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ORIGINAL RESEARCH

Association Between Alcohol Expectancy and Drinking Behaviors in Summer Vacation and Last Year Among College Students

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Background: Drinking in summer vacation, as an important part of college students' drinking behavior, has rarely been studied. At present, there is no research to explore the association between alcohol expectancy and college students' drinking behavior during the summer vacation.

Methods: A total of 487 college students were selected from three universities in Chongqing from July 30, 2017, to August 30, 2017, by cluster sampling. The electronic questionnaires were distributed to complete the anonymous survey related to drinking. The questionnaire on drinking mainly included baseline characteristics, influencing factors related to drinking, drinking behavior in the last year and summer vacation, and alcohol expectancy. Independent sample *t*-test and one-way ANOVA were used for multi-factor analysis. Multi-level logistic regression analysis and ordered logistic regression analysis were used for multivariate analysis.

Results: The past drinking rate in the study group was 86.24%. In the past year, the drinking rate and binge drinking rate of college students were 63.24% and 23.20%. In summer drinking, these two indicators were 29.57% and 8.42%, respectively. About 92.50% of the moderate and heavy drinking groups among college students had drinking behavior during the summer vacation. The average negative expectancy among college students was 3.26 ± 0.87 while the average positive expectancy was 2.63 ± 0.66. In drinking last year, positive expectancy was a risk factor for occasional and light drinking compared with those of non-drinkers ($P<0.05$). In summer vacation drinking, compared with those of non-drinkers, negative expectancy was a protective factor for occasional drinking (*OR*: 1.847, 95% CI: 1.293–2.638), negative expectancy and positive expectancy were both influencing factors for light drinking ($P<0.05$).

Conclusion: The drinking rate in the study group was at a high level in the past. The association between alcohol expectancy and drinking behavior among college students would be different according to the period and amount of drinking.

Keywords: drinking behavior, drinking pattern, alcohol expectancy, college students, summer vacation

Introduction

Drinking in young adults is a global public health problem. By 2016, more than a quarter of the world's teenagers (15–19) have alcohol consumption.[1] The 2015 National Survey on Drug Use and Health (NSDUH) found that 58.0%, 37.9%, and 12.5% of students aged 18–22 had drinking behavior, binge drinking, and heavy drinking behavior, respectively.[2] Alcohol exposure can have a widespread impact on the physical and mental health of young adults. Studies have shown that alcohol exposure in young adults increased the risk of gambling,[3] smoking,[4] drug use,[5] and violence.[6] At the same time, it can also increase the risk of cardiovascular diseases,[7] digestive diseases,[8] cancers,[9] and other diseases[10] in later life. The potential risk of alcohol use and dependence peaks in young adulthood.[11] College students, as an important

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group in young adulthood, are in a period of social transformation. It means that college students have a high risk of alcohol exposure.

According to the different drinking periods, drinking behavior can be divided into typical drinking and atypical drinking.[12] Typical drinking refers to individual's drinking behavior in daily life,[12] while atypical drinking refers to drinking behavior that exists on special days (birthdays, festivals, holidays) or special circumstances (banquets, weddings).[12] In the whole drinking process, atypical drinking is more likely to occur with alcoholism and drunkenness than typical drinking.[13–17] For Chinese college students, winter vacation (one month) and summer vacation (July–August) are the two most important holidays in college life.[18] During the summer vacation, college students have more opportunities to be exposed to alcohol because of temperature, festivals, sports events, and other reasons. The risk of atypical drinking might increase. Several studies have found that college students' overall alcohol consumption increased during certain holidays, accompanied by an increase in the frequency of drinking and binge drinking.[13–17,19] However, at present, there is no research specifically on the summer drinking behavior of college students. It is not clear whether there are differences in alcohol consumption, frequency, and patterns between summer vacation drinking and daily drinking among college students. In addition, most of the current studies on college students' holiday drinking are carried out in Western countries and lack the support of Asian data.

