Brief Report

Association between sensation seeking and alcohol consumption in French college students: Some ecological data collected in “open bar” parties

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Abstract

Numerous factors have been associated with alcohol drinking among college students. Typically, the psychological trait of sensation seeking, has been found to be correlated with alcohol consumption in various populations. Nevertheless, there is a pressing need for more observational and ecological studies of college drinking behavior in unusual and incentive situations. The present study examined the relationship between sensation seeking and blood–alcohol concentration at the end of an “open bar” party in a sample of college students. Our results support the relationship between disinhibition and blood–alcohol concentration among women. In men however, experience seeking was found to be of equal significance than disinhibition. As the sensation seeking ratings were especially high for both sexes as compared to the population norms, the possibility that open bar participants share a specific profile of personality is discussed.

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1. Introduction

Alcohol abuse has a number of negative health consequences. The most well known is liver damage and negative effects on brain and on neuropsychological functioning (e.g., Delin & Lee, 1992). It may also lead indirectly to a number of other health problems. First, alcohol abuse reduces the association between attitudes and behavior, thus people are more likely to engage in behaviors that are not in line with their actual beliefs and that may entail dangerous consequences including unsafe sex and drunk driving (e.g., MacDonald, MacDonald, Zanna, & Fong, 2000). Second, people who are drunk are not able to think rationally as they could when sober. For example, a study by Murphy, Monahan, and Miller (1998) concluded that women who were drunk saw attractive but promiscuous men as much higher in “relationship potential” than did women who were sober. It seems as if a sober woman is apt to recognize that an attractive man who reports consistent sexual promiscuity is probably not interested in having a long-term relationship while a drunk woman is much more likely to misjudge the situation. Finally, alcohol abuse may create a feeling that one is invulnerable to the dangers he or she might normally engage in. This is why people who know that driving while intoxicated is dangerous are unable to face the facts when drunk and believe they are fit to drive.

In a previous analysis by Kuo, Wechsler, Greenberg, and Lee (2003), it was found that, in contrast to normative perceptions, the statistical average for consumption of alcohol by a college student tends to drop and can be estimated at about five standard drinks per week (one standard drink amounts to 14 cl of wine or 34 cl of beer). However, more extreme forms of drinking by college students have been escalating. Indeed, a phenomenon of heavy episodic consumption has infiltrated college campuses in the United States and Europe for 10 years through the popularization of “open bar” parties. “Open bar” parties are musical and dance evenings arranged by college student associations which give access to free (or cheap) booze. As Kuo et al. (2003) highlighted, the availability of large volumes of alcohol and low sale prices are associated with higher binge drinking rates in college students (i.e., five or more standard drinks in a row for men, four or more standard drinks in a row for women); which typically results in various potential harms including drunk driving, getting behind in academic work, or engaging in unexplained sexual activity. For example, Voas, Romano, Tippett, and Furr-Holden (2006) found that heavy episodic drinkers had substantially higher associations with impaired drivers in fatal crashes.

The now large literature on the etiology of drinking problems has supported the link between certain personality traits (e.g., neuroticism, negative affect, impulsivity/disinhibition, or extraversion/sociability) and alcohol consumption (e.g., Sher, Trull, Bartholow, & Vieth, 1999). The present study aims to analyse the contribution of the sensation-seeking trait in blood–alcohol concentration (BAC) at the end of an open bar party in a sample of French college students. This choice was driven by the fact that alcohol abuse has consistently been reported as a behavioral manifestation of sensation seeking tendencies among high-school and college samples (e.g., Pederson, Clausen, & Lavik, 1989). Sensation-seeking is “a trait defined by the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience” (Zuckerman, 1994, p. 27).
While previous studies unanimously highlighted a strong and positive correlation between sensation seeking and alcohol abuse among college students and other groups of young adults (e.g., Chen, Miller, Grube, & Waiters, 2006), conflicting findings about the independent contribution of each subscale have emerged. For example, Douglass and Khavari (1978) found that the highest correlation was with the experience seeking (ES) subscale, whereas it was with the ES and disinhibition (DIS) subscales in the concomitant study by Segal, Huba, and Singer (1980). Also, it has sometimes appeared that the pattern of correlations for alcohol use was different between men and women (alcohol abuse correlating only with thrill and adventure seeking (TAS) and DIS in men, and with ES and DIS in women; Segal et al., 1980). Nevertheless, comparison across these studies are not feasible given the serious confounds presented by the diverse methodologies employed. In addition, it seems that, so far, researchers have chosen to rely on data from self-report instruments for assessing alcohol consumption. This might raise suspicion about previous findings since questions that have a “socially correct answer” – as is the case when inquiring about alcohol consumption – are likely to incite the participant to respond in a socially desirable way.

