Addictive Behaviors 58 (2016) 7–11

Contents lists available at ScienceDirect

Addictive Behaviors

journal homepage: www.elsevier.com/locate/addictbeh

Social anxiety and alcohol-related impairment: The mediational impact of solitary drinking

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HIGHLIGHTS

- Social anxiety was related to more solitary and less social drinking.
- Solitary drinking mediated the social anxiety-more drinking frequency/problems links.
- Social drinking mediated the social anxiety-less drinking frequency/problems links.

ARTICLE INFO

Article history:
Received 31 August 2015
Received in revised form 2 February 2016
Accepted 7 February 2016
Available online 9 February 2016

Keywords:
Drinking contexts
Drinking problems
Solitary drinking
Alcohol
Social anxiety
Social phobia

ABSTRACT

Social anxiety disorder more than quadruples the risk of developing an alcohol use disorder, yet it is inconsistently linked to drinking frequency. Inconsistent findings may be at least partially due to lack of attention to drinking context — it may be that socially anxious individuals are especially vulnerable to drinking more often in specific contexts that increase their risk for alcohol-related problems. For instance, socially anxious persons may drink more often while alone, before social situations for "liquid courage" and/or after social situations to manage negative thoughts about their performance. Among current (past-month) drinkers ($N = 776$), social anxiety was significantly, positively related to solitary drinking frequency and was negatively related to social drinking frequency. Social anxiety was indirectly (via solitary drinking frequency) related to greater past-month drinking frequency and more drinking-related problems. Social anxiety was also indirectly (via social drinking frequency) negatively related to past-month drinking frequency and drinking-related problems. Findings suggest that socially anxious persons may be vulnerable to more frequent drinking in particular contexts (in this case alone) and that this context-specific drinking may play an important role in drinking problems among these high-risk individuals.

1. Introduction

Accumulating evidence suggests that social anxiety appears to be a risk factor for alcohol-related impairment. To illustrate, social anxiety disorder more than quadruples the risk of developing an alcohol use disorder (Buckner, Schmidt, et al., 2008; Kushner, Abrams, & Borchardt, 2000). Social anxiety tends to onset prior to alcohol use disorder among dually diagnosed individuals (Buckner, Timpano, Zvolensky, Sachs-Ericsson, & Schmidt, 2008) and the prospective relation of social anxiety to subsequent alcohol use disorder remains after controlling for relevant comorbid disorders (Buckner, Schmidt, et al., 2008). Drinking to cope with social anxiety (physiologically or psychologically) is thought to reinforce regular use of alcohol (Sher & Levenson, 1982), thereby increasing likelihood of continuing to drink despite experiencing more alcohol-related problems.

Consistent with tension-reduction based models (Conger, 1956), it has been theorized that socially anxious persons are vulnerable to alcohol-related impairment due to reliance on alcohol as a strategy to help manage chronically negative affective states (cf, Battista, Stewart, & Ham, 2010; Buckner, Heimberg, Ecker, & Vinci, 2013; Carrigan & Randall, 2003). Despite accumulating data of a relation between social anxiety and alcohol problems (for review, see Buckner et al., 2013), data are mixed regarding whether social anxiety is related to greater quantity or frequency of drinking, with some studies finding a positive relation between social anxiety and drinking quantity and frequency (e.g., Neighbors et al., 2007; Stewart, Morris, Mellings, & Komar, 2006; Terlecki, Buckner, Larimer, & Copeland, 2011) and others finding social anxiety to be inversely (e.g., Eggleston, Woolaway-Bickel, & Schmidt, 2004; Ham & Hope, 2005) or unrelated to alcohol use quantity and frequency (e.g., Bruch, Heimberg, Harvey, & McCann, 1992; Bruch, Rivet, Heimberg, & Levin, 1997; Buckner, Ecker, & Proctor, 2011; Buckner,

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http://dx.doi.org/10.1016/j.addbeh.2016.02.006
0306-4603/

Mallott, Schmidt, & Taylor, 2006; Ham & Hope, 2006; O'Grady, Cullum, Armeli, & Tennan, 2011; Terlecki, Ecker, & Buckner, 2014). Further delineation of whether and under what circumstances social anxiety is related to heavy drinking will be critical to inform alcohol intervention efforts given that socially anxious students appear vulnerable to heavy drinking after undergoing alcohol treatment (Terlecki et al., 2011).

One possible explanation for the mixed findings is that drinking behavior varies in different social and contextual situations (O'Hare, 1997; Terlecki et al., 2014). Thus, socially anxious persons may be especially likely to drink in situations in which they believe drinking will help them manage their negative affectivity. It is possible that socially anxious persons therefore drink to manage elevated anxiety during social situations. In partial support of this hypothesis, social anxiety is related to drinking to cope in social situations and avoidance of social situations if alcohol is unavailable (Buckner & Heimberg, 2010; Thomas, Randall, & Carrigan, 2003). However, Terlecki et al. (2014) found that although social anxiety was related to drinking in situations involving negative affect, it was unrelated to drinking in social contexts. Thus, it may be that socially anxious individuals do not necessarily drink in social situations, given they may fear losing control and behaving in embarrassing ways as a result of heavy drinking in social contexts. Rather, they drink to manage negative affect while alone, such as prior to a social event for "liquid courage". In support of this hypothesis, social anxiety was positively related to more frequent solitary "pre-drinking" (drinking prior to a social event), which mediated the relation of social anxiety with drinking-related problems (Keough, Battista, O'Connor, Sherry, & Stewart, 2016). Social anxious participants reported less frequent social pre-drinking, which protected them from drinking problems. Yet, it remains unclear whether social anxiety is related to solitary drinking more generally, which is important to determine given that social avoidance may lead some socially anxious persons to drink alone rather than attend social events. Further, socially anxious persons may engage in solitary drinking following social interactions to manage negative affect associated with post-event processing (PEP; i.e., negative rumination about one's performance during a social event; see Brozovich & Heimberg, 2008).