The occurrence of drinking behavior is often influenced by social, family, psychological, and other factors.[20,21] Compared with those of adults, the living environment of college students is relatively simple, and the factors related to drinking are also relatively limited. Previous studies on college students have found that besides the basic demographic characteristics such as age, gender, and race, some factors of school and family might affect the drinking behavior in college students. Among the school-related drinking factors, the grade may be an important one.[20,22,23] Compared with low-grade students, high-grade students might take part in more activities, meet more people and face greater academic pressure. Related research also found that high-grade college students are more likely to have drinking behavior than low-grade students, and the frequency of drinking might be higher.[20] Among the family-related factors, parents' drinking,[20,24] and siblings' situation[25] could have an impact on college students' drinking behavior. Parents and siblings are the people with the highest contact frequency. Some research results showed that individuals with drinking parents might have a higher risk of drinking than those with non-drinking parents.[20,26] At the same time, the more stable the parents' marriage, the fewer siblings, and the lower the risk of drinking probably.[27] Among the individual-related drinking factors, the age of drinking for the first time might affect the drinking behavior.[28–30]

The drinking behavior of the whole life cycle and its cognitive structure play an important role in future drinking.[31] Within the framework of psychological science, alcohol expectancy is the belief that people hold about the effects of alcohol on their behavior, moods, and emotions.[32] The most common classification of alcohol expectancy is the dichotomy, which includes negative expectancy (inhibitory motivation) and positive expectancy (promotive motivation).[31,33] Alcohol expectancy is an important influence factor, even a predictor, for the current drinking behavior or the future drinking level,[34,35] especially in alcoholics.[36] Physiologically, studies have shown that alcohol expectancy might affect the gray matter of the brain, leading to changes in brain structure, thus affecting drinking behavior.[36] In addition, there is an interaction between individual alcohol expectancy and drinking behavior. Among drinkers, alcohol expectancy is thought to be automatically stored in memory. At present, there are no studies to explore the effects of different types of alcohol expectancy on drinking behavior during summer vacation among college students. The purpose of this study is to analyze the current situation of summer vacation drinking behavior of college students and to compare the differences between daily drinking behavior and summer vacation drinking behavior. This study also aimed to analyze the relationship between alcohol expectancy and the related drinking behaviors.

Methods

Study Population

This cross-sectional study aimed to study drinking behavior during summer vacation (July 30, 2017, to August 30, 2017) among college students. The age of the study population ranged from 18 to 22 years old. According to the formula for calculating the cross-sectional sample size, we selected α=0.05, p=50.8%. The p-value was from a survey on the drinking

rate of college students from 44 colleges and universities of 22 provinces in central and western China,[37] though we think that the drinking rate during summer vacation may be larger than that. We are not sure about the extent, so we think it is more proper to use the data in the literature in several provinces rather than estimating one by ourselves. Considering the possible non-response rate (10%), at least 409 participants should be included in this study. In addition, differences in school categories may also be a relevant influencing factor. A comprehensive university, a medical university, and a normal university were selected in August 2017 (just after the summer vacation) in Chongqing using convenience sampling. The subjects were selected by the method of cluster sampling, and the anonymous survey was completed by sending out electronic questionnaires. Finally, a total of 487 college students participated in the survey.

Measures

A self-administered questionnaire consisting of three parts was used in our study. The first part contained students' basic demographic information, including the gender (male vs female), grade (low = freshman and sophomore/1-2 grades vs high = junior and senior/3-5 grades),[38] residence (urban vs rural), siblings (yes vs no), and parents' marital status (married, divorced and widowed). The information on the related drinking influencing factors was also contained, including the age at first drink (AFD)[30] and parental alcohol drinking situation.

The second part focused on alcohol expectancy. The 9-item questionnaire of alcohol expectancy, which was revised by Chinese scholars based on the corresponding part of the "Adolescent Health Behavior Questionnaire" compiled by Jessor et al, was used in this study.[39–41] The questionnaire was divided into two parts, negative expectancy, and positive expectancy. The negative expectancy consisted of 5 items, which mainly investigated teenagers' recognition of the influence of drinking on physical and mental health, academic performance, and behavior out of control, such as "drinking is harmful to health". The positive expectancy consisted of 4 items, which mainly investigated the teenagers' recognition of the fact that drinking can promote social interaction and relieve tension and negative emotions, such as "drinking can add fun to parties". The participants were required to assess the strength of each entry of drinking expectancy on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The score of each dimension was presented in the form of mean points for each item.

