

## Drinking behaviors by stress level in Korean university students

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### Abstract

The purposes of this study are to estimate the stress level of university students, and to verify the relationships between stress level and drinking behavior. A questionnaire survey was administered to 430 university students in the Gangwon area in Korea from November 5 to November 28, 2008, and data from 391 students were used for the final statistical analysis. The most stressful factor was "Worry about academic achievements" (2.86 by Likert-type 4 point scale). The subjects were divided into two groups, a low stress group ( $\leq 65.0$ ) and a high stress group ( $\geq 66.0$ ), by the mean value (65.1) and median value (66.0) of the stress levels. The drinking frequency was not different between the two stress groups, but the amount of alcohol consumption was significantly different ( $P < 0.05$ ). The portion of students reporting drinking "7 glasses or over" was higher in the lower stress group than in the higher stress group. In addition, factor 6, "Lack of learning ability", was negatively correlated with drinking frequency and the amount of alcohol consumption ( $P < 0.05$ ), and factor 3, "Worry about academic achievements", was negatively correlated with the amount of drinking ( $P < 0.05$ ). The major motive for drinking was "When overjoyed or there is something to celebrate" (2.62), and the main expected effect of drinking was "Drinking enables me to get together with people and shape my sociability" (2.73). The higher stress group showed significantly higher scores on several items in the categories of motives ( $P < 0.01$ ), negative experience ( $P < 0.05$ ), and expected effects ( $P < 0.05$ ) of drinking than the lower stress group. Our results imply that university students at the lower stress level may drink more from social motives in positive drinking environments, while those at the higher stress level may have more problematic-drinking despite their smaller amount of alcohol consumption.

**Key Words:** Drinking behavior, stress, university students

### Introduction

Drinking in modern society means more than simply ingesting alcohol. Drinking behavior also conveys social and emotional meanings. Drinking plays a role in enhancing positive emotions during social gatherings such as anniversaries, festivals, and other events, as well as in developing interpersonal relationships. In addition, drinking serves as a means to alleviate tension and pains caused by environmental and mental stress in undesirable situations [1]. Korea has a distinctive drinking culture which is fairly positive and permissive, compared with other countries. In Korea, drunken behaviors are generously accepted, people even boast of the large amount of alcohol they can drink, and liquor can be easily purchased. This causes problems of over-consumption and alcoholism [2,3]. According to The Survey on National Health and Nutrition 2010, 77.8% of male and 43% of female adults over 19 years drink more than once a month. These data reveal that the percentage of Korean males who drink is higher than that of males in the United States, while the percentages of females are similar [4,5].

A psychiatric study reports that the modernization and

industrialization of society have contributed to the increase in environmental and mental stresses, resulting in increases in drinking [6]. Conger proposed a theory that people tend to drink alcohol under stress because alcohol allegedly has effects on alleviating tension [7]. Subsequent studies confirmed that stressful situations trigger drinking [8,9]. Some studies have verified that a high perceived stress level is positively correlated with drinking frequency [10], and that the level of stress in daily life is a predictive factor for drinking [11]. However, although many attempts have been made to identify the relationship between stress and drinking [7-9], that relationship is not yet clear, and it remains controversial to date. Some studies have reported that stress and drinking are not related [12,13]. Recent studies suggested that the relationship between stress and drinking varies depending on the type of stress [14,15] and the ethnic group [16].

In Korea, university students are freed from the restrictions of their high school days and are officially allowed to drink. Campus life at university is the early stage of individuals' drinking behavior, and drinking-related problems grow rapidly during this period [17,18]. It was estimated that 90% or more

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of Korean university students drink [19,20], which is higher than the 75.9% of corporate employees in Korea [21] and the 70% of university students in the US who drink [22]. A survey conducted on female university students indicated that 92.4% of female students drink and 25.2% of them have experienced drinking-related problems, highlighting the seriousness of drinking behavior in university students [23].

University life is a transition period for students to become independent entities in society, and students experience various stresses caused by conflicts with friends, getting a job, school-work, and financial problems during that period [24]. Therefore, we wished to investigate the relationship between stress and drinking for university students, who are exposed to different stresses from those experienced by adults. The purposes of this study are to estimate the stress level of university students in Korea and to verify that stress level is related with drinking behavior, including drinking frequency, amount of alcohol consumption, motives for drinking, negative experiences related with drinking, and expected effects of drinking.

## Subjects and Methods

### *Subjects*

A questionnaire survey was administered to 430 university students from November 5 to November 28, 2008. Inclusion criteria were as follows: students were at university in the Gangwon area in Korea. We selected subjects so as to include male and female students in different school years and with various majors. Subjects who refused the survey or submitted an incomplete response were excluded. In the end, data from 391 students were used for the statistical analysis.

### *The questionnaire*

The questionnaire used for the study included three areas: general characteristics of the subjects, the stress level, and drinking behavior. For general characteristics of the subjects, gender, age, grade, monthly expenditure, satisfaction of expenditure, and health status were examined. The stress level was estimated by the Likert-type 4 point scale (1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree) based on 49 items of the perceived stress scale [25]. Referring to previous studies [10,26,27], drinking behavior was evaluated as follows: Frequency of drinking and amount of alcohol consumption were examined with each item as a nominal scale. Motives for drinking and expected effects of drinking were examined with 10 items each by the Likert-type 4 point scale. 10 items of negative experiences related with drinking were measured by the interval scale (0 = never, 1 = once in a while, 2 = sometimes, 3 = often, 4 = always).

