Published in final edited form as:

Am J Addict. 2016 October ; 25(7): 549–556. doi:10.1111/ajad.12438.

Adolescent Predictors of Alcohol Use in Adulthood: A 22-Year Longitudinal Study

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Abstract

Background and Objectives—The excessive consumption of alcohol is a major issue in the United States and elsewhere. It is associated with a number of adverse health consequences, as well as difficulty in relationships and employment. Therefore, the present longitudinal study investigates the direct and indirect adolescent predictors of alcohol use in adulthood.

Methods—Among the 674 participants (53% African Americans, 47% Puerto Ricans), 60% were females ($n=405$). Mplus software was used to perform structural equation modeling.

Results—Parental problems with alcohol use in the participants' late adolescence were related to low parent-child attachment in late adolescence, which in turn, was related to self delinquency in late adolescence. This was related to peer delinquency in emerging adulthood, which in turn, was associated with alcohol use in emerging adulthood and in adulthood. Low parent-child attachment in late adolescence was also related to low satisfaction for school in late adolescence, which in turn, was related to self delinquency in late adolescence. This was associated with alcohol use in emerging adulthood, which in turn, was associated with alcohol use in adulthood.

Conclusions and Scientific Significance—One of the key implications of this study is that impaired low parent-child attachment relationship is a determinant of children's engagement in delinquent behavior and ultimately the use of alcohol in adult life. Implications for social interventions from the findings of the current study were also discussed.

Keywords

alcohol use; binge drinking; structural equation modeling; longitudinal study

INTRODUCTION

The excessive consumption of alcohol is a major issue in the United States and is associated with a number of adverse health consequences.¹ It can also negatively impact the user's relationships and employment.² According to the Substance Abuse and Mental Health

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

Services Administration (SAMHSA), a 2013 survey reported that there are currently 136.9 million alcohol users 12 years of age or older in the United States, and of these, approximately 12.6% (17.3 million) met the criteria for having an alcohol use disorder in the past year.

The present longitudinal study investigates the adolescent predictors of alcohol use in adulthood. Despite the fact that previous cross-sectional research has examined the predictors of alcohol use, there is a dearth of longitudinal research incorporating a number of contextual and individual factors related to alcohol use across a significant part of the life span.³ This research, based on the Children/Adults in the Community study, is significant because there are few studies (e.g.,⁴) that look at the predictors of alcohol use in adolescence and adulthood over several developmental stages (late adolescence, emerging adulthood, and adulthood).

For the overall frame of our model, the problems of parental alcohol use in adolescence was considered as a starting point, since parental alcohol problems is often transmitted to the next generation's problematic alcohol use.⁵ Seven domains of individual and contextual factors were examined in the present research: parental problems with alcohol use, low parent-child attachment, low satisfaction for school, self delinquency in adolescence, peer delinquency, participant alcohol use in emerging adulthood, and alcohol use in adulthood. The goal of this research was to study the interrelation of these domains beginning in adolescence as related to alcohol use in adulthood using the model proposed in Figure 1.

There are three theories that have relevance for the specific constructs in this study and serve as the basis for the hypotheses. According to Family Interactional Theory and Social Learning Theory, parental problems with alcohol use may affect their offspring's alcohol use in emerging adulthood and adulthood because the offspring may imitate their parents' alcohol use. In addition, Selection Theory postulates that adolescents predisposed to alcohol use tend to select peers who also use alcohol.

According to Family Interactional Theory, a distant parent-child attachment relationship is associated with problematic personality attributes and associating with deviant peers, and ultimately, alcohol use.⁶ The parent-child attachment relationship should also be considered when examining the child's satisfaction for school. Children from families where the parents are conventional and supportive tend to score higher on the SATs than children from families where parents are unconventional and/or highly intrusive.⁷ More recently, a study has shown that parental involvement in a child's life during early adolescence reduces the chances of substance use later on in adolescence.⁸

