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Heavy drinking among college students is influenced by anxiety sensitivity, gender, and contexts for alcohol use

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Abstract

In order to quantify relationships between anxiety sensitivity and situational antecedents to heavy alcohol consumption, 245 university student drinkers completed the anxiety sensitivity index-revised (ASI-R) and the inventory of drinking situations (IDS-42). The observed correlations indicated that anxiety sensitivity is related to negatively reinforced drinking, positively reinforced drinking, and temptation-motivated drinking. However, anxiety sensitivity is most clearly implicated as a factor in negatively reinforced drinking, i.e., drinking followed by “tension reduction.” Additionally, the relationship between anxiety sensitivity and negatively reinforced drinking is stronger among males than among females. The results point to anxiety sensitivity and gender as interacting individual difference variables that influence incidence of negatively reinforced heavy drinking among college students. © 2002 Elsevier Science Inc. All rights reserved.

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1. Introduction

Anxiety sensitivity (Peterson & Reiss, 1992) is a cognitive individual difference construct that summarizes the degree to which one’s anxiety is created and/or

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amplified by catastrophizing about the untoward implications of various bodily sensations, e.g., as reflecting illness, as setting the stage for embarrassment (see especially Taylor, 1999). A growing literature implicates anxiety sensitivity in the etiology of panic and other anxiety-related disorders (e.g., McNally, 1994; Peterson & Reiss, 1992; Valentin, Telch, Pteruzzi, & Bolte, 1996). For example, anxiety-sensitive normal subjects respond as do panic disorder patients to biological challenge (Asmundson, Norton, Wilson, & Sandler, 1994; Holloway & McNally, 1987). Research implicating anxiety sensitivity in the development of panic disorder accords well with current etiological models of panic which contend that catastrophizing about usually benign physical sensations is an important contributing factor (e.g., Barlow, 1988; McNally, 1994).

More recently, there have been attempts to link anxiety sensitivity with alcohol use, particularly heavy alcohol use (see Stewart, Samoluk, & MacDonald, 1999). For example, relatively high levels of anxiety sensitivity have been found among patients diagnosed with alcohol abuse/dependence, and among college students who report excessive drinking (Conrod, Stewart, & Pihl, 1997; McNally, 1994). Research implicating anxiety sensitivity in the development of alcohol-related disorders accords well with the venerable etiological view that alcohol use is oftentimes motivated by drinking-contingent tension reduction (e.g., Conger, 1956).

Part of the literature that links anxiety sensitivity with alcohol use focuses on interactions between anxiety sensitivity and different motives/contexts for alcohol consumption. In an early project with that focus, Stewart and Zeitlin (1995) studied a university sample and found a significant relationship between anxiety sensitivity and reports of using alcohol to cope with aversive affect.

Samoluk and Stewart (1998) reported that the strength of the relationship between anxiety sensitivity and alcohol consumption varied across drinking contexts among 396 university student subjects. Using the 42-item version of the inventory of drinking situation (IDS-42; Annis, Graham, & Davis, 1987) they acquired higher-order factor scores for negatively reinforced drinking, for positively reinforced drinking, and for temptation-motivated drinking. They then calculated correlations between each of the three factor scores and total scores on the 16-item anxiety sensitivity index (ASI; Peterson & Reiss, 1992). A correlation between scores for negatively reinforced drinking and ASI scores was predicted and was significant according to a one-tailed test ($r = .22, P < .05$). A similar correlation ($r = .23$) between scores for temptation-motivated drinking and ASI scores was not predicted and was not significant according to a two-tailed test. There was no association between scores for positively reinforced drinking and ASI scores.

The present research was designed to replicate and extend the findings of Samoluk and Stewart (1998) by exploring relationships between situational antecedents to heavy alcohol consumption and anxiety sensitivity among a sample of college drinkers. We altered the methods of Samoluk and Stewart in two ways. First, we queried students about “heavy” drinking across a variety of

situational contexts instead of “customary” drinking. Second, we used a recently revised and longer version of the anxiety sensitivity index-revised (ASI-R) (Taylor & Cox, 1998a). In line with the findings of Samoluk and Stewart, we predicted that ASI-R total scores would be positively and significantly correlated with IDS higher-order factor scores for negatively reinforced drinking and for temptation-motivated drinking.