### *Statistical analysis*

Statistical analysis of the data from the survey was performed using the SPSS WIN 18.0 program. Descriptive analysis and frequency analysis were conducted for general characteristics and stress level of the subjects. In addition, cross-tabulation analysis (chi-square test) and independent t-test were performed to compare differences between the higher stress group and the lower stress group. To verify the reliability and validity of the measuring tools for the stress level, Cronbach's alpha value and a factor analysis were used. Pearson's correlation analysis was conducted to confirm the relationship between stress factors and frequency or amount of drinking.

## Results

### *General characteristics of the subjects*

General characteristics of the total subjects and subgroups by stress level are shown in Table 1. Of the total subjects, 56.8% were male students and 43.2% were female students. 66% of the subjects were under 23 and 34.0% were 23 years and over. Freshmen accounted for 44.1%, followed by sophomores 26.8%, juniors 15.5% and seniors 13.7%. Reported average monthly expenditure was over 300,000 won for 41.8% of the subjects, 200,000–300,000 won for 32.8%, and less than 200,000 won for 25.4%. 48.7% of the subjects were satisfied with their expenditure and 51.3% were not. For health status perceived by themselves, 64.5% of the subjects answered good.

The subjects were divided into two groups, a lower stress group ( $\leq 65.0$ ) and a higher stress group ( $\geq 66.0$ ), according to the mean value (65.1) and median value (66.0) of the stress levels. A comparison of general characteristics between the two stress groups showed significant differences in gender ( $P < 0.001$ ), age ( $P < 0.05$ ), satisfaction with expenditure ( $P < 0.01$ ), and health status ( $P < 0.001$ ). The higher stress group consists of female students (51.9%), students aged less than 23 (71.8%), and those dissatisfied with expenditures (57.6%). Hence, the higher stress group features women and younger and the more unhealthy subjects.

### *Stress level*

#### *Analysis of reliability and validity*

An analysis for reliability and validity of the perceived stress scale is shown in Table 2. In the first factor analysis for validity, 49 items were divided into 13 factors. Because some of them were at a low level of explanatory power and confused the meaning of factors, these were excluded, and the next factor analysis was then conducted. The level regarded as the optimum for validity was determined by repeating this process, and a total of 8 factors that consisted of 30 question items were decided

**Table 1.** General characteristics by stress group

General characteristics	Total	Stress group <sup>1)</sup>	
		Lower stress Group	Higher stress group
<b>Gender</b>			
Male	222 (56.8) <sup>2)</sup>	123 (66.5)	99 (48.1)
Female	169 (43.2)	62 (33.5)	107 (51.9)
Total	391 (100.0)	185 (100.0)	206 (100.0)
Statistics		$\chi^2 = 13.488^{***}$	
<b>Age<sup>3)</sup></b>			
< 23 years old	258 (66.0)	110 (59.5)	148 (71.8)
≥ 23 years old	133 (34.0)	75 (40.5)	58 (28.2)
Total	391 (100.0)	185 (100.0)	206 (100.0)
Statistics		$\chi^2 = 6.661^*$	
<b>Grade</b>			
1st	171 (44.1)	82 (44.6)	89 (43.6)
2nd	104 (26.8)	40 (21.7)	64 (31.4)
3rd	60 (15.5)	32 (17.4)	28 (13.7)
4th	53 (13.7)	30 (16.3)	23 (11.3)
Total	388 (100.0)	184 (100.0)	204 (100.0)
Statistics		$\chi^2 = 6.001$	
<b>Monthly expenditure</b>			
< ₩200,000	99 (25.4)	43 (23.2)	56 (27.3)
₩200,000~₩300,000	128 (32.8)	61 (33.0)	67 (32.7)
> ₩300,000	163 (41.8)	81 (43.8)	82 (40.0)
Total	390 (100.0)	185 (100.0)	205 (100.0)
Statistics		$\chi^2 = 0.971$	
<b>Satisfaction of expenditure</b>			
Satisfied	189 (48.7)	103 (55.7)	86 (42.4)
Dissatisfied	199 (51.3)	82 (44.3)	117 (57.6)
Total	388 (100.0)	185 (100.0)	203 (100.0)
Statistics		$\chi^2 = 6.865^{**}$	
<b>Health status</b>			
Excellent	74 (18.9)	49 (26.5)	25 (12.1)
Good	252 (64.5)	119 (64.3)	133 (64.6)
Poor or very poor	65 (16.6)	17 (9.2)	48 (23.3)
Total	391 (100.0)	185 (100.0)	206 (100.0)
Statistics		$\chi^2 = 22.283^{***}$	
Stress level	65.1 ± 12.8 <sup>4)</sup>	54.5 ± 8.5	74.7 ± 7.3

<sup>1)</sup> Subjects were classified by the mean value (65.1) and median value (66.0) of stress levels. The stress level of the lower stress group was ≤ 65, and that of the higher stress group was ≥ 66

<sup>2)</sup> N (%)

<sup>3)</sup> Subjects were classified by the mean value of age

<sup>4)</sup> Mean ± SD. The maximum score was 120, the multiplication of 30 items by 4 point on the Likert-type 4 point scale (1 = strongly disagree, 4 = strongly agree)  
\*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$

upon as the final result of the validity test. After consideration of the attributes of items belonging to each factor, factor 1 with 6 variables was named “Pressed for time” (10.223% of variance), factor 2 with 4 variables “Conflict with friends” (9.731% of variance), factor 3 with 5 variables “Worry about academic achievements” (8.432% of variance), factor 4 with 4 variables “Sense of being alienated” (7.869% of variance), factor 5 with 5 variables “Maladjustment to school life” (7.091% of variance), factor 6 with 2 variables “Lack of learning ability” (6.778% of

variance), factor 7 with 2 variables “Financial hardships” (5.632% of variance), and factor 8 with 2 variables “Conflict with the opposite gender” (5.293% of variance). These factors together accounted for 61.050% of the variance.