The perceived environmental system is one of the major psychosocial domains of Social Learning Theory.⁹ This theory states that children often make decisions about a certain behavior by imitating their parents' and peers' behavior and attitudes towards that specific behavior.¹⁰ If children see their parents drinking, they may come to believe that this behavior does not constitute problematic behavior, and alcohol use is justifiable. In addition, there is evidence that parental alcohol use is a predictor of child hostility, for instance, hostility in the child leads to taking risks, and one such risk is the consumption of alcohol.¹¹ The

hostility that the child develops as a result of parental alcoholism can also lead to conduct problems or self delinquent behavior. Conduct problems have been shown to be related to the development of substance use problems in adolescents and young adults.¹²

According to Selection Theory, children and adults tend to select social groups with which they share common practices.¹³ Using data from an online social network consisting of a cohort of college students over 4 years, students who shared certain tastes in music and in movies were significantly more likely to be friends.¹⁴ This phenomenon also occurs regarding adverse characteristics. That is, delinquent adolescents who use alcohol tend to select friends who also use alcohol. In a recent study based on a sample of 5,419 adolescents ages 12–14 years, there was a strong association between self alcohol use and peer alcohol use.¹⁵ Also, self delinquency in the adolescent was correlated with involvement in peer groups that also engage in delinquent behavior.¹⁶

The present study controlled for a number of factors, namely gender, ethnicity, alcohol use at ages 14 and 19, and educational level at age 36. As regards gender, males drink more often, more heavily, and experience more alcohol-related problems as compared to females.¹⁷ In terms of ethnicity, Hispanics drink more than Blacks.¹⁸ As far as educational level, people who do not obtain a high school diploma or college degree are more likely to develop alcohol disorders.¹⁹ Finally, the results of several studies indicate that an early onset of alcohol use increases the probability of alcohol abuse and alcohol dependence during adulthood.²⁰

This study has a number of strengths. One is that it is a longitudinal study beginning when the participants were about 14 years of age, and now extending to about 36 years old. This extensive period of time makes it possible to observe the participants over the span of three critical developmental stages (i.e., adolescence, emerging adulthood, and adulthood), thus making it easier to determine at which earlier stage the predictors of alcohol use in adulthood have the most impact. Also, the study focuses on understudied ethnic groups; more specifically, urban African Americans and Puerto Ricans.

We hypothesized that: 1) Parental problems with alcohol use in the participant's late adolescence will be associated with alcohol use in emerging adulthood and subsequent alcohol use in adulthood. 2) Parental problems with alcohol use in the participant's late adolescence will be related to low parent-child attachment in late adolescence, which in turn, will be related to self delinquency in late adolescence. Self delinquency in late adolescence in turn will be related to peer delinquency in emerging adulthood, which will be associated with alcohol use in emerging adulthood. 3) Low parent-child attachment in late adolescence will also be related to low satisfaction for school in late adolescence, which in turn, will be related to self delinquency in late adolescence. Self delinquency will be associated with alcohol use in emerging adulthood, which ultimately will be associated with alcohol use in adulthood. 4) The pathways will be maintained after control for gender, ethnicity, alcohol use at ages 14 and 19, and educational level at age 36.

METHODS

Participants

This study analyzes data from 674 participants (53% African Americans, 47% Puerto Ricans). Sixty percent were females ($n=405$). Data on the participants were first collected in 1990 (time 1; T1, $N=1,332$) when the participants were students attending schools in the East Harlem area of New York City. At T1, the questionnaires were administered in classrooms under the supervision of the study research staff with no teachers present. The mean age of the participants at T1 was 14.1 years (standard deviation; $SD=1.3$ years). At time 2 (T2; 1994 – 1996; $N=1,190$), the National Opinion Research Center interviewed the participants in person or by phone. The mean age of the participants at this wave was 19.2 years ($SD=1.5$ years). At time 3 (T3; 2000 – 2001; $N=662$ – due to budgetary limitations, we took a subsample of T2 participants), the Survey Research Center of the University of Michigan collected the data. The mean age of the participants at T3 was 24.4 years ($SD=1.3$ years). At time 4 (T4) and time 5 (T5), the data were collected by our research group. At T4 (2004 – 2006; $N=838$), the mean age was 29.2 years ($SD=1.4$ years). At T5 (2011 – 2013; $N=674$), the average age of the participants was 35.9 years ($SD=1.4$ years). The current study included data from the T1, T2, T3, and T5 waves.