Thus, the present study offers a direct testing of the association between sensation seeking trait (and its various subscales) and alcohol consumption (as measured by blood–alcohol concentration) among male and female college participating in an “open bar” party.

2. Method

2.1. Participants

A total of 205 students (90 men and 115 women) recruited from three different open bar parties in the Reims and Paris metropolitan area participated in the study. Most of them were freshmen (75%) and the remaining were high school students since these “open bar” parties were private events with restricted access to high-school and college students and special promotions for 1st year students. Informed consent forms were provided and completed. Four male and two female student’s data were excluded from data analysis for a failure to complete at least 80% of items so that our final sample included 199 college students (86 men and 113 women). The mean age of this final sample was 21.4 years (SD = 2.5).

2.2. Materials

2.2.1. Sensation seeking measure

An abbreviated 40-item version of the Sensation Seeking Scale (SSS) in French (Form IV) was used. This form, which is very similar to SSS form V, had been previously translated into and validated for French (Carton, Jouvent, & Widlöcher, 1992; Carton, Morand, Bungenera, & Jouvent, 1995). The SSS has become the basic method of identifying high or low sensation seekers in the population. Since it is suggested that the sensation-seeking trait should be reflected in individuals’ behaviors, SSS in its current version includes forty items in a forced-choice true–false format describing usual and unusual activities or preferences. This instrument has four subscales as well as a Total score. The TAS subscale reflects a desire to engage in thrill-seeking, risky and adventurous recreational pursuits. The ES subscale represents the need to seek new experiences,
achieved through travel, drugs, music, art, and an unconventional style of life. The DIS subscale reflects a desire for social release through drinking, partying, and a variety of sexual experiences; and finally, items on the boredom susceptibility (BS) subscale tap aversion for repetitive experiences.

2.3. Blood–alcohol concentration determination

Blood–alcohol concentrations were estimated by means of an AlcoSensor IV™ hand-held breath alcohol tester. It offers a simple, accurate and economical method of determining a subject’s breath alcohol content (BrAC) which in turn is converted to a blood–alcohol concentration (BAC) expressed in g l\(^{-1}\) by using a conversion factor (blood:air partition coefficient of 2.1:1).

The AlcoSensor IV™ follows an automated, software driven test protocol. Each function is displayed on a light-emitting diode (LED) panel, which provides the operator with step-by-step instructions for fail-safe testing. The AlcoSensor IV™ automatically samples deep lung breath and displays results in a three-digit readout. The unit has automatic calibration and a mouthpiece release feature which eliminates operator contact with a used mouthpiece. The fuel cell sensor generates a response that is proportional to the breath alcohol concentration. This fuel cell sensor is sensitive to alcohol. It does not respond to acetone or other substances which are found in the breath. The AlcoSensor IV™ can be connected to and run with a printer microprocessor or a personal computer.

2.4. Procedure

This research was supported by students’ associations which has made it possible to attend three different open bar parties and to have school desks at our disposal. The open bar concept has been a great success among French college students for three or four years. In exchange for about 10 Euros, they are given the opportunity to enter a discotheque and to drink unlimited number of cocktails containing alcohol (in France, essentially vodka punch).