Reliability and internal consistency of the stress factors were assessed using Cronbach's alpha (Table 2). Cronbach's alpha coefficient of factor 1 was measured at 0.780, factor 2 at 0.796, factor 3 at 0.703, factor 4 at 0.775, factor 5 at 0.712, factor 6 at 0.660, factor 7 at 0.792, and factor 8 at 0.732. The stress instrument was found to have reliability coefficients well above 0.50, a level typically accepted as sufficiently reliable for the conduct of exploratory research. All of the 30 question items were used for subsequent analyses, because Cronbach's alpha of each item was not increased if any item was deleted.

### Subject's stress level

In Table 2, the mean of stress levels for all subjects was 65.1, with a maximum possible score of 120. The most stressful item was “I am worried about the job in the future” (3.32), followed by “I am worried about the curriculum (lesson, major areas, etc.)” (2.89), “I am not satisfied with my scholastic performance” (2.87), “I have too many things to do at once” (2.77), “I have to keep close relationships” (2.67), and “My grades are below the expectation” (2.58). On the other hand, items with lower stress levels included “I don't like friends at school” (1.58), “I feel myself separated from society” (1.64), “I am ignored” (1.64), “I am criticized by my friends” (1.67), “I feel isolated in society” (1.68), “I am poor at reading” (1.71), and “I am spoken ill of by my friends” (1.79).

The factor with the highest stress level was factor 3, “Worry about academic achievements” (2.86), followed by factor 1, “Pressed for time” (2.35). Meanwhile, factor 2, “Conflict with friends” (1.80), and factor 6, “Lack of learning ability” (1.84) showed relatively low stress levels.

### Drinking behavior

#### Frequency and amount of drinking

For the drinking frequency of the subjects, “1~2 times per week” showed the highest response rate, at 66.8%, and “never or little,” at 13.6%, showed the lowest (Table 3). There was no significant difference in the drinking frequency between the two stress groups. When asked about amount of alcohol consumption, 55.4% of the total subjects reported consumption of “7 glasses or over,” indicating that the amount of drinking at a time is substantial among university students. The amount of alcohol consumption was significantly different between the stress groups ( $P < 0.05$ ). The portion of subjects reporting drinking “7 glasses or over” was 61.1% in the lower stress group. In the higher stress group, consumption of “3 glasses or less” was reported by 17.1% and consumption of “4~6 glasses” by 27.3%. It can be inferred from these findings that the subjects with a low stress level drink

**Table 2.** Validity and reliability of stress scale

Factors & Variables	Factor loading	Cronbach's alpha	Stress level <sup>1)</sup>
Factor 1. Pressed for time	10.223 <sup>2)</sup>	0.780	2.35 ± 0.63
Insufficient leisure time	0.742		2.05 ± 0.95
Too much to do in addition to school work	0.735		2.38 ± 0.90
Insufficient sleeping time	0.671		2.32 ± 0.99
Not enough time to finish assignments	0.666		2.17 ± 0.79
Too many projects or presentations to make	0.587		2.43 ± 0.92
I have too many things to do at once	0.564		2.77 ± 0.91
Factor 2. Conflict with friends	9.731 <sup>2)</sup>	0.796	1.80 ± 0.64
I experience conflict with my friends	0.814		1.85 ± 0.85
I feel myself betrayed by my friends	0.742		1.89 ± 0.90
I am spoken ill of by my friends	0.723		1.79 ± 0.80
I am criticized by my friends	0.635		1.67 ± 0.70
Factor 3. Worry about academic achievements	8.432 <sup>2)</sup>	0.703	2.86 ± 0.59
I am worried about the curriculum (lesson, major areas, etc.)	0.714		2.89 ± 0.90
I am worried about the job in the future	0.685		3.32 ± 0.86
I am not satisfied with my scholastic performance	0.592		2.87 ± 0.86
My grades are below the expectation	0.582		2.58 ± 0.83
I have to keep close relationships	0.549		2.67 ± 0.87
Factor 4. Sense of being alienated	7.869 <sup>2)</sup>	0.775	1.93 ± 0.66
I feel isolated in society	0.732		1.68 ± 0.78
I feel lonely	0.683		2.36 ± 0.99
I feel that I am away from people	0.661		2.03 ± 0.88
I feel myself separated from society	0.626		1.64 ± 0.76
Factor 5. Maladjustment to school life	7.091 <sup>2)</sup>	0.712	2.00 ± 0.56
I am not interested in class	0.702		2.25 ± 0.89
I am not satisfied with school work	0.673		2.47 ± 0.87
I don't like friends at school	0.481		1.58 ± 0.74
I am ignored	0.465		1.64 ± 0.79
I am not sufficiently appreciated even though I do my best	0.436		2.05 ± 0.80
Factor 6. Lack of learning ability	6.778 <sup>2)</sup>	0.660	1.84 ± 0.74
I am poor at writing	0.785		1.97 ± 0.91
I am poor at reading	0.785		1.71 ± 0.79
Factor 7. Financial hardships	5.632 <sup>2)</sup>	0.792	2.13 ± 0.84
I am financially pressed	0.865		2.21 ± 0.94
I experience conflict with my family over financial matters	0.847		2.03 ± 0.91
Factor 8. Conflict with the opposite gender	5.293 <sup>2)</sup>	0.732	2.10 ± 0.89
I have conflict with families of my male friends/female friends/my spouse	0.871		2.35 ± 1.04
I have conflict with my male friends/female friends/my spouse	0.808		1.85 ± 0.97
Total	61.050 <sup>3)</sup>	-	65.1 ± 12.8 <sup>4)</sup>