The Institutional Review Board (IRB) of the New York University School of Medicine approved the study for T4 and T5, and the IRBs of the Mount Sinai School of Medicine and New York Medical College approved the study for the earlier waves. A Certificate of Confidentiality was obtained from the National Institute on Drug Abuse for T1-T5. At each time wave, we obtained informed assent or consent from all of the participants. Additional information regarding the study methodology is available in a previous report.²¹

At T5, we attempted to follow up all those who participated at T1. We compared the demographic variables for the 674 adults who participated at both T1 and T5 with the 658 who participated at T1 but not at T5. There was no significant difference between the T5 non-participants and the T5 participants in the proportion of African Americans and Puerto Ricans ($\chi^2(1) = 0.18, p=0.7$). Also, there were no significant differences between the T5 non-participants and the T5 participants in the percentage of paternal problems with alcohol use at T2 ($\chi^2(1) = 0.99, p=0.3$), and in the mean scores of alcohol use at T1 and T2 (T1; $t=0.82, p=0.4$ and T2; $t=0.95, p=0.3$), low parental warmth at T2 ($t=0.30, p=0.8$), less time spent with parents at T2 ($t=0.24, p=0.8$), low satisfaction for school at T2 ($t=0.22, p=0.8$), rebelliousness at T2 ($t=-0.27, p=0.8$), self delinquency at T2 ($t=1.41, p=0.2$), and violent experiences at T2 ($t=0.80, p=0.4$). However, the percentage of males among T5 non-participants (53%) was significantly higher than the percentage of males who participated at T5 (40%) ($\chi^2(1) = 26.06, p<.001$). The percentage of maternal problems with alcohol use among T5 non-participants (21%) was significantly higher than that among T5 participants (10%) ($\chi^2(1) = 4.74, p<0.05$).

We also compared two demographic variables (i.e., household income and educational level) in the national data from Current Population Survey^{22, 23} and in our study participants. The median household income based on the national population (\$ 51,017) was higher than the median household income of our sample (\$ 40,888).²² As regards the level of education, the

percentages having a GED (national population, 88% vs. our sample, 88%) and advanced degree (national population, 12% vs. our sample, 10%) are close to our sample.²³ However, the national population is reported as having a higher percentage with Bachelor's degree than our sample (national population, 33% vs. our sample, 23%).²³

Measures

The model given in Figure 1 contains 7 domains (5 latent variables and 2 manifest variables). Each is based on the participant's report. The 5 latent variables included: 1) parental problems with alcohol use in the participants' late adolescence (father and mother), 2) low parent-child attachment in late adolescence (parental warmth²⁴ and time spent with parent²⁵), 3) self delinquency in late adolescence (rebelliousness²⁶, self delinquency²⁷, and violent experiences²⁸), 4) alcohol use in emerging adulthood (frequency of alcohol use and binge drinking), and 5) alcohol use in adulthood (frequency of alcohol use and binge drinking). The 2 manifest variables included: 1) low satisfaction for school²⁹ in late adolescence and 2) peer delinquency in emerging adulthood (peer delinquency²⁷). More detailed information about the measures including control variables is presented in Table 1.

Analytic plan

We used Mplus (Version 6) to perform structural equation modeling.³⁰ Following Newcomb and Bentler,³¹ we partialled out the effects of gender, ethnicity, alcohol use at ages 14 and 19, and educational level at age 36. The Mplus Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) were used to assess the fit of the model. For the CFI, values between 0.90 and 1.0 indicate an adequate fit.³⁰ For the RMSEA, values below 0.10 indicate an adequate fit.³² For SRMR, values below 0.05 indicate an adequate fit.^{33, 34}

We report the standardized regression coefficient (reported as β) and its standard score value (reported as z). We also calculated the standardized total effects and total indirect effects by using the Model Indirect command in Mplus. The standardized total effect equals the sum of the direct and the indirect effects of alcohol use in adulthood.

