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Social Network Drinking and Family History Contribute Equally to First-Onset Alcohol Dependence in High Risk Adults

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Abstract

Background—Adult alcohol consumption is influenced by peer consumption, but whether peer drinking is associated with first-onset alcohol dependence (AD) in adults after age 30 is unknown.

Methods—703 adult participants in the St. Louis Epidemiologic Catchment Area Survey (ECA) with no prior history of AD, but with high risk based on previously reported drinking or family history, were re-interviewed 11 years after the last ECA assessment to detect new cases of AD (age at follow-up: $M(S.D.) = 42.9 (8.2)$). Incident AD during the assessment interval was examined in relation to drinking patterns in the social network and history of alcohol problems in parents.

Results—Fifteen percent of the sample had a first-onset of AD; another 19.5% never developed AD but were high-risk drinkers at follow-up. Of those who developed AD, 32.1% were remitted and 67.9% were unremitted (current AD) or unstably remitted (asymptomatic high-risk drinkers). Compared to abstinent or low-risk drinkers who did not develop AD, high-risk drinkers with no AD and unremitted/unstably remitted individuals were 4 times as likely to report moderate drinkers in their networks and remitted individuals were nearly 3 times as likely to report network members in recovery from alcohol problems. Associations of social network drinking with remitted and current AD were similar in strength to those of parental alcohol problems.

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Contributors Author Bucholz designed the study and wrote the protocol. Author McCutcheon managed the literature searches, did the statistical analysis, and wrote a first draft of the manuscript. Authors Bucholz, Lessov-Schlaggar, and Steinley contributed to subsequent drafts of the manuscript. All authors contributed to and approved the final manuscript.

Conflict of Interest No conflict declared.

Conclusions—Social network drinking patterns are associated with high-risk drinking and with the development of incident AD in adults, with effects equal to that of alcohol problems in both parents.

Keywords

social network; adult onset; alcohol use disorder; alcohol dependence

1. INTRODUCTION

The development of alcohol use disorders (AUDs) in adolescents has been well characterized, but less is known about the development of AUDs in adults, since onset is more likely before age 30 than later (Grant et al., 2012; Kessler et al., 2005). Peer influences on alcohol consumption in adolescents are well documented (reviewed in Brechwald and Prinstein, 2011), and evidence supports peer influences in adults as well. Longitudinal studies in population-based samples suggest that adults select peers with similar drinking habits but are also influenced by peer drinking at ages 21 and older (Bullers et al., 2001) and at a mean age of 51 (Rosenquist et al., 2010). Adults aged 55–65 at baseline who were followed over 20 years were more likely to have drinking problems at follow-up if they had higher alcohol consumption at baseline and more friends who were drinkers or who approved of heavy drinking (Moos et al., 2010). Although peer drinking is associated with adult alcohol use and problems, whether it is associated with alcohol dependence (AD) is unknown. The current study examines the contribution of network drinking to a first-onset of AD in adults, using a sample which was assessed at 2 time points in adulthood and followed up 11 years later.

2. METHODS

2.1. Sample

Data are from a follow-up study of a subsample of the St. Louis Epidemiologic Catchment Area Survey (ECA), a five-site study conducted from 1980–1982 and funded by the National Institute of Mental Health (NIMH) to estimate the prevalence of DSM-III psychiatric disorders in the community (Regier et al., 1984). Subjects for the ECA study were selected by a multistage probability sampling and were interviewed at baseline and approximately one year later using a structured, psychiatric interview (Robins et al., 1981) which yielded DSM-III (American Psychiatric Association, 1980) psychiatric and substance use disorders. A subsample from the household sample of the St. Louis ECA study was selected for follow-up 11 years after the second ECA interview for a study designed to detect new cases of AD among adults with no prior history of AD, based on the ECA information. A group of 732 individuals at high risk of developing AD was selected using the following criteria: they reported an alcohol problem at either ECA interview or were heavy drinkers (7 or more drinks daily for 2 weeks, or weekly for several months), they identified first degree relatives who had alcohol problems, or they scored above the median on a multivariate risk equation for alcohol dependence. Also included were 134 individuals randomly selected from the sample remaining after selection of high-risk participants and 63 individuals who met minimum DSM-III criteria for alcohol abuse or dependence (Bucholz

et al., 1996). Of the 929 individuals targeted for follow-up, 81.1% (753) were interviewed, 14.3% refused, and the remainder were deceased (2.8%), not located (1.2%), or otherwise un-interviewable. Of those living and located, 84.4% were interviewed. No relationship between high risk status and interview rates was observed (Bucholz, et al., 1996). Because the focus of the present report was on new cases of AD, we removed individuals who met minimum criteria for AD at ECA, leaving 703 participants for analysis herein.