<sup>1)</sup> Mean ± SD, The Likert-type 4 point scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree)

<sup>2)</sup> Variance %

<sup>3)</sup> Total variance %

<sup>4)</sup> The maximum score was 120 (30 items multiplied by 4 points) on the Likert-type scale (1 = strongly disagree, 4 = strongly agree)

more. We analyzed subgroups by sex, but there was no significant difference in the drinking frequency or the amount of alcohol consumption.

We analyzed correlations between stress factors and drinking behaviors (Table 4). Factor 6, "Lack of learning ability" showed a negative correlation with drinking frequency ( $P < 0.05$ ). Factor 3, "Worry about academic achievements" and factor 6, "Lack of learning ability" were negatively correlated with the amount of alcohol consumption ( $P < 0.05$ ).

### Motives for drinking

The strongest motives for drinking reported by the subjects were "When overjoyed or there is something to celebrate" (2.62) and "When offered to drink while hanging out with people" (2.58) (Table 5). On the other hand, the response rate was relatively low for "When I feel tired" (1.31) or "When I get injured or feel pain in the body" (1.22). Statistical analysis of motives showed that the higher stress group gave significantly higher scores than the lower stress group for the items "When

**Table 3.** Frequency and amount of drinking by stress group

Items	Total	Total			Male			Female		
		Lower stress group	Higher stress group	$\chi^2$ -value	Lower stress group	Higher stress group	$\chi^2$ -value	Lower stress group	Higher stress group	$\chi^2$ -value
<b>Frequency of drinking</b>										
Never or little	53 (13.6) <sup>1)</sup>	27 (14.6)	26 (12.6)	0.933	14 (11.4)	14 (14.1)	0.717	13 (21.0)	12 (11.2)	3.016
Once or twice/week	261 (66.8)	119 (64.3)	142 (68.9)		78 (63.4)	64 (64.6)		41 (66.1)	78 (72.9)	
≥ Three times/week	77 (19.7)	39 (21.1)	38 (18.4)		31 (25.2)	21 (21.2)		8 (12.9)	17 (15.9)	
<b>Total</b>	<b>391 (100.0)</b>	<b>185 (100.0)</b>	<b>206 (100.0)</b>		<b>123 (100.0)</b>	<b>99 (100.0)</b>		<b>62 (100.0)</b>	<b>107 (100.0)</b>	
<b>Amount of alcohol consumption</b>										
Never or little	26 (6.7)	15 (8.1)	11 (5.4)	10.079*	10 (8.1)	7 (7.1)	4.270	5 (8.1)	4 (3.7)	4.818
≤ 3 glasses	50 (12.8) <sup>1)</sup>	15 (8.1)	35 (17.1)		8 (6.5)	14 (14.3)		7 (11.3)	21 (19.6)	
4~6 glasses	98 (25.1)	42 (22.7)	56 (27.3)		21 (17.1)	12 (12.2)		21 (33.9)	44 (41.1)	
≥ 7 glasses	216 (55.4)	113 (61.1)	103 (50.2)		84 (68.3)	65 (66.3)		29 (46.8)	38 (35.5)	
<b>Total</b>	<b>390 (100.0)</b>	<b>185 (100.0)</b>	<b>205 (100.0)</b>		<b>123 (100.0)</b>	<b>98 (100.0)</b>		<b>62 (100.0)</b>	<b>107 (100.0)</b>	

<sup>1)</sup> N (%)\*  $P < 0.05$ **Table 4.** Correlation analysis for stress factors and drinking behaviors

Stress factors	Frequency of drinking	Amount of alcohol consumption
Factor 1. Pressed for time	-0.021 <sup>1)</sup>	-0.088
Factor 2. Conflict with friends	0.071	-0.011
Factor 3. Worry about academic achievements	-0.059	-0.108*
Factor 4. Sense of being alienated	-0.013	-0.055
Factor 5. Maladjustment to school life	-0.090	-0.068
Factor 6. Lack of learning ability	-0.101*	-0.131*
Factor 7. Financial hardships	0.080	-0.045
Factor 8. Conflict with the opposite gender	0.059	0.014

<sup>1)</sup> Correlation coefficients\*  $P < 0.05$ 

depressed" (2.12), "When I am worried about something" (2.09), and "When I am upset" (2.23) ( $P < 0.01$ ).

