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Compulsive use of alcohol among college students

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Abstract

Among college students alcohol consumption is associated with other high-risk behaviors that can lead to short- and long-term negative health consequences. Identification of college students consuming alcohol who are at high risk for problems may have important public health implications. This study examines the ability of the CHQ compulsive use of alcohol item to detect high-risk behaviors relative to other screening measures and its association with different dimensions of compulsive drinking. Three hundred thirty-two college students completed measures on compulsive drinking and hazardous behaviors. Results showed that among male students the CHQ compulsive use of alcohol item was not sensitive to detect hazardous alcohol consumption but co-occurred with the use of illicit drugs. Among female students it was sensitive to detect heavy drinking but not alcohol or drug problems. Among college students compulsive use of alcohol corresponds to an urge to consume alcohol that may be associated with use of illicit drugs in male students, with heavy drinking in female students and with substance use problems. This study suggest that the CHQ compulsive use of alcohol item should not be used as a stand-alone screening for alcohol or drug problems but it could be considered a marker for at-risk behaviors.

Keywords

College students; Compulsive drinking; Risky behaviors; Alcohol; Drug use

1. Introduction

Among college students, alcohol use is highly prevalent as between 70% and 80% of college students report having consumed alcohol in the previous 30 days (O'Malley and Johnston, 2002). However, among college students alcohol consumption can lead to severe short- and long-term negative consequences (Rosenberg and Mazzola, 2007; Hingson et al., 2009). In United States every year approximately 1800 college students die as a result of alcohol-related injuries, 599,000 students are injured due to drinking, 696,000 students are assaulted by another college student who has been drinking alcohol and 97,000 students are subjected to date rape or sexual assault associated with alcohol use (Hingson et al., 2009).

Among college students, heavy alcohol consumption is also associated with increased likelihood of use of licit and illicit drugs. For example, college students who drink heavily are approximately five times more likely to use marijuana and eight times as likely to use cocaine as their peers who engage in light drinking (O'Grady et al., 2008). Similarly, frequent binge drinking is associated with the usage of cigarettes, marijuana, hallucinogens, and LSD during the previous year (Wechsler et al., 1995). Substance use in addition to alcohol consumption is associated with greater number and severity of negative consequences (Bennett et al., 1999; Clapp et al., 2000). For example, students who binge drink and use drugs are twice as likely than those who binge drink only to ride with a drunk driver or to get into an accident (Feigelman et al., 1998), and are more likely to drink and drive, have blackouts, unplanned sex, and drug-related problems (McCabe et al., 2006).

Despite the significant problems associated with alcohol and drug use a small proportion of students who drink at a hazardous level and who use illicit substances seek treatment (Blanco et al., 2008; Caldeira et al., 2009). Thus, it is critical to find strategies to identify college students engaging in hazardous drinking behaviors who also use licit or illicit drugs and may be at higher risk for problems. Screening efforts have been advocated to identify at risk students (NIAAA, 2002; CASA, 2007) and given the high co-occurrence of alcohol use and drug use screening tools for hazardous alcohol consumption may also inform on the likelihood of use of illicit substances. However, not all heavy drinking college students use drugs (O'Malley and Johnston, 2002) thus screenings for drinking behaviors other than quantity of alcohol consumed may be more sensitive methods to identify those who are using illicit substances and are likely to have drinking and/or drug problems.

Compulsive drinking has been defined as a dimension of craving characterized by urges to consume alcohol, as well as by the inability to control these urges (Modell et al., 1992) and among college students it has been found to be associated with greater alcohol consumption (Anton et al., 1995; Pedrelli et al., 2011b), and with higher risk for alcohol-related negative consequences (Rosenberg and Mazzola, 2007), hazardous behaviors (Pedrelli et al., 2011a) and depressive symptoms (Pedrelli et al., 2011b). Moreover, among adults compulsive drinking is associated with severity of alcohol dependence and with increased likelihood of relapse (Anton et al., 1996; Moak et al., 1998). A recent study assessing compulsive drinking with a one-item question included in the Consumptive Habits Questionnaire (CHQ; Guidi et al., 2009) observed that college students who endorsed compulsive use of alcohol on the CHQ item reported greater daily alcohol use and likelihood of risky behaviors such as the use of licit and illicit substances, compulsive sexual behaviors and gambling, relative to those who denied compulsive use of alcohol (Pedrelli et al., 2011a). Thus, the CHQ compulsive use of alcohol item may be useful to identify students with greater likelihood for risky behaviors such as heavy drinking, hazardous alcohol use, licit and illicit drug use and substance use disorders. The present study investigated the ability of the CHQ compulsive use of alcohol item to detect heavy and hazardous alcohol use measured by the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) a common measure of hazardous alcohol use. Moreover, the study compared the ability of the CHQ compulsive use of alcohol item to detect the use of licit and illicit drugs and drug problems relative to employing the AUDIT.

