



Alcohol-induced blackouts, subjective intoxication, and motivation to decrease drinking: Prospective examination of the transition out of college

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HIGHLIGHTS

- Subjective intoxication is a risk factor for alcohol-induced blackouts.
- Blackouts are modest, developmentally-limited predictors of motivation to change.
- Motivation to decrease drinking did not predict changes in future drinking.

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ABSTRACT

Objective: We prospectively examined whether subjective intoxication serves as a risk factor for experiencing alcohol-induced blackouts. We then examined whether subjective intoxication and/or blackouts predicted motivation to decrease their drinking, and whether this motivation to change would promote future changes in drinking behavior.

Method: Participants ($N = 1854$, 62.1% female, 53.2% Caucasian, $M_{\text{age}} = 21.8$) were recruited the summer prior to matriculating into a large, public university to complete a 6-year longitudinal study. Self-reported motivation to decrease their drinking behavior, their frequency of blackouts, quantity of alcohol consumption, and subjective intoxication (i.e., feeling drunk) were assessed annually during the transition out of college (Years 4–6).

Results: In a cross-lagged model, subjective intoxication (i.e., feeling drunk) prospectively predicted experiencing blackouts ($p < 0.001$). Controlling for both objective (e.g., quantity) and subjective intoxication, blackouts at Year 4 predicted greater motivation to decrease drinking behavior at Year 5 ($p < 0.01$), but this motivation did not predict less quantity of alcohol use by Year 6 ($p = 0.076$).

Conclusions: Subjective intoxication is a robust predictor of blackouts across time. Additionally, blackouts are modest, developmentally-limited predictors of motivation to change drinking behavior, but blackouts do not predict future behavior change.

1. Introduction

Ages 18–25 represent a unique developmental period known as emerging adulthood (Arnett, 2000), with this period recently being extended to age 29 (Arnett, Žukauskienė, & Sugimura, 2014). Throughout emerging adulthood, individuals begin to accept responsibility for themselves, make independent decisions, and become financially independent (Arnett, 2001, 2003). Emerging adulthood is a period of exploration in self-identity (e.g., worldviews, love, work). There is often experimentation as a way to gain life experiences, which leads to postponement of marriage and parenthood before settling into adult roles. Behavioral risk-taking, including alcohol use, peaks in

emerging adulthood (Substance Abuse and Mental Health Services Administration, 2017), which Arnett (2000) proposed stemmed from this period of unrestricted exploration before entering adult roles.

Although heavy drinking is common among emerging adults, especially college students, some students preparing to graduate reduce their drinking, a phenomenon known as “maturing out” (Jochman & Fromme, 2010; Patrick & Schulenberg, 2011; Sher, Bartholow, & Nanda, 2001). Some suggest that this may result from decreases in quantity rather than frequency of alcohol use (Arria et al., 2016). Among many, alcohol consumption decreases as those who are transitioning out of college are tasked with conforming to adult roles (e.g., marriage, parenthood, employment) (Staff et al., 2010).

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In fact, conforming to these new roles reflects emerging adults' concern for others (Arnett, 2003), and as such, role transitions during this time can influence their alcohol use. Accordingly, intrapersonal factors (e.g., conscientiousness) become more influential during emerging adulthood, which can lead to role adoption and later reductions in problematic drinking (Lee, Ellingson, & Sher, 2015). Because emerging adults are afforded freedom to define their lives (Arnett, 2000), emerging adulthood is a unique transitional period marked by role changes and increases and subsequent decreases in alcohol consumption (Boyd, Corbin, & Fromme, 2014).

Consequently, the importance of this transition can increase motivation to decrease one's drinking because experiencing alcohol-related consequences becomes more salient and disruptive to conforming with adult roles. Indeed, college students who experienced physical and psychological consequences, including alcohol-induced blackouts, expressed that the particular drinking episode was not worth doing (Fairlie, Ramirez, Patrick, & Lee, 2016), suggesting a recognition that their drinking was problematic and may not be worth the associated consequences. Additionally, Diulio, Cero, Witte, and Correia (2014) found that personal consequences were associated with motivation to change when social problems were low, an effect that disappeared when social problems increased. Further, abuse/dependence symptoms were associated with motivation to change; however, those with the most abuse/dependence symptoms were less motivated. Nevertheless, others have also found that abuse/dependence symptoms predicted problem recognition and motivation to change (Cellucci, Krogh, & Vik, 2006; Vik, Culbertson, & Sellers, 2000). Despite emerging adulthood being a time of experimentation with alcohol, experiencing consequences has a considerable effect on producing motivation to change.