The third part mainly paid attention to college students' drinking behaviour,[42] including whether they drank alcohol, and whether they drank alcohol in the last year before the last summer vacation or during the summer vacation. We defined drinking behavior: (i) "Drinking last one year" specifically referred to drinking ≥1 standard drink at any time during the last one year before the start of the summer vacation;[43] (ii) "Summer vacation drinking", which specifically referred to drinking alcohol during the summer vacation (July to August); (iii) "Binge drinking/Alcoholism": male/female students drink more than 5/4 standard drink within 2 hours;[44] (iv) "Drunkenness" referred to a person has suffered from slurred speech, blurred eyes, unconsciousness, vomiting, coma, etc, due to the consumption of a certain amount of alcoholic drinks;[45] (v) "Drinking patterns" would be divided into the none drinking, occasional drinkers, light drinkers, moderate drinkers, and heavy drinkers.[45] The specific classification of related variables is shown in Table 1.

The confirmation of drinking behavior and alcohol consumption was in the form of a self-report. Respondents were asked about their drinking in the past year (July 2016 to July 2017) and the past two months (July 30, 2017, to August 30, 2017; summer vacation). The determination of alcohol consumption is shown in Table 1.

Table 1 The Classification of Related Variables

Variables	Classification
Basic demographic information	
Gender	Male, Female
Grade	Low (freshman and sophomore/1-2 grades)
	High (junior and senior/3-5 grades)
Residence	Urban, Rural
Siblings	Yes (≥1), No (0)
Parents' marital status	Married, Divorced, Widowed

(*Continued*)

Table 1 (Continued).

Variables	Classification
Drinking influencing factors	
Age at first drink (years old)	None, <12, 12–15, 16–18, >18
Father drinking	Yes, No
Mother drinking	Yes, No
Parents drinking	Yes, No
Alcohol expectancy	
Negative expectancy	The mean value of the five items (continuity variable)
Positive expectancy	The mean value of the four items (continuity variable)
Drinking behaviour	
Drinking last one year	Yes (≥1 standard drink at any time), No
Summer vacation drinking	Yes (≥1 standard drink from July to August), No
Binge drinking	Yes (more than 5/4 standard drink within 2 hours), No
Drunkenness	Yes, No
Drinking patterns (in Chinese standard)	None drinking
	Occasional drinker (1–4 standard drink a month)
	Light drinker (5–6 standard drink a month)
	Moderate drinker (7–9 standard drink a month, continuous)
	Heavy drinker (>10 standard drink a month, continuous)

Statistical Analysis

In descriptive statistical analysis, normal or nearly normal data are presented in the form of mean ± standard deviation. All the data were tested for normality in advance. In univariate analysis, the independent sample *t*-test was used to compare the mean values of drinking expectancy of binary variables. One-way ANOVA was used to compare the alcohol expectancy among multi-classified (>2) variables, and the LSD method was used to test the difference between the mean values of each group. A homogeneity test of variance was conducted before all univariate analyses. In multivariate analysis, binary logistic regression analysis was used to analyze the association between alcohol expectancy and drinking situation/binge drinking. Four logistic regression models were established. Among them, the independent variable of Model 1 only contained alcohol expectancy. Model 2 added gender, grade level, and residence based on Model 1. Model 3 added parents' marital status and sibling situation based on Model 2. Model 4 added AFD and parents' drinking situation based on Model 3. By comparing the results of different models, it can be known the influence of related factors on specific models. The ordinal logistic regression was used to analyze the association between alcohol expectancy and drinking patterns. The crude model independent variable only contained alcohol expectancy. The adjusted model incorporated all the relevant factors mentioned above. All logistic regression analyses were preceded by collinearity analysis. Stata 15.0 software was used for related statistical analysis. Two-tailed $P<0.05$ indicated that there was a statistical difference.