On every occasion, we were positioned at the entrance of the night club, so that students were easily reached. Three hundred fifty-six (356) volunteers agreed to complete the SSS; then an identification number was marked on the SSS sheet and the back of the respondent’s hand. At the very end of the party, 205 participants (i.e., 57.6%) got through a BrAC assessment when they were to go home, the record of which was reported on each individualized questionnaire.

3. Results

In the current study, the internal reliability of the Total Scale score was 0.77 (\(M = 25.77 \pm 5.51\)) while that of the subscales ranged from 0.55 (ES; \(M = 6.6 \pm 1.96\)) to 0.73 (TAS; \(M = 7.73 \pm 1.99\)) with Cronbach alphas of 0.64 and 0.69 for BS (\(M = 5.08 \pm 1.93\)) and DIS (\(M = 6.36 \pm 2.14\)), respectively. The total score is quite high in comparison with those usually found for people of similar age (e.g., mean sensation seeking score was 20.0 \(\pm 8.2\) in a 2003 French study by Franques and colleagues) and the coefficients of internal consistency are quite similar to those found by Zuckerman, Eysenck, and Eysenck (1978) in their original work since they reported internal
reliability levels ranging from 0.83 to 0.86 for the total score, and reliability levels of 0.56–0.82 for the subscales of the SSS-V.

3.1. Initial between-subjects analyses

A multivariate analysis of variance (MANOVA) was conducted on the whole measures with gender status as independent variable, the result of which yielding a non significant outcome (Wilk’s lambda = 0.97; n.s.). Thus, no sex-related differences appeared at the \( p < 0.05 \) level, neither on the SSS measures, nor in the mean blood–alcohol concentration (1.08 g l\(^{-1}\) for men vs. 0.87 g l\(^{-1}\) for women \( F(1,197) = 2.195; p = .089 \)). It should be noted that these mean values can be considered as “high” since in France, it is illegal to drive with BAC > .50 g l\(^{-1}\). (.80 g l\(^{-1}\) in USA).

3.2. The relationship between sensation seeking and blood–alcohol concentration

Table 1 presents means, standard deviations, and the correlations between blood–alcohol concentration and the scores for the sensation seeking subscales for men and women.

The results show that the total score on the SSS was positively and significantly correlated with blood–alcohol concentration at the end of an “open bar” party in both men and women. However, this correlation was statistically higher in men than in women (for men: \( r = 0.46; p < 0.001; \)

Table 1
Means, standard deviations, and correlations for blood–alcohol concentration (g l\(^{-1}\)) and sensation seeking scores for male (a) and female (b) participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>(a) Men (N = 86)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M )</td>
<td>( S )</td>
<td>( D )</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>BAC (g l(^{-1}))</td>
<td>1.08</td>
<td>0.95</td>
<td>0.18*</td>
<td>0.22*</td>
<td>0.33**</td>
<td>0.14*</td>
</tr>
<tr>
<td>Predictor variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Thrill and adventure seeking</td>
<td>7.29</td>
<td>1.79</td>
<td>–</td>
<td>0.24*</td>
<td>0.35**</td>
<td>0.21*</td>
</tr>
<tr>
<td>2. Experience seeking</td>
<td>6.57</td>
<td>1.84</td>
<td>–</td>
<td>0.20*</td>
<td>0.19*</td>
<td>0.48**</td>
</tr>
<tr>
<td>3. Disinhibition</td>
<td>6.36</td>
<td>2.15</td>
<td>–</td>
<td>0.27*</td>
<td>0.27*</td>
<td>0.51**</td>
</tr>
<tr>
<td>4. Boredom susceptibility</td>
<td>4.89</td>
<td>1.82</td>
<td>–</td>
<td></td>
<td></td>
<td>0.37**</td>
</tr>
<tr>
<td>5. Total score</td>
<td>25.65</td>
<td>4.75</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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</tr>
<tr>
<td>(b) Women (N = 113)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAC (g l(^{-1}))</td>
<td>0.87</td>
<td>0.77</td>
<td>0.07</td>
<td>0.02</td>
<td>0.29**</td>
<td>0.03</td>
</tr>
<tr>
<td>Predictor variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Thrill and adventure seeking</td>
<td>7.66</td>
<td>2.14</td>
<td>–</td>
<td>0.56**</td>
<td>0.28**</td>
<td>0.33**</td>
</tr>
<tr>
<td>2. Experience seeking</td>
<td>6.62</td>
<td>2.05</td>
<td>–</td>
<td>0.26**</td>
<td>0.38**</td>
<td>0.48**</td>
</tr>
<tr>
<td>3. Disinhibition</td>
<td>6.35</td>
<td>2.13</td>
<td>–</td>
<td>0.39**</td>
<td>0.51**</td>
<td></td>
</tr>
<tr>
<td>4. Boredom susceptibility</td>
<td>5.22</td>
<td>2.01</td>
<td>–</td>
<td></td>
<td></td>
<td>0.37**</td>
</tr>
<tr>
<td>5. Total score</td>
<td>25.86</td>
<td>6.04</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\* \( p < 0.05 \).