Compulsive drinking in the CHQ is measured by an item saying "Compulsive use of Alcohol" to which respondents may circle "yes" or "no", thus the CHQ does not provide an explicit definition of compulsive use of alcohol and it is unclear whether the behavior measured is consistent with previous definitions of compulsive drinking. Compulsive drinking has been primarily assessed with the Obsessive-Compulsive Drinking Scale (OCDS), a validated self-report measure including 14 items assessing several dimensions of craving, and that includes a compulsive drinking subscale (Anton et al., 1995; Connor et al.,

2008). Preliminary analyses performed in a sample of 332 college students showed that students reporting compulsive use of alcohol on the CHQ had a significantly higher OCDS compulsive drinking subscale score as well as OCDS total score and greater severity of drug related problems than students who denied compulsive use of alcohol on the CHQ (Pedrelli et al., 2011a). These observations suggest that the CHQ compulsive use of alcohol item measures a behavior related to the theoretical definition of compulsive drinking at the bases of the OCDS. However, preliminary analyses did not examine the dimensions of compulsive drinking associated with the CHQ compulsive use of alcohol item and were not performed separately by sex. The current study aims at furthering the understanding of reported compulsive use of alcohol on the CHQ by examining its relationship with the specific items included in the OCDS compulsive drinking subscale. Moreover, the associations between the CHQ compulsive use of alcohol item and the OCDS compulsive drinking subscale and the OCDS total score are examined separately by sex. To examine drinking behaviors separately in male and female college students it is critical for several reasons. Differences in prevalence of risky behaviors across sexes, including rates of compulsive use of alcohol, have been consistently reported (Rosenberg and Mazzola, 2007; Bellis et al., 2008; Randolph et al., 2009; Pedrelli et al., 2011a). Furthermore, male college students consume more alcohol (Wechsler et al., 1994; O'Donnell et al., 2006; White et al., 2006), have more addictive tendencies toward alcohol (Greenberg et al., 1999), and have more alcohol related negative consequences (Geisner et al., 2004; Harrell and Karim, 2008) than female students. Similarly, men are more likely to use marijuana and other illicit drugs than women (Gledhill-Hoyt et al., 2000; O'Malley and Johnston, 2002; Mohler-Kuo et al., 2003). Moreover, male and female college students report different drinking motives (Park and Levenson, 2002; Harrell and Karim, 2008) and experience different types of alcohol-related problems (Norberg et al., 2011). Finally, biological evidence suggests that women and men absorb and metabolize alcohol differently and that the same amount of alcohol consumed by a woman and a man of the same weight is associated with a greater level of blood-alcohol - level (BAL) in the former than the latter (Thomasson, 1995). These dissimilarities have prompted the exploration of different models to explain drinking behaviors in men and women and the delineation of different screening guidelines to define problematic drinking behaviors in men and women (Wechsler et al., 1994; Willenbring et al., 2009).

In summary, the present study will inform as to the utility to employ the CHQ compulsive use of alcohol item to detect male and female students at risk for negative consequences relative to current screening methods. Specifically, sensitive screening methods for risky use may facilitate prompt identification and referrals of students who would benefit from treatments focusing on hazardous use of substances and may prevent further problems. Moreover, the study may shed light into whether compulsive use of alcohol measured by the CHQ is consistent with a current definition of compulsive drinking and it may inform on mechanisms at the basis of the co-occurrence of alcohol use and risky behaviors, and drug problems.

2. Methods

2.1. Participants

Participants consisted of 332 undergraduate college students, who were predominantly female (62.3%), white (non-hispanic) (77.7%), single (99.7%) and not an international student (94.6%) and with a mean average age of 19 ± 1.7 years. Table 1 displays demographic statistics and information for the current study.

2.2. Procedures

The present study was part of a larger ongoing project investigating a suicide prevention program for college students at multiple Boston-area universities. The data included in the present study was collected at one mid-size Boston college. Briefly, participants were recruited during a two-day on-campus screening in high traffic areas at the school. Informed consent was sought, and those completing the questionnaire received a \$10 voucher for the University bookstore. Students who signed informed consent were then provided with a packet of screening questionnaires. Students who returned a completed questionnaire packet were given a \$10 voucher to use at the university bookstore.