#### Negative experience related with drinking

We investigated negative experiences related with drinking (Table 6). The scores for the 10 items examined were all below

1.0, showing that the level of negative experiences was low for the subjects. While the two items "I failed to be on time or keep promise due to drinking" (0.99) and "My parents got angry and worried about my drinking" (0.93) obtained relatively high scores, "I threw away or broke something while drinking" (0.22) and "I was injured in the accident due to drinking" (0.19) were given extremely low scores.

A comparison of negative experiences related with drinking between the two groups indicates that the higher stress group showed a significantly higher score on "I had trouble with improving my school work or academic achievements because of drinking" than the lower stress group (0.86 vs. 0.62) ( $P < 0.05$ ).

#### Expected effects of drinking

The main effects of drinking expected by university students included the following items: "Drinking enables me to get together with people and shape my sociability" (2.73), and "Drinking helps me open up my mind and express myself easily" (2.35) (Table 7). On the other hand, "Drinking makes me feel

**Table 5.** Motives for drinking by stress group

Motives for drinking	Total	Stress group		t-value
		Lower stress group	Higher stress group	
When depressed	1.99 ± 0.81 <sup>1)</sup>	1.86 ± 0.81	2.12 ± 0.80	-3.181**
When I want to be relaxed during holidays or vacation	2.01 ± 0.93	1.97 ± 0.92	2.03 ± 0.95	-0.653
When I am worried about something	1.98 ± 0.85	1.86 ± 0.83	2.09 ± 0.86	-2.681**
When offered to drink while hanging out with people	2.58 ± 0.82	2.56 ± 0.82	2.61 ± 0.82	-0.592
When I feel like having a drink or when I am anxious to drink	2.38 ± 1.00	2.28 ± 1.00	2.48 ± 0.99	-1.881
When I feel tired	1.31 ± 0.57	1.27 ± 0.56	1.34 ± 0.58	-1.265
When I get injured or feel pain in the body	1.22 ± 0.54	1.22 ± 0.52	1.22 ± 0.55	0.023
When I see others drink at a pub or a party	1.70 ± 0.78	1.69 ± 0.79	1.70 ± 0.77	-0.069
When I am upset	2.07 ± 1.02	1.90 ± 1.01	2.23 ± 1.00	-3.214**
When overjoyed or when there is something to celebrate	2.62 ± 0.93	2.64 ± 0.97	2.60 ± 0.90	0.403

<sup>1)</sup> Mean ± SD, The Likert-type 4 point scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree)\*\*  $P < 0.01$

**Table 6.** Negative experience related with drinking by stress group

Drinking-related experiences	Total	Stress group		t-value
		Lower stress group	Higher stress group	
I failed to be on time or keep promise due to drinking	0.99 ± 1.06 <sup>1)</sup>	0.95 ± 1.06	1.03 ± 1.07	-0.777
I argued with my family, friends or others after drinking	0.45 ± 0.82	0.39 ± 0.82	0.50 ± 0.81	-1.249
I threw away or broke something while drinking	0.22 ± 0.65	0.17 ± 0.59	0.28 ± 0.69	-1.606
I had a fight with friends (including boy friend or girl friend) due to drinking habit	0.38 ± 0.83	0.33 ± 0.77	0.43 ± 0.87	-1.157
I started arguing while or after drinking	0.39 ± 0.79	0.32 ± 0.72	0.45 ± 0.85	-1.629
I was scolded from my seniors because of overdrinking or bad drinking habit	0.36 ± 0.84	0.28 ± 0.73	0.43 ± 0.92	-1.702
When I was given to drunken bickering, I was spoken ill of by others	0.31 ± 0.72	0.25 ± 0.67	0.36 ± 0.76	-1.467
I was injured in the accident due to drinking	0.19 ± 0.58	0.14 ± 0.53	0.23 ± 0.63	-1.403
My parents got angry and worried about my drinking	0.93 ± 1.20	0.86 ± 1.13	0.99 ± 1.25	-1.037
I had trouble with improving my school work or academic achievements because of drinking	0.74 ± 1.05	0.62 ± 0.99	0.86 ± 1.10	-2.272*

<sup>1)</sup> Mean ± SD, The interval scale (0 = never, 1 = once in a while, 2 = sometimes, 3 = often, 4 = always)

\*  $P < 0,05$

**Table 7.** Expected effects of drinking by stress group

Expected effects of drinking	Total	Stress group		t-value
		Lower stress group	Higher stress group	
Drinking enables me to get together with people and shape my sociability	2.73 ± 0.80 <sup>1)</sup>	2.75 ± 0.80	2.71 ± 0.81	0.546
Drinking relieves tensions or anxiety	2.20 ± 0.81	2.16 ± 0.84	2.23 ± 0.77	-0.776
Drinking relieves pains	1.66 ± 0.84	1.60 ± 0.85	1.71 ± 0.83	-1.272
Drinking enables me to fall asleep easily and sleep soundly	1.91 ± 0.93	1.81 ± 0.93	2.01 ± 0.92	-1.588
Drinking enables me to present my opinion and convey it confidently	1.78 ± 0.81	1.67 ± 0.80	1.88 ± 0.80	-2.559*
Drinking helps me overcome an inferiority complex readily	1.42 ± 0.70	1.37 ± 0.68	1.47 ± 0.71	-1.423
Drinking helps me open up my mind and express myself easily	2.35 ± 0.88	2.26 ± 0.89	2.43 ± 0.87	-1.888
Drinking makes me feel optimistic for the future	1.24 ± 0.57	1.26 ± 0.61	1.22 ± 0.53	0.766
Drinking makes me feel more sexually attractive	1.31 ± 0.69	1.32 ± 0.73	1.30 ± 0.66	0.288
Drinking helps me ignore people's attention	1.86 ± 0.89	1.75 ± 0.90	1.96 ± 0.87	-2.293*

<sup>1)</sup> Mean ± SD, The Likert-type 4 point scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree)

\*  $P < 0,05$

more sexually attractive” (1.31) and “Drinking makes me feel optimistic for the future” (1.24) obtained low scores.

