



Alcohol-induced blackouts and maternal family history of problematic alcohol use



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HIGHLIGHTS

- 66.4% of university students reported blackouts.
- Controlling for drinking, women had a greater likelihood of experiencing blackouts.
- Men with a maternal family history of alcohol problems were more likely to black out.

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ABSTRACT

Background: Consequences of heavy drinking include alcohol-induced blackouts, which are periods of amnesia for all or part of a drinking event. One risk factor for blackouts is family history of problematic alcohol use (FH+); however, research rarely distinguishes maternal from paternal FH+. The objective of this study was to examine whether maternal or paternal FH+ better predicts likelihood of experiencing blackouts than a general measure of overall FH+, and whether gender moderates this association.

Method: Participants (N = 1164; 65.4% are female) were first-time college freshmen (age range = 17–19) who participated in a 6-year, 10-assessment, longitudinal study in the United States. Alcohol-induced blackouts, the dependent measure, were dichotomized (yes/no) based on endorsement of memory problems after drinking using a single item during Years 4–6. FH+, captured at baseline, was coded if participants self-reported that their mother, father, or any of their four grandparents were a possible or definite problem drinker.

Results: Overall, 773 (66.4%) participants reported experiencing blackouts during Years 4–6. Women were more likely to report blackouts than men; however, compared with women with a maternal FH+, men with a maternal FH+ were more than twice as likely to report blackouts.

Discussion: Men appear to be more susceptible than women to the effects of a maternal FH+. Genetic and environmental explanations for this finding are discussed. In sum, these findings are an important step toward understanding a significant yet understudied negative consequence of heavy alcohol use.

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1. Introduction

Heavy drinking, which is especially prevalent among college students (Substance Abuse and Mental Health Services Administration, 2013) is associated with behavioral risk-taking and an increased likelihood of developing alcohol use disorders (White & Hingson, 2014). Another consequence of heavy drinking is blackouts, which are periods of amnesia for all or part of a drinking event (Hartzler & Fromme, 2003b; Wetherill & Fromme, 2011; White, 2003).

Blackouts do not involve loss of consciousness, but rather reflect a failure to form long-term memories when information is not transferred from short-term memory (White, 2003). Further, individuals with a history of blackouts, compared with those without such history, show impaired

episodic or contextual memory when intoxicated (Hartzler & Fromme, 2003b; Wetherill & Fromme, 2011). Specifically, they have difficulties recalling spatio-temporal and social context of events and show different patterns of brain activation (Wetherill, Schnyer, & Fromme, 2012).

Generally, blackouts occur with excessive alcohol intake and at higher blood alcohol concentrations (BAC; Jennison & Johnson, 1994; White, Signer, Kraus, & Swartzwelder, 2004; White, 2003), although blackouts have been reported at BACs as low as .07 g% (Hartzler & Fromme, 2003a). Importantly, only about 50% of drinkers experience blackouts (White, Jamieson-Drake, & Swartzwelder, 2002), suggesting differential susceptibility to alcohol's effects on memory processes and potentially neurological differences between those who do and do not report blackouts.

Whereas the extant literature is somewhat limited, several individual risk factors have been identified. Being female (White et al., 2002), Caucasian (Jennison & Johnson, 1994), having an early onset of drinking

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(Jennison & Johnson, 1994; White et al., 2002), and a family history of problematic alcohol use (Jennison & Johnson, 1994; LaBrie, Hummer, Kenney, Lac, & Pedersen, 2011) increase one's likelihood of experiencing blackouts. In fact, blackouts share some of the same individual risk factors as alcohol dependence, such as early onset of drinking (Dawson, Goldstein, Chou, Ruan, & Grant, 2008) and family history of alcohol use disorders (Sørensen et al., 2011). Just as there is thought to be a common genetic vulnerability toward developing alcohol use disorders (Kendler, Aggen, Prescott, Crabbe, & Neale, 2012), other consequences of heavy drinking, such as blackouts, may also be heritable. Indeed, twin studies support a genetic vulnerability for blackouts (Nelson et al., 2004). Thus, a genetic vulnerability may explain, in part, why not everyone who drinks heavily will experience blackouts.

Although not studied extensively for blackouts, a family history of problematic alcohol use (FH+) is a risk factor for other alcohol-related consequences. For instance, FH+ individuals were more likely to develop alcohol dependence (Sørensen et al., 2011), which speaks to a genetic predisposition for consequences in FH+ individuals. Indeed, FH+ men and women drank more and experienced more negative consequences from their alcohol use compared with FH− individuals of the same gender (LaBrie, Migliuri, Kenney, & Lac, 2010).

When comparing across genders, FH+ differentially affects men and women. For example, FH+ was related to negative consequences resulting from alcohol use only for men (Larimer, Anderson, Baer, & Marlatt, 2000). As such, FH+ may be a more powerful risk factor for negative consequences, including blackouts, in men compared with women. This would suggest that men may be more vulnerable than women to the same amount of genetic risk.