2.2. Measures

2.2.1. Remission from alcohol dependence—Individuals who met AD criteria during the interval between the last ECA interview and follow-up were categorized as remitted if at follow-up their most recent symptom was at least one year ago and they were abstinent or drinking at low-risk levels (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2010), as asymptomatic high-risk drinkers if their drinking exceeded low-risk levels during the previous year, and as having current AD if they had symptoms within the last year. Because the typical weekly alcohol consumption of male ($M=38.1$, $S.D.=24.3$) and female ($M=28.9$, $S.D.=25.0$) asymptomatic high-risk drinkers far exceeded NIAAA low-risk limits for men (no more than 14/week) and women (no more than 7/week), these individuals were grouped with unremitted, rather than remitted, individuals. A separate category was created for individuals who drank at high-risk levels but who never met AD criteria. The dependent variable thus had 4 categories: never developed AD and was (1) abstinent or a low-risk drinker (reference category), or (2) a high-risk drinker; or developed AD and at follow-up was (3) abstinent or a low-risk drinker (“remitted”), or (4) had current symptoms or was a high-risk drinker (“unremitted/unstably remitted”).

2.2.2. Parental alcohol problems at follow-up assessment—History of alcohol problems in one or both parents was based on an affirmative response to the question at 11-year follow-up, “Have any of the following relatives drunk heavily or had any drinking problems, like problems with health, family, job or police?”

2.2.3. Current network drinking characteristics—Social network drinking was based on respondent reports of drinking patterns in closest male and female friends and current spouse or partner (range 0–3) and in the broader friendship network. Close network drinking was queried by “Now I’d like to know about the current drinking habits of the people you may be close to.” Respondents were asked to choose which of 7 drinking patterns best fit each individual in the close network (“lifelong abstainer,” “non-drinker,” “occasional or light drinker,” “moderate drinker,” “heavy drinker,” “problem drinker or alcoholic,” “recovering problem drinker or alcoholic who doesn’t drink now”). Dichotomous variables representing *any* network members in each drinking category were created, since the number of close network members varied. Respondents were then asked whether *any* friends in the broader network fit the drinking patterns (yes/no). Associations of the close and broad network variables with each category of the outcome variable were similar (e.g., comparing the associations of heavy drinking in the close and broad network with remitted AD yielded $X^2_{(1)}=0.7$, $p=.40$) and so were combined. The final network drinking variables thus represented the presence in the network of any person who was a (1) moderate drinker, (2) heavy drinker, (3) problem drinker or alcoholic, or (4) recovering problem drinker or

alcoholic who no longer drinks. Non-drinkers and occasional or light drinkers comprised the reference group.

2.3. Statistical methods

Associations of network drinking and parental alcohol problems with high-risk drinking without AD and with remitted and unremitted/unstably remitted first-onset AD were tested using multinomial logistic regression. Regressions were adjusted for gender, age, ethnicity, marital status, and childhood psychiatric disorder (attention deficit hyperactivity disorder, conduct disorder, or oppositional defiant disorder).

3. RESULTS

First-onset AD was detected in 15.5% ($n=109$) of the sample (21.0% of men, 12.4% of women), and 19.5% never developed AD but were drinking at high-risk levels at follow-up. Of those who developed AD, one-third ($n=35$) had remitted by follow-up and were abstinent or drinking at low-risk levels, and 67.8% were unremitted/unstably remitted ($n=54$ with current AD; $n=20$ asymptomatic high-risk drinkers). Younger age and self-reported excessive drinking were more prevalent in all categories relative to abstinent or low-risk drinkers without AD (Table 1). High-risk drinkers without AD were less likely to be female, to have married, and to have sought help for psychiatric or substance use problems. Individuals who developed AD, whether remitted or not, had higher rates of childhood psychiatric disorder. Unremitted/unstably remitted individuals were less likely to be female and to have married. High-risk drinkers without AD and unremitted/unstably remitted individuals were less likely to report non-drinkers and more likely to report moderate, heavy, and problem drinkers or alcoholics in their networks. Remitted and unremitted/unstably remitted individuals were more likely to report recovering problem drinkers or alcoholics who no longer drink in their networks, relative to abstinent or low-risk drinkers without AD.