An analysis of the expected effects of drinking by stress group indicates that the higher stress group (1.88) showed higher expectations for “Drinking enables me to present my opinion and convey it confidently” than the lower stress group (1.67) with significant difference ( $P < 0.05$ ). In addition, the higher stress group (1.96) showed higher expectations for “Drinking helps me ignore people's attention” than the lower stress group (1.75) ( $P < 0.05$ ).

## Discussion

In this study, we showed that drinking behavior is related with the stress level of university students. The subjects were divided into lower and higher stress groups, and drinking behaviors between the two groups were compared. There were significant differences between the two groups in drinking behaviors such as amount of alcohol consumption, motives for drinking, negative

experiences related with drinking, and expected effects of drinking. We confirmed that some drinking behaviors depend on stress levels.

While there was no difference in drinking frequency by stress level, the lower stress group showed a significantly higher level of alcohol consumption, compared with the higher stress group. This finding proves that a relationship exists between stress level and amount of alcohol consumption. In addition, amount of alcohol consumption was negatively correlated with stress factors such as “Worry about academic achievements” and “Lack of learning ability”, and drinking frequency was also negatively correlated with “Lack of learning ability”. This implies that the less schoolwork-related stress university students have, the more they drink. Our finding is consistent with Park and Lee's study asserting that students, who feel stressed about their future, drink less frequently [28]. This is presumably because university students drink voluntarily in positive and pleasant situations, unlike corporate employees, who normally drink with their boss and co-workers in negative situations to relieve the stress from the workplace [21]. Farber *et al.* [29] and Bradizza *et al.* [1]

divided drinking motives largely into two categories, namely, “a coping motive”, a motive of drinking to relieve negative emotions such as personal problems, and “a social motive”, a motive of drinking to promote positive emotions and enjoy social activities such as festivals. Considering that young adolescents largely drink from the motives of facilitating social interactions, enhancing social events, and so forth [30,31], it is postulated that the younger a person is, the more he or she tends to drink from social motives. A study on university students in the Ulsan area suggested that they drink largely on occasions such as “anniversary” (40%) and “social gathering with people” (34%), while “alleviating stress” is at a minimal 6.0% [32]. Our study also showed that students mostly drink “When overjoyed or when there is something to celebrate” and “When offered to drink while hanging out with people”. Our findings support the idea that university students largely drink positively from social motives, while they seldom drink from negative motives such as coping motives. Moreover, a comparison of drinking motives by stress groups found that the lower stress group shows significantly lower scores than the higher stress group on items such as “When I am upset”, “When depressed”, and “When I am worried about something”, further indicating that subjects at low stress levels do not drink from coping motives. A domestic study on university students reported that drinking behavior varies depending on the motives for drinking [10], and another study demonstrated that students who drink from social motives do not drink as frequently but drink a lot at a time, findings similar to the results of our study [28]. Students at a low stress level, who drink mainly from social motives, seem to be more sociable and have more opportunities to drink to develop close relationships, thus inducing themselves to drink more. However, corporate employees tend to drink from social pressure and negative issues, indicating that they drink more from coping motives [33]. These findings imply that university students’ drinking behaviors differ from those of corporate employees. Experimentation in animals has suggested that acute stress reduces the amount of alcohol consumption, while chronic stress raises it [15]. Because university students have been exposed to stress for a short time compared to adults and the elderly, short-term stress may reduce the amount of alcohol consumption. However, contrary to our results, findings of other studies have also suggested both that stress stimulates drinking [34] and that stress is not associated with drinking [12,13]. These conflicting results show that the relationship between stress and drinking is very complicated, and it is thought that results of studies could vary depending on the kind of stress, motives for drinking, and the characteristics of the subjects.

Our findings for negative experiences due to drinking showed that university students have relatively few experiences of drinking problems. This is different from other studies reporting that the drinking problems of university students are serious and substantial [32,35,36]. However, the higher stress group in our study scored significantly higher than the lower stress group on the item, “I had trouble with improving my school work or