Missing data

As a result of the sample restriction at T3, the percentage of missing values for alcohol use at T3 was 28.5%. The percentages of missing values for other variables were between 2.1% and 5.5%. The structural equation algorithm in Mplus dealt with missing data by using maximum likelihood estimation.³⁰

RESULTS

We tested the measurement model, as well as the structural model, controlling for the participant's gender, ethnicity, alcohol use at ages 14 and 19, and educational level at age 36. All factor loadings were significant ($p < 0.001$). The CFI was 0.96, the RMSEA was 0.04, and the SRMR was 0.04, which indicated an adequate model fit. The standardized coefficients (β) and z -statistics in the parenthesis for the sample are presented in Figure 1 for the structural model.

Parental problems with alcohol use in participants' late adolescence were related to low parent-child attachment in late adolescence ($\beta=0.37, p<.001$), which in turn, was related to self delinquency in late adolescence ($\beta=0.17, p<.01$). Self delinquency in late adolescence was related to peer delinquency in emerging adulthood ($\beta=0.53, p<.001$), which in turn, was associated with participant alcohol use in emerging adulthood ($\beta=0.43, p<.001$) and in adulthood ($\beta=0.32, p<.05$). Low parent-child attachment in late adolescence was also related to low satisfaction for school in late adolescence ($\beta=0.32, p<.001$), which in turn, was related to self delinquency in late adolescence ($\beta=0.10, p<.05$). Self delinquency in late adolescence was associated with alcohol use in emerging adulthood ($\beta=0.29, p<.001$), which in turn, was related to alcohol use in adulthood ($\beta=0.96, p<.001$).

As hypothesized, alcohol use in emerging adulthood had the greatest total effect on alcohol use in adulthood as shown in Table 2. Each of the domains had significant total effects on alcohol use in adulthood. The standardized total effects on alcohol use in adulthood for the other domains are presented in Table 2.

DISCUSSION

We investigated the associations between parental problems with alcohol use, low parent-child attachment, low satisfaction for school, self delinquency during late adolescence, peer delinquency, alcohol use during emerging adulthood, and alcohol use in adulthood. A structural equation model partially supported the hypothesized pathways. Although parental problems with alcohol use in the participant's late adolescence was not significantly associated with the participant's alcohol use in emerging adulthood, there was a trend. However, there was consistency in the use of alcohol from emerging adulthood to adulthood.

Our finding indicating a continuation of alcohol use from emerging adulthood to adulthood is consistent with the results from a 9 year longitudinal study which reported that the symptoms of alcohol use disorder were moderately stable from age 21 to 30.³⁵ In this study by Kosterman and colleagues,³⁵ the findings supported the social development model which specifies the etiological pathways to antisocial and prosocial outcomes. An individual who uses alcohol may socialize more easily with drinkers and consequently is more likely to bond to alcohol-using peers. These two factors can be two of the key mechanisms explaining the continuation of alcohol use from emerging adulthood to adulthood.

Family Interactional Theory⁶ and Selection Theory³⁶ support the pathway from parental problems with alcohol use to the offspring's alcohol use in adulthood via a distant parent-child attachment relationship, self delinquency, and peer delinquency. Family Interactional Theory suggests that parents' problems with alcohol use may lead to difficulty in interpersonal functioning with their children, and low parent-child mutual attachment may affect the delinquent behavior of their children. Also, the use of alcohol affects those regions of the brain, including the frontal lobe, which play an important role in regulating behaviors such as social conduct, decision-making, problem solving, judgment and planning.³⁷ It becomes difficult to maintain a good relationship with others (e.g., their children) when any one of these functions is altered. Consequently, children who do not receive adequate love and warmth at home due in part to parental alcohol use tend to demonstrate deviant

behavior, which ultimately may lead to substance use. Selection Theory proposes that individuals self-select into social groups that are similar to themselves. That is, alcohol users are more likely to select peers who also use alcohol. Indeed, one study found that exposure to delinquent peers is one of the strongest predictors of adolescent delinquency.³⁸

A low parent-child mutual attachment relationship was associated with low satisfaction for school in late adolescence. This association can be also explained by Family Interactional Theory which posits that supportive relationships with parents are a major protective factor resulting in children being satisfied with their environments including school. Our findings are also consistent with a study of 5,126 adolescents who reported that difficult parent-child communication was a risk factor for low life satisfaction (e.g., school, family) in boys and girls.³⁹