To date, few studies have distinguished between maternal and paternal FH+; although, this distinction may be informative for understanding differential risk for negative consequences of heavy drinking. For instance, maternal FH+ in men predicted increased lifetime alcohol use, heavy drinking, drinking problems, and drinking to cope compared with women with a maternal FH+ (Cooper, Peirce, & Tidwell, 1995). Because the majority of the primary caretakers for children continues to be women (Shackelford, Weekes-Shackelford, & Schmitt, 2005), it may be that an alcoholic mother creates more distress than an alcoholic father within the household, and this distress may contribute to her male children exhibiting externalizing behaviors, such as problems with substance abuse, whereas her female children may respond with greater internalizing behaviors, such as anxiety and depression (Cooper et al., 1995). One study, however, failed to find a significant association between maternal and paternal FH+ and problematic alcohol use (Chermack, Wrybeck, Walton, & Blow, 2006). Given the contradictory findings regarding maternal and paternal FH+, further research is needed, especially for understudied consequences of heavy drinking, such as blackouts.

The current study was designed to investigate the association between maternal and paternal FH+ and blackouts. Consistent with previous studies (Jennison & Johnson, 1994; LaBrie et al., 2011), we hypothesized that having a FH+ would predict a greater likelihood of experiencing blackouts. To expand this research, however, we also separately analyzed the effects of maternal and paternal FH+ on the occurrence of blackouts. Further, we hypothesized that gender would moderate the association between FH+ and blackouts, such that men who have a maternal FH+ would show a greater likelihood of experiencing blackouts than women or those with a paternal FH+. To our knowledge, no study has examined the differential effects of maternal or paternal FH+ on blackouts.

2. Method

2.1. Participants

All participants were first-time college freshmen who were recruited the summer before they matriculated into a large, state university

in the Southwestern United States. These data are a result of their participation in a 6-year, longitudinal study examining alcohol use and behavioral risks during the transition from high school through college. Initially, incoming freshman were invited to participate ($N = 6391$), and a subset agreed to participate and met the additional inclusion criterion of being unmarried ($n = 4832$). Of these, 3046 participants were randomized to be assessed longitudinally, whereas others were assigned to conditions not relevant to the current analyses. Among those assigned to be assessed longitudinally, those who provided informed consent and completed the baseline survey comprised the longitudinal sample ($n = 2245$).

Participants completed online assessments 10 times over the 6 years: high school (baseline), twice a year during Years 1–3, and then once a year during Years 4–6. All participants included in these analyses must have completed assessments for at least baseline and Year 6 ($N = 1164$; 65.4% Female), but some may have also completed assessments at Years 4 and 5. The average age at Year 6 was 23.8 years ($SD = 0.4$), 701 (60.2%) participants were Caucasian, 259 (22.3%) were Asian, 46 (4.0%) were Black, and 158 (13.5%) reported other races.

2.2. Measures

2.2.1. Demographics

Participants reported demographic information, including gender and race, which were used in all of our analyses.

2.2.2. Alcohol-induced blackouts

A single item asked respondents to report the frequency with which they “had difficulty remembering things you said or did or events that happened while you were drinking.” Responses were coded on a 5-point Likert-type scale, where 1 = never, 2 = some of the time, 3 = half of the time, 4 = most of the time, and 5 = always. Blackouts were dichotomized (yes/no) with a response of 2 or greater at Years 4–6 being coded as positive. We aggregated blackouts across these three years in order to more broadly capture the prevalence of blackouts because assessments only asked about the previous three months.

2.2.3. Family history of problematic alcohol use

FH+ was assessed at baseline using the Family Tree Questionnaire (Mann, Sobell, Sobell, & Pavan, 1985), a self-report measure that asks about the alcohol use of mother, father, grandparents, and siblings. Response options were: never drank, social drinker, possible problem drinker, and definite problem drinker. Respondents were coded as FH+ if they reported a mother, father, or any of their four biological grandparents as a possible or definite problem drinker (Vaughan, Corbin, & Fromme, 2009). Overall FH+ was calculated using mother, father, and all four grandparents. Maternal FH+ was calculated using mother, maternal grandmother, and maternal grandfather. Paternal FH+ was calculated using father, paternal grandmother, and paternal grandfather.

2.2.4. Alcohol use

The Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) measured participants' alcohol use in terms of quantity and frequency of typical drinking. Using an open-ended response format, the participants indicated the number of standard drinks that they consumed on each day in a typical week during the past 3 months. Frequency was calculated as the average number of drinking days, and quantity was calculated as the average number of drinks per drinking day. Number of drinks was calculated based on standard drinks, where a standard drink was defined as 1.5 fl oz of liquor, 12 fl oz of beer, or 5 fl oz of wine.

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