2.3. Measures

The screening packet included several measures about mental health symptoms. For the current study, we considered information collected from the following questionnaires:

Drug Abuse Screening Test (DAST) (Skinner, 1982)—The DAST is a 28-item self-report questionnaire commonly used for clinical screening and treatment evaluation and it evaluates the presence and severity of problems related to the use of drugs other than alcohol. The DAST yields a quantitative index of the range of problems related to drug abuse with a total score ranging from 0 to 28, where higher scores indicate greater severity of problems (Skinner, 1982). The DAST has been found to be a sensitive screening instrument for the abuse of drugs other than alcohol among college student (Kaloyanides et al., 2007). A cutoff score of six has been found to provide excellent sensitivity for identifying patients with substance use disorders as well as satisfactory specificity (Yudko et al., 2007; Staley and El-Guebaly, 1990).

Consumptive Habits Questionnaire (CHQ) (Guidi et al., 2009)—The CHQ is a self-report questionnaire including 14 items inquiring about consumption of alcohol and caffeine, and current and past engagement in several compulsive behaviors. Specifically, in the first section respondents are asked to report quantity of daily alcohol and caffeine use. In the following section respondents are asked to indicate whether they have engaged in the compulsive behaviors listed in a table and the current and past frequency of the compulsive behaviors. Respondents indicate their answers by circling either a yes or a no in the space adjacent each behavior. The behaviors included in the list are compulsive use of alcohol, compulsive use of street drugs, compulsive use of prescription drugs, compulsive use of caffeine, compulsive exercise, compulsive eating, gambling, compulsive sexual activities, compulsive buying or spending, risk taking behaviors and other compulsive activities.

The CHQ was developed to collect information on the prevalence of several risky behaviors and does not measure a single construct. Thus, it does not provide a total score and each question can be used on its own. The CHQ has not been extensively validated but previous studies have observed that the compulsive eating item is associated with depressive symptoms, self-aggression and quality of life (Guidi et al., 2009) and that the CHQ compulsive use of alcohol item is associated with daily alcohol use, risky behaviors and depressive symptoms (Pedrelli, 2011a, 2011b). Information on the CHQ test–retest reliability is not available. This study evaluated the CHQ compulsive use of alcohol item and includes information collected by the CHQ items inquiring about daily alcohol use, and compulsive use of alcohol, street drugs and prescription drugs. Daily alcohol use was computed on the basis of the first item of the CHQ that asks: “Do you currently consume alcohol?” to which respondents may answer yes or no. Subsequently respondents who answered yes may write a number, describing amount of consumption, on a line by three sub-items: “# 12 ounce beer or wine coolers per day”, “# 4–6 ounce glasses wine per day”,

“# ounce distilled spirits per day.” Each sub-item corresponds to the definition of a standard drink. Total daily alcohol use corresponded to the sum of the three sub-items.

Obsessive Compulsive Drinking Scale (OCDS) (Anton et al., 1995)—The OCDS is a 14-item self-report questionnaire that measures obsessive thoughts and compulsive behaviors about alcohol use. Items are rated from 0 (no symptoms) to 4 (severe symptoms). Questions 1 and 2, 7 and 8, 9 and 10 and 13 and 14 are pairs and are scored using the highest score of each pair. The OCDS total score can range from 0 to 40, with higher scores indicating greater obsessions and compulsions with regard to alcohol (Anton et al., 1995). The developers of the OCDS hypothesized the existence of two subscales: the obsessive thoughts of drinking subscale, which measures severity of obsessive thoughts on alcohol use (items 1–6), and the compulsive drinking subscale, which measures the ability and effort to resist drinking (items 7–14). However, a recent factor analysis showed that the OCDS included four subscales assessing compulsions, interference, obsessions and resisting to obsessions (Connor et al., 2008). In the present study the compulsive drinking subscale was computed following this 4-factor structure and includes items on alcohol consumption (How many drinks do you drink each day?; How many days each week do you drink?; item 7 and 8 respectively), on effort to resist alcohol use (How much of an effort do you make to resist consumption of alcoholic beverages?; item 12), on strength of the drive to consume alcohol (How strong is the drive to consume alcoholic beverages?; item 13) and on control over drinking (How much control do you have over the drinking?; item 14). The OCDS has adequate test–retest reliability and high internal consistency and interrater reliability (Anton et al., 1995). The OCDS is associated with severity of alcohol dependence (Moak et al., 1998) and it is sensitive to predict relapse among alcohol-dependent individuals (Anton et al., 1996).