Ethics Approval

The Ethics Committee of Chongqing Medical University approved this study (Reference Number: 2017015). Each participant in the study was over 18 years old. This study was an electronic survey based on the network platform. At the front of the electronic questionnaire, there was a brief introduction about this study. Participants must read the relevant introduction and choose whether to agree to participate in the study. Participants were only allowed to conduct the following surveys if they agree. All electronic questionnaires were kept on file. All participants have informed consent. This study strictly followed the Declaration of Helsinki.

Results

Basic Demographics and Alcohol Expectancy in the Study Population

A total of 487 college students were finally included in the study. Among them, 35.32% were male, 43.33% were low-grade college students, and 55.44% had their home addresses in urban. In terms of family situation, 91.58% of college students' parents were married (6.57% divorced, 1.85% widowed) and 38.19% of them had siblings. In the part of information related to drinking, 70.02% of college students' fathers and 20.94% of college students' mothers had drinking situations. In all, 19.71% of college students had both parents who had a drinking situation, 51.54% had only one parent who had a drinking situation, and 28.75% had neither parents who had a drinking situation. 70.02% of college students' age at first drink (AFD) were in the range of 12–18 years old. The specific baseline characteristics of the study group are shown in Table 2.

Table 2 Alcohol Expectancy and Basic Demographics in Study Population (N = 487)

Variables	N (%)	Negative Expectancy			Positive Expectancy		
		$\bar{x}$(SD*)	t/F*	P	$\bar{x}$(SD*)	t/F	P
Gender							
Male	172(35.32)	3.10(0.89)	−3.097	0.002	2.77(0.68)	3.396	0.001
Female	315(64.68)	3.35(0.85)			2.56(0.64)		
Grade level							
Low	211(43.33)	3.24(0.79)	−0.442	0.658	2.62(0.64)	−0.318	0.750
High	276(56.67)	3.28(0.93)			2.64(0.68)		
Residence							
Urban	270(55.44)	3.30(0.85)	0.223	0.823	2.61(0.63)	−0.117	0.907
Rural	217(44.56)	3.22(0.89)			2.66(0.70)		
Parental marital status							
Married	446(91.58)	3.28(0.88)	0.585	0.558	2.64(0.65)	1.128	0.277
Divorced	32(6.57)	3.16(0.75)			2.46(0.77)		
Widowed	9(1.85)	3.04(0.61)			2.74(0.61)		
Siblings							
Yes	186(38.19)	3.15(0.93)	−0.223	0.823	2.65(0.68)	−0.117	0.907
No	301(61.81)	3.34(0.83)			2.62(0.65)		
Father drinking							
Yes	341(70.02)	3.20(0.89)	−2.486	0.013	2.69(0.66)	3.278	0.001
No	146(29.98)	3.41(0.81)			2.48(0.65)		
Mother drinking							
Yes	102(20.94)	2.96(0.89)	−4.044	<0.001	2.72(0.68)	1.567	0.118
No	385(79.06)	3.34(0.85)			2.61(0.65)		
Parents drinking							
Only one1	251(51.54)	3.30(0.86)	8.994	<0.001	2.65(0.65)	4.854	0.008
Both 2	96(19.71)	2.95(0.90)			2.76(0.67)		
Neither3	140(28.75)	3.42(0.81)			2.50(0.65)		
AFD (years old)							
None	67(13.76)	3.40(0.89)	1.113	0.350	2.25(0.61)	11.540	<0.001
<12	85(17.45)	3.20(0.94)			2.89(0.67)		
12~15	114(23.41)	3.18(0.89)			2.71(0.60)		
16~18	142(29.16)	3.24(0.80)			2.68(0.66)		
>18	79(16.22)	3.38(0.87)			2.47(0.61)		

Notes: *The independent sample *t*-test was used when the dependent variable was two-classified variable, and the one-way ANOVA was used when the dependent variable was multi-classified (>2) variable, and the post-test was carried out. A test for homogeneity of variance would be carried out before all other tests.

Abbreviation: SD, standard deviation.

