50
Parental drinking behavior	0.37	0.95
Disadvantaged family environment	1.29	0.88
Race	0.46	0.50
N		625

Table 3

Cox Regression of age onset of alcohol-impaired driving on age onset of drinking along with the control variables

Variable	b	t-ratio	Exp. (b)
Age onset of drinking	-0.17	-6.42**	0.85
Age onset of delinquency	-0.06	-3.11**	0.94
Childhood behavioral problems	0.05	1.24	1.05
Parental drinking behavior	-0.05	-0.82	0.95
Disadvantaged family environment	-0.10	-1.53	0.90
Race	0.24	1.97*	1.27
N		625	

*
p < .05

**
p < .01