2. Method

2.1. Subjects

The subjects (Ss) were 309 university students (60% female) whose mean age was 19.75 years. Sixty-four of the students reported not drinking during the previous year, leaving 245 questionnaires for analysis. Among the 245 students whose data were analyzed, 91.4% were Caucasian; 5.7% were African-American (the others were Asian or native American).

2.2. Materials

2.2.1. Anxiety sensitivity index-revised

The ASI-R (Taylor & Cox, 1998a) has 36 items including 10 from the original 16-item ASI (Peterson & Reiss, 1992). The respondent endorses each of the 36 items by assigning a number from 1 to 5 ($R = 36-180$). Principal components factor analysis of ASI-R data from 155 cognitive-behavior therapy patients (Taylor & Cox, 1998a) yielded a four-factor solution that accounted for 60% of the variance as well as a single higher-order factor. The four factors were (1) fear of respiratory symptoms; (2) fear of publicly observable anxiety reactions; (3) fear of cardiovascular symptoms; and (4) fear of cognitive dyscontrol. These factors are similar to those obtained for the original ASI (Peterson & Reiss, 1992) and to factors obtained when a similar, 60-item instrument was administered to 349 university students (Taylor & Cox, 1998b). Data concerning psychometric desiderata such as test-retest stability are not yet available, but subscales of the ASI-R have shown good internal consistency (Taylor & Cox, 1998a) and the original ASI performed very well psychometrically (Taylor, 1995).

2.2.2. Inventory of drinking situations (IDS-42)

The IDS (Annis et al., 1987), contains 100 items about different situational and psychological contexts for drinking. The 42-item version of the IDS is empirically equivalent to the original 100-item scale. Each inventory possesses solid psychometric properties with high subscale correlations (.93 to .98) and demonstrable concurrent and discriminant validity.

Carrigan, Samoluk, and Stewart (1998) factor analyzed the IDS-42 (with modified instructions) in a non-clinical university sample and established a factor

structure similar to that reported by [Annis et al. \(1987\)](#). In their analyses, Carrigan et al. found eight lower-order factors: unpleasant emotions, physical discomfort, pleasant emotions, testing personal control, urges and temptations, conflict with others, social pressure to drink, and pleasant times with others. These eight factors loaded onto three higher-order factors: negatively reinforcing situations (which includes conflict with others, unpleasant emotions, and physical discomfort subscales) positively reinforcing situations (which includes pleasant times with others, social pressure to drink, and pleasant emotions subscales), and temptation situations (which includes testing personal control and urges and temptations subscales).

As noted earlier, the current research maintained the instructional format of the original IDS-42 ([Annis et al., 1987](#)) and queried respondents about their past year frequency of “heavy” drinking in the situations described in the inventory. Subjects responded to each item on a four-point Likert-type scale (“never” to “almost always”).

2.3. Procedure

Subjects were recruited by classroom and posted announcements that described the project minimally and that offered credit for research participation. They completed the two questionnaires anonymously at one of several designated times in a classroom along with 4–40 other student respondents. They received research participation credit in one of several undergraduate psychology courses.

3. Results

3.1. Descriptive data

[Table 1](#) shows mean ASI-R total scores for males and for females. [Table 1](#) also shows means from male and female respondents for each of the three higher-order factor scores from the IDS-42. Factor scores were calculated using item subsets taken from the factor analyses reported by [Carrigan et al. \(1998\)](#). Lower-order factor scores were calculated as weighted means by multiplying individual item

Table 1
Means and standard deviations for the ASI-R and the IDS-42 higher-order factor scores by gender

Measure	Male		Female	
	<i>M</i>	S.D.	<i>M</i>	S.D.
ASI-R total	31.22	22.47	34.08	19.10
Negatively reinforcing situations	19.27	24.24	12.83	18.67
Positively reinforcing situations	39.98	20.79	28.71	18.67
Temptation situations	12.56	10.94	8.12	8.48

Table 2
Correlations among ASI-R scores and IDS-42 higher- and lower-order factor scores