Alcohol Use Disorders Identification Test (AUDIT: Saunders et al., 1993)—The AUDIT is a 10-item questionnaire developed by the World Health Organization (WHO) to screen for excessive drinking and it measures alcohol consumption (items 1–3), drinking behavior (items 4–6), adverse reactions to alcohol (items 7–8), and alcohol-related problems (items 9–10) (Saunders et al., 1993; Reinert and Allen, 2002). Each item ranges in score from 0 to 4 with an overall total score range of 0–40. The AUDIT has shown high reliability, sensitivity and specificity and to be a valid screening for Alcohol Use Disorders (Saunders et al. 1993). A cut-off value of eight points has been widely used to screen for problematic drinking in a variety of settings including with college students (Saunders et al., 1993; Kelly et al., 2002; Egan et al., 2004; Reinert and Allen 2002). Item 3 of the AUDIT (AUDIT3) asks to report the frequency of consuming six or more drinks in the previous year and respondents options are as follows: never (0), less than monthly (1), monthly (2), weekly (3), daily or almost daily (4). In the present study AUDIT3 was used as an index of heavy drinking and students who reported consuming six or more drinks at least once monthly were considered heavy drinkers. This classification has been used previously to measure heavy drinking (Bush et al., 1998).

2.4. Data analyses

Data were collected and analyzed using the SPSS statistical package (SPSS-17; 2009). First, descriptive statistics were computed, including demographic characteristics of students, and then the proportions of students endorsing several risky behaviors, including compulsive use of alcohol, were computed.

2.4.1. CHQ compulsive use of alcohol item, hazardous behaviors and severity of drug problems—The associations between the CHQ compulsive use of alcohol item and daily alcohol consumption and item AUDIT3 were examined by computing independent

univariate t-tests and point-biserial correlations. When one of the variables is dichotomous and the other is at the interval or ratio level, the point-biserial correlation coefficient is an adequate method to use to assess association (Rosenthal et al., 2000). The ability of the CHQ compulsive use of alcohol item to screen for male and female students engaging in heavy drinking and hazardous drinking was examined by computing, using standard procedures (Altman and Bland, 1994), its sensitivity and specificity to detect students with a score greater than one on the AUDIT 3 and AUDIT score equal or greater than eight. Sensitivity corresponds to the proportion of true positives that are correctly identified by the test and specificity is the proportion of true negatives that are correctly identified by the test (Altman and Bland, 1994). Specifically, in the case of the total AUDIT score sensitivity corresponded to the percentage of students who reported compulsive use of alcohol and who also had an AUDIT score equal or greater than eight. Sensitivity corresponded to the percentage of students who did not meet the cutoff score on AUDIT and did not report compulsive use of alcohol. Confidence intervals for sensitivity and specificity were computed following indications by Deeks and Altman (1999). Moreover to investigate whether endorsing the CHQ compulsive use of alcohol item was associated with increased prevalence of other risky behaviors, chi-square analyses were performed and differences in rates of risky behaviors between students who endorsed this item and those who did not were examined. We anticipated that a significant greater proportion of students endorsing the CHQ compulsive use of alcohol item would also endorse compulsive use of street drugs and compulsive use of prescription drugs. Moreover, the specificity and sensitivity of the CHQ compulsive use of alcohol item to detect the presence of licit and illicit drug use were computed using standard procedures (Altman and Bland, 1994) and were compared with those of the AUDIT and of the AUDIT3. Moreover, to investigate the presence of drug-related problems among students reporting compulsive use of alcohol the mean difference on the DAST total score between students who endorsed the CHQ compulsive use of alcohol item and those who did not was examined conducting univariate t-tests. We expected that the former group would have a significantly higher DAST and CPFQ total score than the latter. Finally, we computed the sensitivity and specificity of the CHQ compulsive use of alcohol to detect students with a DAS score equal or greater than six, suggesting the presence of a substance use disorder, and compared them to those of the AUDIT and of the AUDIT3.

2.4.2. The CHQ compulsive use of alcohol item and the OCDS—To evaluate the association between the CHQ compulsive use of alcohol item and the total scores of the OCDS and of the OCDS compulsive subscale independent univariate t-tests were conducted. We anticipated that there would be a significant difference between the mean scores of the students who reported compulsive use of alcohol on the CHQ item and those who did not. Compulsive drinking has been defined as a behavior that can be characterized by an urge or drive to consume alcohol, a lack of ability to control alcohol use, and distress if one is prevented from using (Modell et al., 1992). These dimensions are assessed by items 11 (“If you were prevented from drinking alcohol when you desired a drink, how anxious or upset would you become?”), 12 (“How much of an effort do you make to resist consumption of alcoholic beverages?”), 13 (“How strong is the drive to consume alcoholic beverages?”), and 14 (“How much control do you have over the drinking?”) of the OCDS. These items are also included in the compulsive drinking subscale obtained by a recent factor analysis of the OCDS (Connor et al., 2008). Thus, to gain insight as to the dimensions of compulsive drinking associated with the CHQ compulsive use of alcohol item chi-square analyses were performed to examine the proportion of students who reported compulsive use of alcohol on the CHQ item and also scored at least a one on the four aforementioned OCDS items. We expected to find that a significant higher proportion of students who reported compulsive

use of alcohol on the CHQ, compared to those who did not, would also endorse items 11, 12, 13 and 14 on the OCDS.