Alcohol expectancy was divided into negative expectancy and positive expectancy. The overall average score of negative expectancy was 3.26 ± 0.87 points, while the average score of positive expectancy was 2.63 ± 0.66 points. The results of independent sample *T*-test or one-way ANOVA showed that there were statistically significant differences in negative expectancy among college students in terms of gender, father's drinking, mother's drinking, and parents' drinking ($P<0.05$). The average negative expectancy of females (3.35 ± 0.85) was higher than that of males (3.10 ± 0.89, $P=0.002$). The average negative expectancy of college students whose fathers had no drinking situation (3.41 ± 0.81) was higher than that of college students whose fathers had a drinking situation (3.20 ± 0.89, $P=0.013$). The average negative expectancy of college students whose mothers had no drinking situation (3.34 ± 0.85) was higher than that of college students whose mothers had a drinking situation (2.96 ± 0.89, $P<0.001$). Among the college students with different parental drinking conditions, it was further verified by the LSD method that the average negative expectancy of college students whose both parents had a drinking situation (2.95 ± 0.90) was lower than that of only one parent who had a drinking situation (3.30 ± 0.86, $P<0.001$) and that of both parents had no drinking situation (3.42 ± 0.81, $P<0.001$). On the other hand, there were statistically significant differences in the average positive expectancy among college students of different genders, fathers'drinking, parents'drinking, and AFD ($P<0.05$). The average positive expectancy of males (2.77 ±0.68) was higher than that of females (2.56 ±0.64, $P=0.001$). The average positive expectancy of college students whose fathers had a drinking situation (3.41 ± 0.81) was higher than that of college students whose fathers had no drinking situation (3.20 ±0.89, $P=0.013$). Among the college students with different parental drinking conditions, it was further verified by the LSD method that the average positive expectancy of college students whose both parents had no drinking situation (2.50 ± 0.65) was lower than that of only one parent who had a drinking situation (2.65 ± 0.65, $P<0.05$) and that of both parents had drinking situation (2.76 ± 0.67, $P<0.05$). Among the college students with different AFD, it was further verified by the LSD method that there was no significant difference only in the average positive expectancy between 12–15 AFD and 16–18 AFD ($P>0.05$). The differences in average alcohol expectancy among different subgroups of the study population are shown in Table 2.

Drinking Behaviors and Alcohol Expectancy in the Study Population

According to the time, college students' drinking behavior could be divided into three situations: overall drinking in the past, drinking last year, and drinking during the last summer vacation. According to the drinking state, the drinking behavior could be subdivided into binge drinking and drunkenness. Based on the actual alcohol consumption, the drinking patterns of college students could be divided into none drinking, occasional drinker, light drinker, moderate drinker, and heavy drinker. In the study population, 86.24% of college students used to have drinking situations. In the past year, 63.24% of college students had drinking behavior. Overall, 23.20% of the individuals had binge drinking behavior, and 26.08% of them had been drunk. At the same time, 39.63% of them were occasional drinkers, 15.40% were light drinkers, 7.19% were moderate drinkers and 1.03% were heavy drinkers. During last year's summer vacation, 29.57% of individuals had drinking behavior. In total, 8.42% of the individuals had binge drinking behavior, and 8.21% had been drunk. At the same time, 18.89% of them were occasional drinkers, 7.19% were light drinkers, 2.46% were moderate drinkers and 1.03% were heavy drinkers. The specific drinking behavior information of the study population is shown in Table 3.

Table 3 Alcohol Expectancy and Drinking Behaviours in Study Population (N = 487)

Variables	N(%)	Negative Expectancy			Positive Expectancy		
		$\bar{x}$(SD)	t/F	P	$\bar{x}$(SD)	t/F	P
Drinking							
Yes	420(86.24)	3.24(0.87)	1.369	0.172	2.69(0.65)	−5.482	<0.001
No	67(13.76)	3.40(0.89)			2.25(0.61)		
Drinking last one year							
Yes	308(63.24)	3.16(0.87)	3.487	0.001	2.79(0.62)	−7.442	<0.001
No	179(36.76)	3.44(0.84)			2.35(0.63)		

(*Continued*)

Table 3 (Continued).