IDS higher- and lower-order factors	Coefficient alpha	Correlation coefficients	Disattenuated correlations
Negatively reinforcing situations	.92	.43*	.46*
Conflict with others	.91	.43*	.46*
Unpleasant emotions	.74	.36*	.43*
Physical discomfort	.68	.30*	.38*
Positively reinforcing situations	.87	.26*	.29*
Pleasant times with others	.86	.28*	.31*
Social pressure to drink	.81	.24*	.27*
Pleasant emotions	.74	.19*	.23*
Temptation situations	.84	.39*	.44*
Testing personal control	.67	.38*	.48*
Urges and temptations	.81	.34*	.39*

* $P < .001$.

raw scores by maximum likelihood factor loadings taken from Table 2 in Carrigan et al. Likewise, higher-order factor scores were calculated by summing the products of the weighted lower-order factor scores and maximum likelihood factor loadings associated with each higher-order factor taken from Table 4 in Carrigan et al. (1998).

3.2. Internal consistencies for the IDS-42 and ASI-R subscales

A Cronbach's coefficient alpha was calculated for scores on each of the eight IDS-42 subscales and for each of the three higher-order IDS-42 factors. Each of the 11 alpha coefficients was large; most were greater than .80. The lowest coefficients were found for the testing personal control (.67) and physical discomfort (.68) subscales. These results are consistent with previous reports (Carrigan et al., 1998; Samoluk & Stewart, 1998). Alpha coefficients were calculated also for the ASI-R total scores (.94) and scores on each of the four ASI-R factors (.83 to .91). In order to reduce influences on correlations from variations in internal consistency, we calculated disattenuated correlations (see Table 2).

3.3. Correlations among IDS-42 and ASI-R scores

Correlations were computed between the ASI-R total scores and scores on the three higher-order factors and the eight lower-order factors on the IDS. For purposes of comparison to Samoluk and Stewart (1998), Table 2 contains correlations among ASI-R total scores all IDS higher- and lower-order factor scores. As is shown in Table 2, all 11 correlations were positive and all were significant ($P < .005$) based on a Bonferroni adjustment for multiple (11) comparisons.

Table 3

Correlations among IDS-42 higher- and lower-order factor and ASI-R factor scores^a

IDS higher- and lower-order factors	Correlation coefficients			
	ASI-R factor 1	ASI-R factor 2	ASI-R factor 3	ASI-R factor 4
Negatively reinforcing situations	.27*	.29*	.36*	.55*
Conflict with others	.27*	.30*	.36*	.56*
Unpleasant emotions	.26*	.23*	.28*	.46*
Physical discomfort	.16	.20	.30*	.41*
Positively reinforcing situations	.16	.25*	.21*	.29*
Pleasant times with others	.17	.27*	.22*	.30*
Social pressure to drink	.14	.24*	.18	.30*
Pleasant emotions	.13	.17	.16	.18
Temptation situations	.28*	.28*	.33*	.42*
Testing personal control	.26*	.27*	.34*	.40*
Urges and temptations	.25*	.25*	.27*	.37*

^a Factor 1: fear of respiratory symptoms; factor 2: fear of publicly observable anxiety reactions; factor 3: fear of cardiovascular symptoms; factor 4: fear of cognitive dyscontrol.

* $P < .001$.

Correlations were calculated also between subscales based on each of the four ASI-R factor scores and scores for the three higher-order factors and the eight lower-order factors on the IDS. As is shown in Table 3, all of these correlations were positive and most were significant ($P < .001$), based on a Bonferroni adjustment for multiple (44) comparisons.

The ubiquity of positive and significant correlations just described suggested that shared variance was at work. When partial correlations were re-calculated so as to take shared variance into account, only the correlation between ASI-R total scores and the IDS-42 factor scores for negatively reinforcing drinking situations was significant ($r = .24$, $P < .001$).

3.4. Gender differences in the relationships between ASI-R scores and IDS-42 scores

In order to evaluate the influence of gender on relationships between ASI-R total scores and IDS higher-order factor scores, we tested the difference between regression coefficients using *t*-tests (Cohen & Cohen, 1983, p. 56). Because regression values are not influenced by differences in variances of the independent variable or by differences in measurement error in the dependent variable, they are preferable to correlational methods for evaluating differences such as gender differences (Baron & Kenny, 1986). The analyses revealed that gender was a significant moderator of the relationship between ASI-R scores and IDS factor scores for negatively reinforced drinking, but it did not significantly moderate the relationship between ASI-R scores and scores for positively reinforced drinking

or temptation-motivated drinking. The relationship between ASI-R scores and negatively reinforced drinking was stronger ($t(229) = 2.96, P < .005$) for males ($b = .64$) than for females ($b = .29$).