All of the aforementioned analyses were conducted separately for men and women. All test were conducted two-tailed and at a significance level $p = 0.05$.

3. Results

3.1. Prevalence of risky behaviors

Table 2 displays the prevalence of risky behaviors among students in our sample, separated by sex. Approximately one out of six male students endorsed compulsive use of alcohol and of street drugs, while approximately one out of eight female students endorsed compulsive use of alcohol and of street drugs.

3.2. CHQ compulsive use of alcohol item and hazardous behaviors and severity of problems

Among male college students there was not a significant difference in daily alcohol use between students who reported compulsive use of alcohol relative to those who did not ($M=2.1\pm2.4$ vs. $M=1.2\pm2.1$, $t=-1.4$ (56), $p=0.1$). However, compulsive use of alcohol on the CHQ item had a significant large association with heavy drinking measured by the AUDIT3 ($r=0.51$, $p<0.001$). Among female students there was a significant difference in daily alcohol use between students who reported compulsive use of alcohol relative to those who did not ($M=4.7\pm8.7$ vs. $M=0.9\pm1$, $t=-25.2$ (77), $p<0.001$) and compulsive use of alcohol was associated with heavy drinking ($r=0.48$, $p<0.001$). Among male students compulsive use of alcohol had low sensitivity and high specificity to detect hazardous alcohol use on the AUDIT (AUDIT ≥ 8) (Table 3). Specifically, out of the 30 male students who had an AUDIT score equal to or greater than eight, 17 (56.7%) reported compulsive use of alcohol and out of the 66 male students who had an AUDIT score lower than eight, 61 (92.4%) did not report compulsive use of alcohol. Similarly, among female students the CHQ compulsive use of alcohol item had low sensitivity and high specificity to detect students engaging in hazardous drinking (Table 4). Specifically, out of the 35 female students who had an AUDIT score equal to or greater than eight, 13 (37.1%) reported compulsive use of alcohol and out of the 133 female students who had an AUDIT score less than eight, 121 (91%) did not report compulsive use of alcohol. With regard to detecting heavy drinking the CHQ compulsive use of alcohol item had low sensitivity and specificity among male students. Conversely, it showed adequate sensitivity and specificity among female students (Table 4).

Compulsive use of street drugs and of prescription drugs was significantly higher among male students who endorsed the CHQ compulsive use of alcohol item than among those who did not ($\chi^2=59.8$ (1,111), $p<0.001$; $\chi^2=-16.5$ (1,111), $p<0.001$ respectively). Similar results were found in female students ($\chi^2=37.3$ (1,190), $p<0.001$; $\chi^2=14.7$ (1,189), $p<0.001$ respectively). Among male students the CHQ compulsive use of alcohol item proved sensitive in detecting those reporting compulsive use of street drugs and compulsive use of prescription drugs (Table 3). Specifically, 93.5% of the male students reporting compulsive use of illicit drugs and 75% of the male students who reported compulsive use of prescription drugs also reported compulsive use of alcohol. Moreover, only less than 15% of the male students who did not report compulsive use of illicit drugs and who did not report compulsive use of prescription drugs reported compulsive use of alcohol. Conversely, among female students the CHQ compulsive use of alcohol item showed a lower ability to detect those reporting compulsive use of street drugs or compulsive use of prescription drugs (Table 4). Specifically, approximately half of the female students who reported compulsive use of street drugs and of prescription drugs reported compulsive use of alcohol. Compulsive use of alcohol was reported by less than 8% of female students who did not

report compulsive use of illicit drugs and by less than 12% of female students who did not report prescription drugs.

Among male students the AUDIT showed 77.3% sensitivity and 79% specificity to detect reported compulsive use of street drugs and 75% sensitivity and 64.4% specificity to detect reported compulsive use of prescription drugs and the AUDIT3 had low ability to detect both compulsive use of street drugs and compulsive use of prescription drugs (Table 3). Among female students the AUDIT showed low sensitivity and fair specificity to detect compulsive use of street drugs and compulsive use of prescription drugs and the AUDIT3 had good ability to detect compulsive use of street drugs but low ability to detect compulsive use of prescription drugs (Table 4).