Variables	N(%)	Negative Expectancy			Positive Expectancy		
		$\bar{x}$(SD)	t/F	P	$\bar{x}$(SD)	t/F	P
Binge drinking last one year							
Yes	113(23.20)	3.04(0.87)	3.070	0.002	2.88(0.62)	−4.761	<0.001
No	374(76.80)	3.33(0.86)			2.56(0.65)		
Drunkenness last one year							
Yes	127(26.08)	3.17(0.82)	1.429	0.154	2.87(0.57)	−4.792	<0.001
No	360(73.92)	3.30(0.89)			2.55(0.67)		
Drinking patterns last one year							
None drinking1	179(36.76)	3.44(0.84)	8.282	<0.001	2.35(0.63)	16.695	<0.001
Occasional drinkers2	193(39.63)	3.27(0.91)			2.71(0.59)		
Light drinkers3	75(15.40)	2.99(0.69)			2.91(0.57)		
Moderate drinkers4	35(7.19)	3.11(0.84)			2.93(0.83)		
Heavy drinkers5	5(1.03)	1.73(0.43)			3.25(0.39)		
Summer drinking							
Yes	144(29.57)	2.91(0.87)	5.959	<0.001	2.80(0.66)	−3.883	<0.001
No	343(70.43)	3.41(0.83)			2.56(0.65)		
Summer Binge drinking							
Yes	41(8.42)	2.89(0.82)	3.301	0.001	3.00(0.65)	3.756	<0.001
No	446(91.58)	3.30(0.87)			2.60(0.65)		
Summer Drunkenness							
Yes	40(8.21)	2.95(0.92)	2.249	0.029	2.86(0.74)	−2.353	0.019
No	447(91.79)	3.29(0.86)			2.61(0.65)		
Summer Drinking patterns							
None drinking1	343(70.43)	3.44(0.84)	9.990	<0.001	2.35(0.63)	6.828	<0.001
Occasional drinkers2	92(18.89)	3.27(0.91)			2.71(0.59)		
Light drinkers3	35(7.19)	2.99(0.69)			2.91(0.57)		
Moderate drinkers4	12(2.46)	3.11(0.84)			2.93(0.83)		
Heavy drinkers5	5(1.03)	1.73(0.43)			3.25(0.39)		

Notes: The independent sample *t*-test was used when the dependent variable was two-classified variable, and the one-way ANOVA was used when the dependent variable was multi-classified (>2) variable, and the post-test was carried out. A test for homogeneity of variance would be carried out before all other tests.
Abbreviation: SD, standard deviation.

In the part of alcohol expectancy, the results of independent sample *t*-test or one-way ANOVA showed that there were significant differences in the average negative expectancy among different drinking, binge drinking, drinking patterns last year and drinking, binge drinking, drunkenness, drinking patterns during last summer vacation ($P<0.05$). First of all, the average negative expectancy of college students who had no drinking behavior last year (3.34 ± 0.84) was higher than that of college students who had drinking behavior last year (3.16 ±0.87, $P=0.001$). At the same time, college students who had not binge drinking last year (3.33 ±0.86) also had higher average negative expectancy than those who had binge drinking (3.04 ±0.87, $P=0.002$). Based on the results of the LSD method, light and above drinkers had lower average negative expectancy than that of the non-drinkers (3.44 ± 0.84, $P<0.05$), heavy drinkers (1.73 ± 0.43) had lower average negative expectancy than those of the other groups ($P<0.05$), and light drinkers had lower negative expectancy than that of the occasional drinkers (3.27 ±0.91, $P<0.001$). In the summer vacation last year, the average negative expectancy of non-drinking college students (3.41 ± 0.83) was higher than that of drinking college students (2.91 ± 0.87, $P<0.001$). The college students who had not binge drinking (3.30 ± 0.87) also had higher average negative expectancy than those who had binge drinking (2.89 ± 0.82, $P=0.001$). At the same time, the college students who had not been drunk (3.29 ± 0.86) had higher average negative expectancy than those who had been drunk (2.95 ± 0.92, $P=0.029$). Based on the results of the LSD method, non-drinkers (3.44 ± 0.84) had higher average negative expectancy than those of the other groups ($P<0.05$), and occasional drinkers (3.27 ± 0.91) had higher average negative expectancy than that of the heavy drinkers (1.73 ± 0.43, $P<0.05$).