The pathway from low satisfaction for school to self delinquency in late adolescence, and then in turn, to alcohol use in emerging adulthood is consistent with a 16 year longitudinal study based on a sample of 1,265 New Zealand-born children that showed earlier conduct problems in childhood predicted later substance use/abuse (e.g., alcohol use) after controlling for child IQ as well as demographic factors.¹²

LIMITATIONS

One limitation of this study is that the data for the current study were based on self-report and may include some respondent bias (e.g., under-reporting of alcohol use). However, self-reported data have been used in a number of survey studies and have been found to have adequate reliability and validity.⁴⁰ Further, the findings of this study are based on African American and Puerto Rican adults living in an urban area. Therefore, one should keep in mind the limitation of generalizability of the findings to other populations. Also, low retention rates at T5 are of concern, because it could lead to some biased results. As regards the measure of alcohol use, future study should assess the participant's alcohol use more often than during the past 5 years. Lastly, confounding factors such as job and family stress in adulthood were not included in the model. Future study should include these proximate variables.

CONCLUSIONS

Despite these limitations, our findings contribute to the literature in four ways. First, the analysis covers three significant stages of development, beginning when the participants were in adolescence, emerging adulthood, and continuing into adulthood. Also, it includes the contribution of parental problems with alcohol use when their children were in late adolescence. Second, to our knowledge, this is one of the first longitudinal studies of a number of dimensions in late adolescence as related to alcohol use in the mid 30s assessed in a sample of urban African Americans and Puerto Ricans. Third, our findings indicated that low parent-child mutual attachment, low satisfaction for school, and self delinquency served as partial mediators on the pathway from earlier parental problems with alcohol use to later participants' alcohol use. Fourth, the pathways in our model were maintained after control for gender, ethnicity, alcohol use at ages 14 and 19, and educational level at age 36.

The findings from this research have implications for social interventions. The most important social worlds of adolescents are the family and school/peers. An important clinical implication of our findings is that they highlight the developmental importance of addressing low parent-child mutual attachment, dissatisfaction with school, and **self delinquency** in late adolescence as well as having peers who are delinquent in emerging adulthood. As the results of the current study demonstrate, the consequences of these risk factors for later development are evident at age 36 in terms of increased rates of alcohol use. Using positive reinforcement, listening and communication skills, and problem solving strategies, improvement of parent-child relations is necessarily needed for prevention. Teacher training is also necessary for the interactive teaching techniques informing the students about alcohol use and its problematic consequences. Making available counseling programs for children and adolescents who find themselves in difficult situations at home and/or at school may reduce the extent of later alcohol use. Also, there should be programs for parents who do not know how to communicate with their children about the topic of substance use, especially those parents with alcohol use problems.

One of the key implications of this study is that a low parent-child attachment relationship is a determinant of children's engagement in delinquent behavior and ultimately the use of alcohol. Therefore, measures must be taken to help parents and children have a better relationship. A clear challenge facing developmental psychopathology is that of devising effective interventions and treatments to address these problems and in examining the extent to which intervention in late adolescence may reduce long-term problems such as a higher frequency of alcohol use and binge drinking. Physicians and policy makers should take these relationships with alcohol use under careful consideration. Finally, it is important that prevention efforts be consistent across contexts, that is, efforts at the individual, family, school, and community levels should reinforce one another for the most successful in facilitating the desired behavior change.⁴¹

Acknowledgments

This research was supported by NIH grants awarded to Dr. Judith S. Brook: research grant CA084063 from the National Cancer Institute in Rockville, MD and research grant DA05702 from the National Institute on Drug Abuse in Baltimore, MD.