\** \( p < 0.01 \).

\*** \( p < 0.005 \).
for women: $r = 0.14; p < 0.05; z = 2.45; p < 0.001)$. In addition, when data were analyzed for each subscale separately, it appeared that all scores were positive and significantly correlated with BAC in men, while in women only DIS showed a significant correlation.

In order to test for the contribution of each sensation seeking subscale on blood–alcohol concentration, we performed a standard multiple regression for each of both genders. As the total score of the SSS was the summing up of the rest of the scales, this variable was not included in the analysis. The ordinary least square procedure (OLS) was used. The results of fitting this final multiple regression model to the blood–alcohol concentration data in men and women are given in Table 2. The global test that all of the regression coefficients are zero have statistically significant associated $p$-values both in the female ($F(4, 108) = 2.795; p < 0.03$) and in the male samples ($F(4, 81) = 5.63; p < 0.01$). According to usual benchmarks (e.g., Cohen, 1988), the magnitudes of squared correlations can be considered as almost “large” in men ($R^2 = 0.22$) and “medium” in women ($R^2 = 0.09$).

The examination of the significant coefficients revealed that DIS was the main predictor of blood–alcohol concentration in women ($\beta = 0.329; p < 0.005$) whereas it hardly reached statistical significance in men ($\beta = 0.209; p = 0.05$). Another important difference between male and female college students was the contribution of ES which appeared to be positively linked to blood–alcohol concentration only in men ($\beta = 0.232; p < 0.03$). Finally, the results indicate that the sensation seeking trait is more related to drinking behaviour in men ($R^2 = 0.218$) than in women ($R^2 = 0.094$).

### Table 2
Regression analysis summary for sensation seeking ratings predicting blood–alcohol concentration among male (a) and female (b) participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>SEB</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(a) Men (N = 86)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrill and adventure seeking</td>
<td>0.08</td>
<td>0.06</td>
<td>0.15</td>
</tr>
<tr>
<td>Experience seeking</td>
<td>0.12</td>
<td>0.05</td>
<td>0.23*</td>
</tr>
<tr>
<td>Disinhibition</td>
<td>0.09</td>
<td>0.05</td>
<td>0.21*</td>
</tr>
<tr>
<td>Boredom susceptibility</td>
<td>0.08</td>
<td>0.05</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>(b) Women (N = 113)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrill and adventure seeking</td>
<td>0.01</td>
<td>0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>Experience seeking</td>
<td>−0.02</td>
<td>0.04</td>
<td>−0.05</td>
</tr>
<tr>
<td>Disinhibition</td>
<td>0.12</td>
<td>0.04</td>
<td>0.33**</td>
</tr>
<tr>
<td>Boredom susceptibility</td>
<td>−0.04</td>
<td>0.04</td>
<td>−0.09</td>
</tr>
</tbody>
</table>

Note: (a) $R^2 = 0.22$ ($N = 86, p < 0.01$) and (b) $R^2 = 0.09$ ($N = 113, p < 0.05$).