With regard to substance use disorders and problems, the DAST total score of both male and female students who endorsed compulsive use of alcohol on the CHQ was significantly higher than that of students who did not (males: $M=6\pm6.5$ vs. $M=1.69\pm1.9$, $t=-5.15$ (97), $p=0.011$; females: $M=1.41\pm2.9$ vs. $M=1.4\pm2.1$, $t=-4.45$, $p=0.001$). As seen in Tables 3 and 4 among male and female students the CHQ compulsive use of alcohol had low sensitivity and high specificity to detect those students with substance use problems. The AUDIT had low sensitivity and fair specificity to detect substance use problems in male and female students. However, among female students the AUDIT3, but not the AUDIT, had good sensitivity and specificity to detect substance use disorders.

3.2.1. The CHQ compulsive use of alcohol item and the OCDS—Table 5 displays the proportion of students who endorsed the CHQ compulsive use of alcohol item and the four OCDS items describing dimensions of compulsive drinking. A significantly high proportion of both female and male students who reported compulsive use of alcohol on the CHQ item endorsed a drive to consume alcohol (OCDS item 13), anxiety if prevented from drinking (OCDS item 11), some or no effort to resist drinking (OCDS item 12) and ability to control drinking (OCDS item 14). Both male and female students who reported compulsive use of alcohol on the CHQ item had significantly higher scores on the OCDS total score and on the OCDS compulsive subscale than those who did not (Table 5).

4. Discussion

The primary aim of the study was to examine the CHQ compulsive use of alcohol item relative to current measures of hazardous and heavy alcohol use and drug problems. In the present study in male students compulsive use of alcohol co-occurred greatly with compulsive use of illicit drugs. However, the CHQ compulsive use of alcohol item had low sensitivity to detect frequency of heavy drinking, of hazardous alcohol use, and of substance use problems. Thus, the CHQ may not be used instead of currently validated measures for hazardous alcohol use and substance use problems such as the AUDIT and the DAST. However, the fact that of the male students, who reported compulsive use of alcohol approximately two thirds reported heavy drinking and 93.5% reported compulsive use of illicit drugs, suggest that compulsive use of alcohol may be a marker for at-risk behaviors. Moreover, it appears that compulsive drinking among males was a better predictor of substance use problems than heavy drinking measured by the AUDIT3.

With regard to women, the CHQ compulsive use of alcohol item was associated with daily alcohol use, was able to detect the majority of the women who were drinking heavily but only a minority of those having alcohol problems according to the AUDIT. Similarly, to the findings with male students the CHQ compulsive use of alcohol item had low sensitivity to detect the female students with substance use problems. However, approximately half of the female students who reported compulsive use of alcohol engaged also in compulsive use of

illicit drugs and 60% of them had significant substance use problems. Therefore, the CHQ compulsive use of alcohol item may be an indicator of heavy alcohol use among women and of at-risk female students.

We did not anticipate that compulsive use of alcohol would be sensitive to detect the majority of the students with substance use problems because they are two distinct constructs and because not all students who drink alcohol engage in problematic drug use but we were interested in how it performed relative to other screening for hazardous problems. Our findings, together with the fact that compulsive drinking is associated with depressive symptoms, alcohol-related problems and with substance use, suggest that the CHQ compulsive use of alcohol item may be used together with other screening measures and may aid in identifying students engaging in unhealthy behaviors and who may benefit from treatment.

We observed that male as well as female students who reported compulsive use of alcohol had higher scores on both the OCDS compulsive drinking subscale and the OCDS total score. This finding is consistent with a previous report that examined the sample not divided on the bases of sex (Pedrelli et al., 2011a). The present study provides further information with regard to drinking behaviors that may be measured by the CHQ compulsive use of alcohol item among college students. Examination of the specific OCDS items showed that although the majority of the male and female students who reported compulsive use of alcohol on the CHQ reported a drive to consume alcohol and distress if prevented from drinking approximately only one third reported having little or no control over alcohol use. Consistently, two-third of students reporting compulsive use of alcohol reported little or no effort to resist alcohol consumption. Thus, students who reported compulsive use of alcohol on the CHQ believed that they could control their consumption and would become upset if prevented from drinking. This finding is consistent with reports indicating that most students consider alcohol use a normative behavior in college and even those who engage in heavy alcohol use do not believe that their alcohol consumption is problematic (Wechsler et al., 1994; Wu, et al., 2007). Although a greater proportion of female than male students who endorsed compulsive use of alcohol on the CHQ reported a drive to drink and anxiety if prevented from drinking, results show an overall similar pattern of associations between the CHQ compulsive use of alcohol item and the OCDS items suggesting that compulsive drinking is a behavior that may be defined in a similar way by male and female college students. It appears that the theoretical definition of compulsive drinking at the bases of the OCDS is dissimilar from the one held by young adults. Compulsive drinking has been hypothesized to be a dimension of craving characterized by difficulty to inhibit and control alcohol use and has been found to be associated with alcohol dependence among adults (Anton et al., 1995; Moak et al., 1998). However, students in this sample interpreted compulsive use of alcohol as corresponding primarily to strong urge to consume alcohol but not with inability to control it.