Secondly, the results of independent sample *t*-test or one-way ANOVA showed that there were significant differences in average positive expectancy among different past drinking, last year drinking, binge drinking, drunkenness, drinking patterns, and last summer vacation drinking, binge drinking, drunkenness, and drinking patterns ($P<0.05$). The college students who had drinking behaviors in the past (2.69 ± 0.65) had higher average positive expectancy than those who had no drinking behaviors (2.25 ± 0.61, $P<0.001$). In the past year, the college students who had drinking behaviors (2.79 ± 0.62) had higher average positive expectancy than those who had no drinking behaviors (2.35 ± 0.63, $P< 0.001$). The average positive expectancy of binge-drinking college students (2.88 ± 0.62) was higher than that of non-binge-drinking college students (2.56 ± 0.65, $P<0.001$). The average positive expectancy of drunken college students (2.87 ± 0.57) was higher than that of non-drunken college students (2.55 ± 0.67, $P<0.001$). Based on the results of the LSD method, non-drinkers (2.35 ± 0.63) had lower average positive expectancy than those of other groups ($P<0.05$), and occasional drinkers (2.71 ± 0.59) had lower average positive expectancy than that of light drinkers (3.25 ± 0.39, $P<0.001$). During the summer vacation last year, the college students who had drinking behaviors (2.80 ± 0.66) had higher average positive expectancy than those who had no drinking behaviors (2.56 ± 0.65, $P<0.001$). The average positive expectancy of binge-drinking college students (3.00 ± 0.65) was higher than that of non-binge-drinking college students (2.60 ± 0.65, $P<0.001$). The college students who had been drunk (2.86 ± 0.74) had higher average positive expectancy than those who had never been drunk (2.61 ± 0.65, $P=0.019$). Based on the results of the LSD method, non-drinkers (2.35 ± 0.63) had lower average positive expectancy than those of light and above drinkers ($P<0.05$), occasional drinkers (2.71 ± 0.59) had lower average positive expectancy than those of moderate drinkers (2.91 ± 0.57, $P<0.001$) and heavy drinkers (3.25 ± 0.39, $P<0.001$). The differences in average alcohol expectancy among different subgroups of the study population are shown in Table 3.

Association Between Alcohol Expectancy and Drinking Situation

In the study, we explored the association between positive expectancy, negative expectancy, drinking last year, and drinking last summer by constructing four logistic regression models. In the part about drinking last year, all four models showed that there was no statistically significant correlation between negative expectancy and drinking behavior ($P>0.05$). On the contrary, all four models showed that there was a statistically significant correlation between positive expectancy and drinking behavior ($P<0.05$). The adjusted model 4 showed that positive expectancy was the risk factor of drinking behavior (*OR*: 2.010, 95% CI: 1.494–2.705). In the part about drinking during the summer vacation last year, all four models showed that there was a statistically significant correlation between negative expectancy and drinking behavior in summer vacation ($P<0.05$). The adjusted model 4 showed that negative expectancy was the protective factor of drinking behavior in summer vacation (*OR*: 0.608, 95% CI: 0.477–0.776). However, there were differences in the analysis results between positive expectancy and summer vacation drinking behavior in different models. Comparing model 4 with other models, we found that there was no statistically significant correlation between negative expectancy and summer drinking behavior in the study group when the factors related to individual drinking were added to the logistic regression model (*OR*: 1.121, 95% CI: 0.881–1.42). Table 4 presents the specific logistic regression analysis results of alcohol expectancy and drinking behavior of the study population.