In the multivariate equation, high-risk drinkers without AD were characterized by moderate and problem drinkers or alcoholics in their networks (Table 2). Remitted individuals were characterized by recovering former drinkers in the network and by alcohol problems in both parents. Unremitted/unstably remitted individuals were characterized by moderate drinkers in the network and alcohol problems in both parents. The associations of alcohol problems in both parents with remitted and unremitted/unstably remitted AD were statistically similar ($X^2_{(1)} = 0.1$, $p = 0.71$). The associations with remitted AD of network recovery and alcohol problems in both parents were statistically similar ($X^2_{(1)} = 0.2$, $p = 0.61$), as were the associations with unremitted/unstably remitted AD of moderate drinking and parental alcohol problems ($X^2_{(1)} = 0.1$, $p = 0.74$).

4. DISCUSSION

In this follow-up study of ECA participants, 15.5% of high-risk adults with no prior history of AD developed AD over an 11-year interval. One-third of these remitted within that interval, 18.3% were in unstable remission, characterized by high-risk drinking with no current AD symptoms, and 49.5% had current AD at follow-up. Twenty percent of the

sample never developed AD but was drinking at high-risk levels at follow-up. Social network drinking patterns were associated with high-risk drinking without AD and with remitted and unremitted/unstably remitted AD after adjustment for parental alcohol problems and childhood psychiatric disorder. Network drinking patterns were differentially associated with each outcome category: moderate and problem drinking with high-risk drinking without AD, recovering problem drinkers with remitted AD, and moderate drinking with unremitted/unstably remitted AD, suggesting peer assortment by drinking habit.

The rate of incident AD in this sample of high-risk adults was higher than that found in population-based samples, as would be expected. In the Framingham Heart Study, a population-based study with multiple assessments over 50 years, 12.8% of men and 3.8% of women who were aged 40 and older developed a first onset of alcohol abuse or dependence (Zhang et al., 2008). By contrast, the current study found 21.0% of men and 12.4% of women had a first onset of AD, more severe than abuse, at an earlier age, consistent with their high-risk status.

Network drinking was associated with incident AD after adjustment for parental alcohol problems, which is associated with increased risk for AD (Hartman et al., 2006; Prescott et al., 1994), and with childhood disorders which have genetic components in common with AD (Kendler et al., 2003; Slutske et al., 1998). Because the influence of peer drinking on substance use patterns declines as genetic influences increase after adolescence (Kendler et al., 2008), one would expect the association of network drinking patterns with incident AD to be negligible after adjustment for factors associated with genetic risk in adult samples. That network drinking was independently associated with AD in this adult sample is consistent with recent findings in genetically informative samples. In a longitudinal study of the intergenerational transmission of alcoholism, peer drinking patterns predicted AUD symptoms at ages 17–22, 23–28, and 29–40, after accounting for parental alcohol problems and specific genetic influences (Chassin et al., 2012). Similarly, a population-based study in school-aged youth, which included social network data and modeled genetic influences using a twin and sibling design, found evidence for peer influences on increased alcohol use from adolescence into young adulthood (Cruz et al., 2012). The current study provides evidence that peer drinking is associated with the development of first-onset AD in adults, independently of parental alcohol problems and childhood disorders which have genetic overlap with AD.

4.1. Limitations

Because the network measure queried only the 3 closest network members and the broader network in aggregate, the actual network size is unknown and the numbers and proportion of network members in each category could not be calculated. The network drinking measure was thus based on the report of any network member in a drinking category and lacked the descriptive information and power of more dimensional measures. Additionally, network drinking data were from follow-up only; therefore we could not test whether results were due to peer selection, peer influence, or a combination of both. Nonetheless, peer assortment, whether by selection or influence, is suggested by the association of network recovery with remitted individuals and of network drinking with unremitted individuals.

Measures of network drinking did not permit differentiation of abstinent and non-abstinent remission as did respondent data; this further refinement will be pursued in future studies. Network drinking data were based on respondent reports rather than direct interviews with network members, and since respondents tend to see the habits of others as similar to their own, the association between respondent and network drinking may have been inflated. It is also important to remember that the sample was selected for high risk and therefore does not represent the general population. Nonetheless, the current report provides evidence that network drinking is an important consideration even for adult development of AD, and thus contributes to more recent and sophisticated longitudinal analyses in youth.

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Table 1

Characteristics of 703 adults at high risk¹ for alcohol dependence (AD), by AD status at 11-year follow-up.