Sensation seeking, defined as a need for varied and novel experiences and willingness to take risk to engage in such experiences (Zuckerman, 1979), has been associated with poly-drug use among college students (Martin et al., 1992) and given the high prevalence of illicit drug use among students who reported compulsive use of alcohol this personality trait may have characterized this group. Moreover given the association between sensation seeking and enhancement motives (Magid et al., 2008) students reporting compulsive use of alcohol may drink to enhance their mood. Alternatively, given that compulsive use of alcohol is associated with depressive symptoms (Pedrelli et al., 2011a) it may be associated with drinking to cope motives. It has been observed that students who use both alcohol and marijuana report more coping motives than students who consume only alcohol (Simons et

al., 2005). Future studies may further investigate distal and proximal variables associated with compulsive use of alcohol.

Several limitations ought to be considered. It should be kept in consideration that our study included a convenience sample from one college and our results may not be generalizable to other populations. This convenience sample was taken from a mid-size, liberal arts institution located in an urban setting and thus performing a similar screening using the CHQ compulsive use of alcohol item at a range of other institutions may provide further evidence regarding the generalizability of our findings. Moreover, the definition of heavy drinking and binge drinking has varied in the past decades (Fillmore and Jude, 2008) and different definitions of the one used in this study may have been more sensitive to detect the use of licit and illicit drugs. We compared the ability to detect hazardous drinking and drug problems using reference standards that have not been used extensively in the past. The AUDIT has been used in previous research as a reference measure (Schlesinger et al., 2007; Fillmore and Jude, 2008; Khan et al., 2011; Meneses-Gaya et al., 2010), but this is not a very common practice. The CHQ compulsive use of illicit drugs and of prescription drugs have not been validated, thus inferences are limited and these findings ought to be considered preliminary. Although the OCDS has been widely validated its specific items have not which may have affected our qualitative comparison of the CHQ compulsive use of alcohol item with OCDS items 11, 12, 13 and 14. Finally, we did not assess the test-retest reliability of the CHQ. Therefore, it is not possible to know whether students report consistent rates of compulsive use of alcohol when asked on different occasions. Time of reporting of compulsive use of alcohol may have affected its ability to detect the use of licit and illicit drugs.

In conclusion, it appears that compulsive use of alcohol among college students is characterized by a drive and urge to drink, little or no effort to limit alcohol consumption and ability to control alcohol use and it is associated with heavy drinking in female students, with compulsive use of licit and illicit drugs among male students and with the likelihood of substance use problems.

Although the CHQ compulsive use of alcohol item may not be helpful to identify students at risk for AUDs it may be used, together with other measures, to identify male students who are more likely to use licit and illicit drugs and who may have drug-related problems. Given that use of alcohol and of illicit substances may be associated with severe negative consequences the CHQ compulsive use of alcohol item may be used in college health clinics and counseling centers to identify students who are at greater risk for problems and may be referred to appropriate services and thus decrease the likelihood of problems.

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Table 1

Demographic information about the study sample.

Sociodemographic variables	N (%)
Gender	
Female	207 (62.3)
Male	125 (37.7)
Ethnicity	
White, not of Hispanic origin	258 (77.7)
Black, not of Hispanic origin	11 (3.3)
Hispanic	19 (5.7)
American Indian or Alaskan native	2 (0.6)
Asian or Pacific Islander	23 (6.9)
Other	17 (5.1)
Marital status	
Single	331 (99.7%)
International student	
Yes	18 (5.4%)
No	314 (94.6%)
Mean±S.D.	
Age	19+1.7

Table 2

Prevalence of risky behaviors and severity of substance use problems and of cognitive impairment.