Thus, the current study sought to elucidate the relationships of social anxiety, drinking context, and drinking outcomes in several ways. Specifically, we sought to extend Keough et al. (2016) in three key ways: (1) we tested whether social anxiety was positively related to solitary drinking frequency and negatively related to social drinking frequency more broadly; (2) we tested whether solitary drinking frequency mediated the relation of social anxiety with drinking-related problems and with drinking frequency generally; and (3) we tested whether social drinking frequency mediated the relation of social anxiety with drinking-related problems and with drinking frequency generally. These hypotheses were tested among college students given that research consistently shows that college students experience greater alcohol impairment relative to non-college attending peers (Blanco, Okuda, Wright, et al., 2008; Johnston, O'Malley, Bachman, Schulenberg, & Patrick, 2013; Knight et al., 2002; Slutske, 2005). Further, social anxiety often increases when young adults make the transition to college (Spokas & Heimberg, 2009) and socially anxious persons may be especially vulnerable to drinking to cope with novel, social anxiety-provoking interactions (e.g., making new friends, meeting new people) given that the college environment promotes drinking (e.g., living in residence halls; Cross, Zimmerman, & O'Grady, 2009; Page & O'Hegarty, 2006; Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism, 2002).

2. Method

2.1. Participants and procedures

Participants were recruited through the psychology participant pool at a large state university in the southern United States for a study on college substance use. Participants completed computerized self-report measures using a secure, on-line data collection website (surveymonkey.com). Participants received research credit for their psychology courses and referrals to university-affiliated psychological outpatient clinics for completion of the survey. The university's Institutional Review Board approved the study and all participants provided informed consent prior to data collection.

Of the 1009 students who completed the survey, 779 endorsed past-month alcohol use and were eligible for the current study. Of those, 3 were excluded due to questionable validity of their responses (described below). The final sample of 776 was predominately female (83.5%) and the racial/ethnic composition was 9.3% non-Hispanic African American, 0.3% Hispanic African American, 2.7% Asian American, 79.3% Non-Hispanic Caucasian, 3.5% Hispanic Caucasian, 0.8% Native American, 2.1% multiracial, and 2.2% "other". The mean age was 20.2 ($SD = 1.9$) and the majority (60.1%) were under 21 years old.

2.2. Measures

Social versus *solitary drinking* was assessed using the strategy outlined in Gonzalez and Skewes (2013) such that participants reported the number of days on which drinking occurred in the past year in social (i.e., with others) and in solitary (i.e., alone) settings.

The *Daily Drinking Questionnaire* (DDQ; Collins, Parks, & Marlatt, 1985) assessed typical weekly drinking frequency in the past month. The DDQ has demonstrated good convergent validity (Collins et al., 1985) and test–retest reliability (Collins, Carey, & Sliwinski, 2002). Participants are asked to rate how often they drank in the past month from 0 (*I did not drink at all*) to 6 (*once a day or more*).

Past-month alcohol problems were assessed with the past-month version of the 23-item *Rutgers Alcohol Problems Index* (RAPI; White & Labouvie, 1989). Both the original and the past-month versions of the RAPI have demonstrated adequate psychometric properties (Buckner, Eggleston, & Schmidt, 2006; White & Labouvie, 1989). Consistent with prior work (e.g., Morean & Corbin, 2008), endorsed items were summed to provide a total count of alcohol-related problems. In our sample, the RAPI demonstrated good internal consistency ($\alpha = .87$).

The *Social Interaction Anxiety Scale* (SIAS; Mattick & Clarke, 1998) assessed social anxiety with 20 items scored from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). The SIAS has demonstrated good internal consistency in both community and undergraduate samples and have been shown to be specific for social anxiety relative to other forms of anxiety (i.e., trait anxiety; Brown et al., 1997). Internal consistency of the SIAS was excellent in the current sample ($\alpha = .93$).

The *Infrequency Scale* (IS; Chapman & Chapman, 1983) was used to identify random responders who provided random or grossly invalid responses. Four questions (e.g., "I find that I often walk with a limp, which is the result of a skydiving accident") from the IS were included. As in prior online studies (e.g., Cohen, Iglesias, & Minor, 2009), individuals who endorsed three or more infrequency items were excluded from this study ($N = 3$).

3. Results

Inspection of the data (Table 1) revealed that some variables were not normally distributed (skew > 3.0; kurtosis > 10; Kline, 2005),

Table 1
Descriptive statistics.

	M	SD	Skew	Kurtosis
Social anxiety	21.55	13.04	1.04	1.08
Social drinking frequency	7.76	6.29	1.61	2.68
Solitary drinking frequency	1.29	3.07	4.18	21.88
Drinking frequency	2.43	0.94	0.08	0.19
# drinking problems	3.86	4.15	1.56	2.90