	Did not develop AD during follow-up interval		Developed AD during follow-up interval	
	Abstinent or Low-Risk Drinkers (N=457) ^R	High-Risk Drinkers (N=137)	Remitted (n=35)	Unremitted/Unstably Remitted (n=74)
Female, %	70.9	51.8*	65.7	44.6*
Age at Wave 2 ECA, M (SD)	32.8 (8.4)	30.8 (8.0)*	29.0 (6.0)*	29.0 (7.2)*
Age at follow-up, M (SD)	43.9 (8.3)	41.9 (8.0)*	40.1 (6.0)*	40.0 (7.2)*
Black/Hispanic, %	41.1	46.7	45.7	52.7
Years education, M (SD)	12.9 (2.4)	13.0 (2.2)	13.1 (2.0)	12.7 (2.2)
Marital status at follow-up, %				
Married ^R	56.7	49.6	57.1	41.9
Separated/Divorced/Widowed	28.7	24.1	22.9	17.6
Never Married	10.5	21.2*	8.6	27.0*
Living as married	4.2	5.1	11.4	13.5*
Age regular drinking, M (SD) ²	22.8 (6.9)	22.9 (6.5)	19.3 (3.9)*	21.8 (4.7)
Abstinent last 12 months, %	77.2	0.0 ^{NE}	74.3	0.0 ^{NE}
Ever thought self excessive drinker	6.1	16.8*	45.7*	47.3*
Childhood psychiatric disorder (ADHD, CD, ODD)	7.8	4.4	31.4*	20.3*
Consulted health professional or counselor about psychiatric or substance use problems	39.4	22.6*	48.6	44.6
Ever treated for psychiatric or substance use problem	12.0	8.0	17.1	18.9
Drinking patterns in network, % ³				
Non-drinkers drinkers	66.7	54.0*	57.1	50.0*
Light drinkers	90.4	94.9	82.9	98.9*
Moderate drinkers	58.4	87.6*	51.4	89.2*
Heavy drinkers	24.9	34.3*	28.6	51.3*
Problem drinkers or alcoholics	13.1	21.9*	28.6*	25.7*
Recovering problem drinkers or alcoholics who don't drink now	20.6	19.0	42.9*	32.4*

Notes: remitted=abstinent or low-risk drinkers; unremitted/unstably remitted=current AD or asymptomatic high-risk drinking;

^R reference category for comparisons;

¹ high risk status=alcohol problem or heavy drinking at either ECA interview, first-degree relatives with alcohol problems, and/or above-mean score on multivariate risk equation for alcohol dependence (illicit drug use, problem drinking in one or more first-degree relatives, intoxication 2 or more times prior to age 15, risky sexual behavior, (e.g., promiscuity, prostitution), any depressive symptom, lifetime daily smoking, 2 or more childhood behavior problems)).

² M(SD) based on 300 regular drinkers in No AD, low-risk category;

³ any close network or broad network member nominated for drinking pattern;

NE
not estimated;

* significantly ($p < .05$) different from No AD category.

Table 2

Associations of network drinking characteristics and parental alcohol problems with AD status at follow-up in 703 adults at high risk for AD.¹

	Did not develop AD during follow-up	Developed AD during follow-up	
	High-Risk Drinkers	Remitted	Unremitted/Unstably Remitted
	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)
Network drinking characteristics			
Any non/light-drinkers	1.0	1.0	1.0
Any moderate drinkers	4.6 (2.6–8.1)	0.6 (0.2–1.3)	4.0 (1.7–9.1)
Any heavy drinkers	0.9 (0.6–1.5)	0.6 (0.2–1.7)	1.6 (0.9–3.0)
Any problem drinkers/alcoholics	1.9 (1.0–3.4)	2.6 (0.9–6.8)	1.4 (0.7–3.0)
Any recovering drinkers	0.7 (0.4–1.2)	2.8 (1.3–6.1)	1.5 (0.8–2.8)
Parental alcohol problems			
None	1.0	1.0	1.0
One parent	0.8 (0.5–1.2)	1.2 (0.5–2.7)	0.6 (0.3–1.1)
Both parents	1.6 (0.6–4.5)	4.2 (1.2–15.0)	3.2 (1.1–9.5)

Notes: remitted=abstinent or low-risk drinkers; unremitted/unstably remitted=current AD or asymptomatic high-risk drinking; RRR=relative risk ratio,

¹ high risk status=alcohol problem or heavy drinking at either ECA interview, first-degree relatives with alcohol problems, and/or above-mean score on multivariate risk equation for alcohol dependence (illicit drug use, problem drinking in one or more first-degree relatives, intoxication 2 or more times prior to age 15, risky sexual behavior, (e.g., promiscuity, prostitution), any depressive symptom, lifetime daily smoking, 2 or more childhood behavior problems)). Adjusted for gender, age, ethnicity (African American or Hispanic versus White), marital status (separated/divorced, never married or currently living as married versus currently married), and one or more childhood psychiatric disorders (conduct disorder, oppositional defiant disorder, attention deficit hyperactivity disorder).