* $p < 0.05$.  
** $p < 0.01$.

4. Discussion

Consistent with previous North-American and European studies, this research shows empirical evidence that sensation seeking – especially DIS and ES – is associated with binge drinking in
French college students during open bar parties. Our results indicated that the size of the effects from the sensation seeking constructs to predict BAC levels was “medium” in women, and somewhere between “medium” and “large” in men. The fact remains that in our sample, about 80–90% of the total variance in alcohol consumption results from other sources than sensation seeking related motives. Several reasons for these results may be put forward.

First of all, psychological theories of alcohol drinking and alcoholism are not restricted to personality ones. Indeed, associations between binge drinking and other factors emerge from the literature, broadly categorized into socio-demographic factors (e.g., sex, age), individual factors (e.g., tension reduction theory suggesting that people drink alcohol to cope with negative mood including feelings of tension or anxiety; Swendsen et al., 2000), social factors (e.g., social learning theory according to which one learns the norms for alcohol use by watching others, including one’s parents, siblings, peers, and media figures; Maisto, Carey, & Bradizza, 1999), and biological/genetic factors (a number of researchers have examined whether certain people are born with some type of disposition for alcohol abuse; e.g. McGue, 1999). As a result, it makes it quite unlikely to find that sensation seeking alone could account for a large proportion of variance in alcohol consumption.

Second, it sounds reasonable to consider heavy episodic alcohol consumption as a situational behavior which depends more on the motivational and emotional states at the instant of decision rather than a general motivational or emotional trait. Traits summarize the long-term consistencies of states which are likely to operate in certain kinds of situations, whereas a state defines a “person’s self-perceived affects, impulses, and physiology for a short period of time ranging from a given instant to as long as a day” (Zuckerman, 1991, p. 47). Open bar parties undoubtedly put the person in an approach-avoidance conflict where the rewards are positive sensations and experiences (e.g., having fun, feeling more comfortable around others) and the possible punishments are of several kinds (e.g., clashes, being suspended from driving). As a result, approach and withdrawal tendencies are a function of the differential strengths of sensation seeking and anxiety states. Thus, it is likely that entering an open bar party induces a sensation-seeking mode of behavior in most college students, by raising one’s usual disposition to seek intense sensations and experiences.

There are several other important points about our data, which should be emphasized. In the first place, our multiple regression analysis makes a good case for the differential impact of SSS constructs in men and women. Indeed, the results from the present study indicate that, though DIS ($\beta = 0.33; p < 0.002$) still is the single predictor for women’s blood–alcohol concentration at the end of an open bar party, DIS ($\beta = 0.21$) and ES ($\beta = 0.23$) have a similar predictive power in men. As mentioned previously, much of the research in college student drinking has employed self-report questionnaires inquiring about drinking quantity or frequency. So, it may well be the case that this original pattern of regression coefficients has resulted from our original methodology of investigation (i.e., a direct testing of the association between sensation seeking and blood–alcohol concentration).

If it proved to be confirmed in future research, the present findings may have far-reaching consequences because this would imply that among French male students, ES could also be associated with non-normative forms of risk-taking (Gomà-i-Freixanet, 1995; Gomà-i-Freixanet, 2001; Gomà-i-Freixanet, 2004; Gomà-i-Freixanet, Pérez, Valero-i-Ventura, & Puntí-i-Vidal, 2001). It may be argued that at the ages studied (most of our participants were less than 21-years old), alco-
hol intake is the most common form of substance abuse so that it is very likely for these adolescent subjects to drink because of experience-seeking tendencies. As alcohol becomes more commonly used, peer pressure may substitute for the seeking of novel experiences. However, in our sample, the estimated effect size of ES is only “small” according to Cohen’s benchmarks ($R^2 = 0.04$). Furthermore, an important limitation should be acknowledged since the internal consistency of this subscale in the French SSS version that was used in the present study did not reach an acceptable level (Cronbach value = 0.56). So, at this stage of our investigations, the results obtained need to be replicated in order to provide researchers with a much more accurate picture.