Although the relationship between many alcohol-related consequences and motivation to change among emerging adults is documented, the relationship between blackouts, one significant consequence, and motivation to change has largely gone unexamined. Whereas Fairlie et al. (2016) found that blackouts predicted a belief that the drinking episode was not worth doing, it is unknown whether blackouts predict motivation to decrease drinking, a possible result of expressing this regret. Examining the relationship between blackouts and motivation to decrease drinking during the transition out of college is important because for those graduating and entering marriage, parenthood, or the workforce, it may no longer be socially or professionally normative to engage in a pattern of heavy drinking that can lead to blackouts as it previously was (Substance Abuse and Mental Health Services Administration, 2017). Blacking out can also interfere with adopting new roles because it is incongruent with their emerging self-identity. In fact, blackouts have a considerable psychological impact as some drinkers describe their blackouts as frightening and emotionally stressful (Buelow & Koeppe, 1995; White, Signer, Kraus, & Swartzwelder, 2004). Ultimately, blackouts warrant further exploration if we are to expand how we identify catalysts for expressing motivation to decrease drinking across developmental periods.

Specifically, blackouts are periods of amnesia for events occurring while drinking that result from information not being transferred from short-term into long-term memory (White, 2003). Risk factors for blackouts include: being female (Marino & Fromme, 2015, 2016; Schuckit, Smith, Goncalves, & Anthenelli, 2016; White, Jamieson-Drake, & Swartzwelder, 2002), Caucasian (Jennison & Johnson, 1994; Schuckit, Smith, Goncalves, & Anthenelli, 2016), having an early onset of drinking (Jennison & Johnson, 1994; Marino & Fromme, 2016), or a family history of problematic drinking (Jennison & Johnson, 1994; LaBrie, Hummer, Kenney, Lac, & Pedersen, 2011; Marino & Fromme, 2015). Rapidly drinking large amounts of alcohol and high blood alcohol concentrations (BAC) are also risk factors (Jennison & Johnson, 1994; Perry et al., 2006; White, 2003; White et al., 2004), but blackouts can occur at BACs below 0.08 (Hartzler & Fromme, 2003a). Yet, only half of drinkers experience blackouts (White et al., 2002).

Subjective responses to alcohol are additional risk factors for

blackouts. Indeed, having a low level of response (LLR; e.g., needing more drinks to feel the effects during the first 5 times ever drinking) was associated with experiencing blackouts, controlling for maximum BAC (Schuckit, Smith, Goncalves, & Anthenelli, 2016). The LLR likely contributes to blackouts because those individuals are drinking more to feel the effects. Yet, feeling greater stimulating and sedating effects of alcohol during a heavy drinking occasion was also associated with blackouts, relationships that were not mediated by estimated BAC (Wetherill & Fromme, 2009). This finding is likely operating through different mechanisms. Individuals who feel more stimulating effects are more likely to continue drinking. Additionally, drinking heavily can produce feelings of sedation once their BAC declines. Because these findings were not explained by BAC, they raise the question of whether sensitivity to subjective experiences of drinking might better explain risk for blacking out than the actual amount of alcohol consumed. Expanding upon this, other proxies for sensitivity to alcohol's effects, specifically subjective intoxication (i.e., feeling drunk), may also be a better predictor of blackouts than quantity of drinking.

Furthering our understanding of blackouts is crucial because they are prospectively associated with other significant alcohol-related consequences after controlling for alcohol consumption. These include: future alcohol-related injuries (Hingson, Zha, Simons-Morton, & White, 2016; Mundt, Zakletskaia, Brown, & Fleming, 2012), social and emotional consequences (Wilhite & Fromme, 2015), overdosing, hangovers, school/work problems, engaging in illegal activities, and legal trouble (Hingson et al., 2016). Thus, blackouts are markers of problematic drinking, which may indicate the need for behavioral changes.

Studying blackouts and subjective intoxication is particularly relevant during emerging adulthood because although this period includes experimentation with alcohol, problematic drinking can be developmentally limited after adopting adult roles, a hypothesis proposed by Arnett (2005). Thus, identifying factors that predict blackouts (i.e., subjective intoxication) can inform prevention through early identification of individuals at risk (i.e., those experiencing blackouts). Intervening early may produce reductions in problematic drinking and blackouts, which may then reduce the need to make behavioral changes by the transition out of college and into adult roles.

Because blackouts produce fragmented or total memory loss for events occurring while drinking (Hartzler & Fromme, 2003b; Wetherill & Fromme, 2011; White, 2003), experiencing blackouts can be distressing (Buelow & Koeppe, 1995; White et al., 2004). With significant distress serving as a catalyst, some individuals may be motivated to change their drinking to avoid blacking out. With motivation to decrease their drinking, these individuals may make behavioral changes to conform with their new roles. If this motivation leads to behavioral changes, we would expect to see decreases in drinking.

Consequently, we had three a priori hypotheses for the current study. First, we hypothesized that greater subjective intoxication (i.e., more times feeling drunk) would increase likelihood of experiencing blackouts across time, controlling for the quantity of alcohol consumed. Second, we hypothesized that blackouts alone are sufficient to generate motivation to decrease drinking, beyond the influence of objective (quantity of drinking) and subjective intoxication. Third, we hypothesized that this motivation would lead to future decreases in quantity consumed during the transition out of college.

2. Method

2.1. Participants and procedure

Participants were from a cohort of college freshmen at a large state university in the Southwestern United States. They were recruited the summer before they matriculated and had never previously attended any college or university. The 6-year longitudinal study received Institutional Review Board approval. After providing informed consent, participants were assessed ten times: summer before college, biannually

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