academic achievements because of drinking”, thus suggesting that the subjects at a higher stress level may have more drinking-related problems in spite of their smaller amount of alcohol consumption. One study on female university students demonstrated that perceived stress directly affects drinking-related problems [37]. Han *et al.* [23] also reported that perceived stress levels and drinking-related problems have a positive correlation, and that the problematic drinking group shows a higher level of perceived stress and stress symptoms than the control group does. In addition, Lee reported in his study on male and female students that problems after drinking are closely related with the stress of daily life [11]. These findings correspond to those of the present study. Meanwhile, some studies have reported that drinking problems of university students tend to occur under extreme emotional conflict or feelings of being alienated [38,39]. The current study has also found that students in the higher stress group with drinking-related negative experiences, which cause trouble with schoolwork and scholastic performance, scored higher on items of expected effects of drinking such as “Drinking enables me to present my opinion and convey it confidently” and “Drinking helps me ignore people’s attention” than the lower stress group did. These results suggest that the higher stress group has an emotionally problematic tendency of lacking in self-confidence and sociability, and of feeling alienated from others. In addition, a previous study suggested that in the case of female university students, the more serious drinking-related problems are, the more the students use drinking for emotional coping [23]. Other studies also reported that social anxiety or social phobia is related with alcohol consumption [40–42]. Savette attributed this phenomenon to the effects of alcohol on cognitive processes, resulting in relief of social anxiety, and suggested “an appraisal disruption model” [43]. In line with previous results, students expect to solve problems relating to social interaction and personal relations by means of drinking. Therefore, effective management for the stress arising from interpersonal relations is essential to the prevention of drinking problems. Moreover, appropriate university-wide education programs should be prepared in universities.

This study has several limitations. First, since drinking frequency and amount of alcohol consumption were measured on a relative scale, actual alcohol consumption may be a little different. Second, the generalization of our results may be limited by the fact that the survey was carried out only for university students in a specified region. Third, since the current study uses a cross-sectional design, further longitudinal studies are needed to clarify cause-and-effect relationships between stress from daily life and drinking behavior. Lastly, the present study did not take into account the inherent differences between male and female subjects. We analyzed subgroups by sex only for frequency and amount of drinking by stress group. The physiological response to alcohol differs between males and females [44], and women are often restricted in drinking by their unique gender roles, including pregnancy and delivery [20,45]. Prospective studies

with a large sample size on a national scale and experimental studies measuring alcohol consumption accurately are required to overcome these limitations. We also plan further investigation which makes a comparison between male and female students. In spite of such limitations, our results imply that university students on a lower stress level may drink more from social motives in positive drinking environments, while those on the higher stress level may have more problematic drinking despite smaller amounts of alcohol consumption. Our results differ from the general hypothesis that stress may stimulate drinking or increase the amount of alcohol consumption. These findings will be helpful to understand drinking behavior and prevent drinking problems among university students, and will also provide these students a guide to develop proper drinking behavior as adults.

## References

- Bradizza CM, Reifman A, Barnes GM. Social and coping reasons for drinking: predicting alcohol misuse in adolescents. *J Stud Alcohol* 1999;60:491-9.
- Ahn HR, Pai HJ, Kim ES. Relation between self-esteem and the degree of drinking of the aged in the C city. *J Korean Acad Psychiatr Ment Health Nurs* 1999;8:478-92.
- The Korean Alcohol Research Foundation [Internet]. Disease related with alcohol. [cited 2012 February 17]. Available from: [http://www.karf.or.kr/information/alcoholDB\\_list\\_1.asp](http://www.karf.or.kr/information/alcoholDB_list_1.asp).
- Ministry of Health and Welfare. Korea Health Statistics 2010: Korea National Health and Nutrition Examination Survey (KNHANESV-1). Seoul; 2010. p.24.
- National Center for Health Statistics [Internet]. Summary health statistics for U.S. adults: national health interview survey, 2010. Vital health statistics. [cited 2012 February 17]. Available from: [http://www.cdc.gov/nchs/data/series/sr\\_10/sr10\\_252.pdf](http://www.cdc.gov/nchs/data/series/sr_10/sr10_252.pdf).
- Kim SJ, Lee MH, Hwang MH, Namkoong K, Kim BH, Kim SA. Comparison of psychiatric symptom manifestation rate and family function of alcoholic and non-alcoholic family members. *J Korean Neuropsychiatr Assoc* 1989;28:1073-81.
- Conger JJ. Alcoholism: theory, problem and challenge. II. Reinforcement theory and the dynamics of alcoholism. *Q J Stud Alcohol* 1956;17:296-305.
- Cooper ML, Frone MR, Russell M, Mudar P. Drinking to regulate positive and negative emotions: a motivational model of alcohol use. *J Pers Soc Psychol* 1995;69:990-1005.
- Cox WM, Klinger E. A motivational model of alcohol use. *J Abnorm Psychol* 1988;97:168-80.
- Kim YS. The relationship between coping motives for drinking and drinking behavior among college students. *Ment Health Soc Work* 2000;9:5-23.
- Lee MK. Psychosocial factors for drinking behavior. *Korean J Psychol Gen* 1993;12:165-79.
- Fidler TL, LoLordo VM. Failure to find postshock increases in ethanol preference. *Alcohol Clin Exp Res* 1996;20:110-21.
- McCreary DR, Sadava SW. Stress, drinking, and the adverse consequences of drinking in two samples of young adults. *Psychol Addict Behav* 1998;12:247-61.
- Ayer LA, Harder VS, Rose GL, Helzer JE. Drinking and stress: an examination of sex and stressor differences using IVR-based daily data. *Drug Alcohol Depend* 2011;115:205-12.
- Becker HC, Lopez MF, Doremus-Fitzwater TL. Effects of stress on alcohol drinking: a review of animal studies. *Psychopharmacology (Berl)* 2011;218:131-56.
- Aldridge-Gerry AA, Roesch SC, Villodas F, McCabe C, Leung QK, Da Costa M. Daily stress and alcohol consumption: modeling between-person and within-person ethnic variation in coping behavior. *J Stud Alcohol Drugs* 2011;72:125-34.
- Ham LS, Hope DA. College students and problematic drinking: a review of the literature. *Clin Psychol Rev* 2003;23:719-59.
- Han SY, Lee MK, Shin HC. Gender differences in the effect of risk factors on drinking problems in college students. *Korean J Couns Psychother* 2005;17:1003-19.
- Chun S. Analysis of college student binge drinking and alcohol-related problems. *J Korean Alcohol Sci* 2002;3:221-33.
- Chung SK. Factors influencing problem drinking among female college students in Korea. *Ment Health Soc Work* 2007;27:176-98.
- Park SB. Recognition status of health related to smoking, alcohol drinking, and stress in a working place. *J Korean Acad Fam Med* 2001;22:1814-22.
- Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. Monitoring the future: national survey results on drug use, 1975-2010. Volume I. Secondary school students. 2010. [cited 2012 February 17]. Available from: [http://safeschools.state.co.us/docs/mtf-vol1\\_2010.pdf](http://safeschools.state.co.us/docs/mtf-vol1_2010.pdf).
- Han GS, Yang SH, Jeon GG. Effects of perceived stress and ways of coping on symptoms of stress and drinking related problems among female college students. *Korean J Health Psychol* 2003;8:565-79.
- Chon KK, Kim KH, Yi JS. Development of the revised life stress scale for college students. *Korean J Health Psychol* 2000;5:316-35.
- Go FM, Monachello ML, Baum T. Human Resource Management in the Hospitality Industry. New York: John Wiley & Sons, Inc.; 1996. p.80-1.
- O'Hare TM. Drinking in college: consumption patterns, problems, sex differences and legal drinking age. *J Stud Alcohol* 1990;51:536-41.
- Jang SO. Drinking behavior and drinking canon of college students. *Korean J Soc Welf* 1997;31:423-40.
- Park KM, Rhee MK. Effects of perceived stress, social support and drinking motives on drinking behaviors among college students. *Korean J Health Psychol* 2005;10:277-93.
- Farber PD, Khavari KA, Douglass FM 4th. A factor analytic study of reasons for drinking: empirical validation of positive and negative reinforcement dimensions. *J Consult Clin Psychol* 1980;48:780-1.
- Feldman L, Harvey B, Holowaty P, Shortt L. Alcohol use beliefs and behaviors among high school students. *J Adolesc Health* 1999;24:48-58.
- Kuntsche E, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. *Clin Psychol Rev* 2005;25:841-61.
- Hong SM, Yang JA, Jung SI, Cho JY. Comparison of drinking behaviors and symptoms after drinking alcohol of the female and male college students in Ulsan metropolitan city. Proceedings of Spring Symposium of the Korean Society of Community Nutrition. 2005. p.142-3.
- Carney MA, Armeli S, Tennen H, Affleck G, O'Neil TP. Positive