	Males <i>N</i>	Females <i>N</i>
Compulsive use of alcohol	22 (17.6%)	25 (12.1%)
Compulsive use of street drugs	22 (17.6%)	27 (13.0%)
Compulsive use of Rx drugs	8 (6.4%)	11 (5.3%)
AUDIT 8	28 (32.7%)	40 (21.6%)
Heavy drinking	42 (34.7%)	27 (13.1%)
<i>M (S.D.)</i>		
OCDS total score	3.61 (4.87)	2.61 (2.37)
Daily drinking	0.60 (0.49)	0.47 (0.50)
AUDIT total score	6.32 (5.51)	5.21 (5.16)
DAST total score	2.46 (3.54)	1.74 (2.37)
CPFQ total score	16.28 (4.84)	16.25 (3.64)

Table 3
Sensitivity and specificity of the CHQ compulsive use of alcohol item and of the AUDIT and AUDIT 3 among males.

	AUDIT TOT	AUDIT 3	CHQ illicit	CHQ RX	DAST 6
CHQ alcohol					
Sensitivity% (95% CI)	56.7 (46.7–66.6)	64.7 (55.7–73.7)	93.5 (88.9–98.1)	75 (66.9–83.1)	54.5 (44.7–64.4)
Specificity% (95% CI)	92.4 (87.1–97.7)	87.9 (81.7–94.1)	84.2 (77.4–90.9)	84.5 (77.7–91.2)	85.2 (75.4–95)
AUDIT TOT					
Sensitivity% (95% CI)			77.3 (69.2–85.4)	75 (83.4–73.7)	61.4 (51.8–71.2)
Specificity% (95% CI)			79.0 (71.1–86.9)	64.4 (55.1–73.7)	72.6 (63.7–81.5)
AUDIT 3					
Sensitivity% (95% CI)			45.5 (36.4–54.5)	62.5 (53.6–71.4)	38.5 (29.3–47.6)
Specificity% (95% CI)			96.5 (93.9–99.0)	85.8 (79.5–92.2)	87.5 (81.3–93.7)

Sensitivity and specificity of the CHQ compulsive use of alcohol item and of the AUDIT and AUDIT 3 among females.

Table 4

	AUDIT TOT	AUDIT 3	CHQ illicit	CHQ RX	DAST 6
CHQ alcohol					
Sensitivity% (95% CI)	37.1 (29.8–44.4)	80 (74.3–85.7)	54.5 (47.5–61.6)	55.6 (48.5–62.6)	61.5 (54.4–68.6)
Specificity% (95% CI)	91 (86.7–95.3)	90.5 (86.3–94.7)	92.3 (88.5–96.1)	88.9 (84.4–93.4)	90.4 (86.1–94.7)
AUDIT TOT					
Sensitivity% (95% CI)			53.8 (46.5–61.2)	66 (56.5–70.7)	71.4 (64.8–78)
Specificity% (95% CI)			83.3 (77.8–88.8)	80.5 (74.6–86.4)	82.5 (76.9–88.1)
AUDIT 3					
Sensitivity% (95% CI)			81.5 (76–86.9)	63.6 (56.9–70.3)	50 (43–56.9)
Specificity% (95% CI)			96.5 (93.9–99)	96.2 (93.5–98.9)	97.8 (95.8–99.9)

Table 5
OCDS responses among students who endorse and do not endorse compulsive alcohol use.

	Males		Females	
	Endorse compulsive alcohol use N (%)		Endorse compulsive alcohol use N (%)	
	Yes	No	Yes	No
OCDS anxiety (item 11)	14 (63.6%)	21 (23.9%)	17 (70.8%)	20 (12.3%)
			12.83 (1, 110) $P=0.001$	44.87 (1, 186) $P=0.000$
OCDS effort to resist drinking (item 12)	14 (66.7%)	7 (33.3%)	16 (64.0%)	9 (36.0%)
			21.12 (1, 104) $P=0.000$	36.29 (1, 184) $P=0.000$
OCDS drive to consume (item 13)	15 (68.2%)	21 (24.1%)	19 (76.0%)	47 (24.0%)
			15.4 (1, 109) $P=0.000$	20.94 (1, 187) $P=0.000$
OCDS control (item 14)	8 (36.4%)	7 (8.0%)	9 (36.0%)	22 (13.5%)
			11.87 (1, 109) $P=0.002$	7.97 (1, 188) $P=0.009$
	M (S.D.)		M (S.D.)	t (d.f.)
	Yes	No	Yes	No
OCDS total score	8.14 (7.33)	2.36 (3.21)	6.98 (5.36)	1.76 (2.14)
			-5.42 (100) $P=0.000$	-8.85 (178) $P=0.000$
OCDS compulsive subscale score	5.93 (3.93)	2.15 (2.46)	5.54 (3.33)	1.87 (2.16)
			-5.43 (101) $P=0.000$	-7.14 (180) $P=0.000$