There is another interesting point to comment on in this sample: the lack of significant differences among genders in sensation seeking scores. In the general population, males score higher than females. Cross-cultural comparisons have consistently reported higher scores for men for Total SSS and subscales but ES (for example in United States: Zuckerman, Kuhlman, Thornquist, & Kiers, 1991; in Canada: Ridgeway & Russell, 1980; in Spain: Perez & Torrubia, 1986; and in France, Michel, LeHeuzey, Purper-Ouakil, & Mouren-Siméoni, 2001). It should be mentioned however that our sample is not likely to be representative of the general population of French college students, as it has been selected for matching a criterion, i.e., attending open bar parties. Several studies have shown that when one selects a group of subjects meeting a specific criterion, individual differences in personality profiles among genders tend to disappear (e.g., Gomà-i-Freixanet, 1995; Gomà-i-Freixanet, 2001). Thus it is plausible that in our study, as the subjects were selected for a specific criterion, only those meeting a specific personality profile would attend these kinds of parties.

It is also noteworthy to mention the high scores on SSS found in this sample compared to other samples of similar age (e.g., Gomà-i-Freixanet et al., 2001; Franques et al., 2003). Though it has been admitted that in college samples sex differences in Sensation Seeking tend to be less important than in the general population (e.g., Zuckerman & Neeb, 1980), both male ($M = 25.65$) and female French students ($M = 25.86$) displayed higher scores on the sensation seeking trait than usual ratings among other college populations (total scores on SSS V usually come to be around 23 for male students, and around 19 for female students; e.g., Zuckerman, 1994, p. 107). It is plausible that the lack of gender differences and overall high sensation seeking ratings are due to the fact that students attending open bar parties share common psychological features. Thus, probably only those scoring high on this trait engage in such events since they are prone to “seek novel, varied, complex and intense sensations and experiences”.

In two previous studies comparing several personality traits (including sensation seeking) between antisocial risk takers, prosocial risk takers, risky sport practitioners and control participants, Gomà-i-Freixanet (1995), Gomà-i-Freixanet (2001) found major differences in Total Scale scores and DIS between antisocial risk takers and the other groups of participants. Namely, total sensation seeking score in both men ($M = 26.58 \pm 5.98$) and women ($M = 24.05 \pm 6.79$) from antisocial groups reached levels which appeared to be especially high and quite similar to those noted in the French college students who participated in this study. This is also the case with regard to DIS ratings which were higher in antisocial groups ($M = 6.75 \pm 2.36$ and $M = 5.74 \pm 2.69$ for men and women, respectively) and equivalent to those we reported in this paper.

In conclusion, new insight on the contribution of sensation seeking in binge drinking has been gained using direct assessment of blood–alcohol concentration. Although the results of the
current study do not clearly support the idea that sensation seeking is the major predictor of heavy episodic alcohol consumption among French college students, high levels of sensation seeking were identified in those attending open bar parties. A more detailed account of each subscale contribution has been provided for men and women, suggesting that ES and DIS are significant predictors of blood–alcohol concentration at the end of an open bar party for male students, while in women, DIS makes the strongest independent contribution.

Understanding the variables related to abuse drinking is essential in identifying those in need of therapy and in informing prevention and intervention strategies. It should be remembered that heavy episodic alcohol consumption is a high-risk behavior since many individual problems are alcohol-related in college students. These include: accidents and injuries, driving under the influence of alcohol, suicide, fights and interpersonal violence, unprotected sex or unwanted sexual encounters. In contrast to many other causes of death, diseases and injuries, these alcohol-related problems are due to preventable, high-risk behaviors. Previous studies have shown that brief interventions in clinical settings have been shown to be effective in reducing harmful drinking by adults. For example, *The Alcohol Skills Training Program* (ASTP) which is based on lectures, group discussion and role play, effectively decreased participants’ peak blood alcohol level, and the amount of alcohol consumed per week, per month, and in heavy drinking situations (*Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990*).

**References**