- and negative daily events, perceived stress, and alcohol use: a diary study. *J Consult Clin Psychol* 2000;68:788-98.
34. Helzer JE, Badger GJ, Searles JS, Rose GL, Mongeon JA. Stress and alcohol consumption in heavily drinking men: 2 years of daily data using interactive voice response. *Alcohol Clin Exp Res* 2006;30:802-11.
  35. Lewis BA, O'Neill HK. Alcohol expectancies and social deficits relating to problem drinking among college students. *Addict Behav* 2000;25:295-9.
  36. Saunders JB, Kypri K, Walters ST, Laforge RG, Larimer ME. Approaches to brief intervention for hazardous drinking in young people. *Alcohol Clin Exp Res* 2004;28:322-9.
  37. Kim HE, Park K, Jung EH, Han JY. The effects of perceived stress, dysfunctional metacognition on problematic drinking of female university student. *Proceedings of 2009 Annual Symposium of Korean Psychological Association*. 2009. p.340-1.
  38. Park JS. A study on factors affecting problem drinking of university students. *J Korean Public Health Assoc* 2000;26:393- 413.
  39. Han SH, Han D. The related factors of alcohol drinking in Korean young adults. *J Korean Public Health Assoc* 2001;27: 130-43.
  40. Schneier FR, Martin LY, Liebowitz MR, Gorman JM, Fyer AJ. Alcohol abuse in social phobia. *J Anxiety Disord* 1989;3:15-23.
  41. Lépine JP, Pélioso A. Social phobia and alcoholism: a complex relationship. *J Affect Disord* 1998;50 Suppl 1:S23-8.
  42. Stevens S, Gerlach AL, Rist F. Effects of alcohol on ratings of emotional facial expressions in social phobics. *J Anxiety Disord* 2008;22:940-8.
  43. Sayette MA. An appraisal-disruption model of alcohol's effects on stress responses in social drinkers. *Psychol Bull* 1993;114: 459-76.
  44. Frezza M, di Padova C, Pozzato G, Terpin M, Baraona E, Lieber CS. High blood alcohol levels in women. The role of decreased gastric alcohol dehydrogenase activity and first-pass metabolism. *N Engl J Med* 1990;322:95-9.
  45. National Institute on Alcohol Abuse and Alcoholism (NIAAA) [Internet]. Women and alcohol. 2011 [cited 2012 February 17]. Available from: <http://pubs.niaaa.nih.gov/publications/womensfact/womensfact.htm>.