4. Discussion

The current investigation replicated and extended the work of Samoluk and Stewart (1998) concerning relationships between anxiety sensitivity and situational antecedents to drinking among college students. Total raw scores on the 36-item (ASI-R; Taylor & Cox, 1998a, 1998b) were correlated with factor scores of the 42-item version of the inventory of drinking situations (IDS-42; Annis et al., 1987). Scores on the ASI-R were significantly and positively correlated with all three IDS higher-order factors. However, when shared variance of the IDS factors was partialled out, ASI-R total scores were significantly associated with only the factor of negatively reinforced drinking. This suggests that anxiety sensitivity is uniquely associated with drinking heavily in situations in which the removal of unpleasant emotions is a primary motive for drinking.

The relationship between ASI-R total scores and scores on the factor of negatively reinforced drinking was stronger among males than among females. The literature on gender as a mediating variable in the relationship between anxiety sensitivity and substance use is inconsistent (see Stewart et al., 1999, for a brief review). Our findings are consistent with some reports (e.g., Cox, Swinson, Shulman, Kuch, & Reichman, 1993; Norton et al., 1997), and inconsistent with others (e.g., Stewart & Zeitlin, 1995; Stewart, Karp, Pihl, & Peterson, 1997). There is some evidence that males in general are more likely to use alcohol to “cope” than are females (Parry, Cisin, Balter, Mellinger, & Manheimer, 1974) who are more likely to cope by using drugs other than alcohol (Biener, 1987). However, regardless of gender differences, our data suggest that there is a strong relationship between anxiety sensitivity and negatively reinforced alcohol consumption for both men and women.

One methodological difference between the current study and that of Samoluk and Stewart (1998) merits repeated notice. Samoluk and Stewart modified the instructions on the IDS-42 from “frequency of heavy drinking” to “frequency of drinking.” They stated that this was done to assess “customary” drinking as well as the drinking of students who engage in “heavy” drinking less frequently. In our research, the original instructions were used in order to retain the structure of the original measure.

Assessment of situational “heavy” drinking may encompass patterns of binge drinking that have become a specific focus of recent “harm reduction” interventions for alcohol abuse (Marlatt et al., 1998). Because of the greater harm associated with binge drinking (Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998) and the limitations of abstinence-oriented treatments, harm reduction interventions that focus on reducing binge drinking are an appealing treatment

option. The finding that anxiety sensitivity is associated with heavy drinking in negatively reinforcing situations thus increases the relevance of anxiety sensitivity as an individual difference variable that may require clinical attention. Accordingly, an index of anxiety sensitivity (e.g., the ASI-R) might contribute useful information for alcohol problem assessment and treatment planning.

Relationships among ASI-R factors and IDS factors were not foci of this research. It is interesting, however, that cognitive dyscontrol factor scores of the ASI-R were always more highly correlated with IDS factor scores than were corresponding scores for the other ASI-R factors (see [Table 3](#)). Future research might focus on relationships between the components of anxiety sensitivity as measured by the ASI-R (i.e., fear of respiratory symptoms, fear of publicly visible anxiety reactions, fear of cardiovascular symptoms, and fear of cognitive dyscontrol) and alcohol use.

Given the data presented here, it appears that anxiety sensitivity plays a role in heavy drinking among college students. However, other psychological individual difference factors such as trait anxiety, neuroticism, interpersonal sensitivity, and depression (e.g., see [Lilienfeld, 1996](#); [Peterson & Reiss, 1992](#)) may also have roles. In addition, debate continues about the relative independence of the construct of anxiety sensitivity from other dispositional constructs (cf. [Lilienfeld, Turner, & Jacob, 1993](#); [Reiss, 1991](#)). Hence, there is room for continuing research on relationships among anxiety sensitivity and related dispositional constructs as well as on their relationships with alcohol abuse.

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