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Table 1

Measures: contextual and individual factors in adolescence and alcohol use in emerging adulthood and in adulthood

Variable (number of items)	Sample Item	Response Range	Cronbach's α
<i>Control variables</i>			
Gender (1)	Are you (female or male)?	female (1), male (2)	n/a
Ethnicity (1)	Which (race/ethnicity) best describes you?	African American (1), Puerto Rican (2)	n/a
Alcohol use at age 14 (1)	How often do you drink (beer, wine, or hard liquor)?	none (0), less than once a week (1), once a week to several times a week (2), 1 or 2 drinks a day (3), three or more drinks every day (4)	n/a
Alcohol use at age 19 (1)	On average, how often do you drink (beer, wine, or hard liquor) in the past 5 years?	none (0), less than once a week (1), once a week to several times a week (2), 1 or 2 drinks a day (3), three or more drinks every day (4)	n/a
Educational level at age 36 (1)	What is the last year of school you completed? (If you are in school, what year are you in?)	11 th grade or below (0), 12 th grade or GED (1), business or technical school (2), college freshman (3), college sophomore or associate's degree (4), college junior (5), college senior (Bachelor's degree) (6), postgraduate business, law, medical, masters, or doctoral program (7)	n/a
<i>Parental problem with alcohol use when the participant was 19 years old</i>			
Father (1)	Has your biological father had a problem with alcohol use?	yes (1), no (0)	n/a
Mother (1)	Has your biological mother had a problem with alcohol use?	yes (1), no (0)	n/a
<i>Low parent-child attachment at age 19</i>			
Low parental warmth ²¹ (18)	Does your father or mother believe in showing his/her love for you?	very much (0) to not at all (3)	0.86
Less time spent with parent (5) [22]	How much time do you spend with your parent on an average Saturday or Sunday (do not include watching TV)?	3 hours or more (0) to none (4)	0.62
<i>Low satisfaction and enthusiasm with school at age 19</i>			
Low satisfaction and enthusiasm with school ²⁶ at age 19 (7)	Do you feel that you are getting opportunities to develop your skills and abilities?	not at all (0) to definitely (3)	0.73
<i>Self delinquency at age 19</i>			
Rebelliousness ²⁴ (3)	Do you enjoy doing things you should not, just for the fun of it?	completely false (0) to completely true (3)	0.63
Self delinquency ²³ (10)	During the last 5 years, how often have you broken into a house or building you were not supposed to be in?	never (0) to 5 or more times (4)	0.84
Violent experiences ²⁵ (5)	During the last few years, how often have you held a weapon (a gun or club) to someone?	never (0) to more times (4)	0.80
<i>Peer delinquency at age 24</i>			
Peer delinquency ²³ (3)	How many of your friends have gotten into a serious fight at school or work?	none (0) to most (3)	0.79
<i>Alcohol use at age 24</i>			
Frequency of alcohol use (1)	In the past 5 years, on average, how many drinks (beer, wine, or hard liquor) did you have?	none (0), less than once a week (1), once a week to several times a week (2),	n/a

Variable (number of items)	Sample Item	Response Range	Cronbach's α
Binge drinking (1)	In the last two weeks, how many times have you had five or more drinks in a row?	1 or 2 drinks a day (3), 3 or more drinks every day (4) none (0) to 10 or more times (5)	n/a
<i>Alcohol use at age 36</i>			
Frequency of alcohol use (1)	In the past 5 years, on average, how many drinks (beer, wine, or hard liquor) did you have?	none (0), less than once a week (1), once a week to several times a week (2), 1 or 2 drinks a day (3), 3 or 4 drinks a day (4), 5 or more drinks every day (5)	n/a
Binge drinking (1)	In the last two weeks, how many times have you had five or more drinks in a row?	none (0) to 10 or more times (5)	n/a

Note. n/a = not applicable

Table 2

Standardized total effects of each domain on alcohol use in adulthood (z-statistics in parentheses)

	Total effects on alcohol use in adulthood
Alcohol use in emerging adulthood	0.96 (4.78) ***
Peer delinquency in emerging adulthood	0.41 (3.16) ***
Self delinquency in late adolescence	0.28 (4.53) ***
Low satisfaction for school in late adolescence	0.03 (2.00) *
Low parent-child attachment in late adolescence	0.06 (3.02) **
Parent problems with alcohol use in the participants' late adolescence	0.12 (1.99) *

Note.

*
 $p < 0.05$;**
 $p < 0.01$;***
 $p < 0.001$