Table 4 Association Between Alcohol Expectancy and Drinking Situation: Logistic Regression Analysis (N = 487)

Model*		Drinking Last One Year			Summer Vacation Drinking		
		OR	*95% CI*	*P*	*OR*	*95% CI*	*P*
Model 1	Negative expectancy	0.932	0.717–1.210	0.595	0.556	0.457–0.770	<0.001
	Positive expectancy	1.957	1.491–2.569	<0.001	1.411	1.138–1.748	0.002
Model 2	Negative expectancy	0.970	0.732–1.284	0.830	0.585	0.468–0.731	<0.001
	Positive expectancy	1.960	1.468–2.617	<0.001	1.317	1.054–1.647	0.016
Model 3	Negative expectancy	0.967	0.731–1.279	0.815	0.578	0.461–0.725	<0.001
	Positive expectancy	2.203	1.507–2.716	<0.001	1.339	1.070–1.677	0.011
Model 4	Negative expectancy	0.973	0.731–1.293	0.849	0.608	0.477–0.776	<0.001
	Positive expectancy	2.010	1.494–2.705	<0.001	1.121	0.881–1.426	0.354

Notes: *Model 1 was a crude model, and the independent variable only contained alcohol expectancy. Other models were all adjusted models. The independent variables of model 2 were added with gender, grade level and residence on the basis of model 1. The independent variables of model 3 were added with parental marital status and sibling situation on the basis of model 2. The independent variables of model 4 were added with AFD and parents' drinking situation on the basis of model 3.

Association Between Alcohol Expectancy and Binge Drinking

We constructed four logistic models to explore the association between negative expectancy, positive expectancy, and binge drinking behavior last year and last summer vacation. In the part about binge drinking behavior last year, four models had different analysis results on the association between negative expectancy and binge drinking behavior in the study population. Comparing models 3, and 4 with models 1, and 2, we found that there was no statistically significant correlation between negative expectancy and binge drinking behavior in the study population when the individual family situation and drinking-related factors were added to the logistic regression model ($P>0.05$). On the contrary, all four models showed that there was a statistically significant correlation between positive expectancy and binge drinking behavior ($P<0.05$). The adjusted model 4 showed that positive expectancy was a risk factor for binge drinking (*OR*: 1.411, 95% CI: 1.071–1.860). In the part on binge drinking behavior during the summer vacation last year, all four models showed that there was a statistically significant correlation between negative expectancy, positive expectancy, and binge drinking in summer vacation ($P<0.05$). The adjusted model 4 showed that negative expectancy was the protective factor of summer vacation binge drinking (*OR*: 0.686, 95% CI: 0.473–0.997), while positive expectancy was the risk factor of summer vacation binge drinking (*OR*: 1.659, 95% CI: 1.129–2.438). Table 5 presents the specific logistic regression analysis results of alcohol expectancy and binge drinking behavior of the study population.

Association Between Alcohol Expectancy and Drinking Patterns

We used the ordered logistic regression analysis to explore the association between negative expectancy, positive expectancy, and drinking patterns last year and summer vacation. In the part of drinking behavior last year, taking non-drinkers as the reference group, the results of ordered logistic regression analysis showed that negative expectancy was a protective factor for light drinking (*OR*: 0.627,95% CI: 0.439–0.896). That was, between the two groups, the individuals with higher negative expectancy were more likely not to drink. Similarly, taking non-drinkers as the reference group, positive expectancy was a risk factor for occasional, light, and moderate drinking ($P<0.05$). At the same time, by comparing the OR values of each group (1.639, 2.284, 2.390), we found it is possible that the higher the positive expectancy, the greater the individual's alcohol consumption. In the part of drinking behavior in summer vacation last year, taking non-drinkers as the reference group, the results of ordered logistic regression analysis showed that negative expectancy was a protective factor for occasional and light drinking ($P<0.05$). In contrast, taking non-drinkers as the reference group, there was no statistically significant correlation between positive expectancy and drinking behavior in other groups ($P>0.05$). Table 6 presents the detailed results of the ordered logistic regression analysis.

Table 5 Association Between Alcohol Expectancy and Binge Drinking: Logistic Regression Analysis (N = 487)

Model*		Binge Drinking Last One Year			Summer Vacation Binge Drinking		
		OR	*95% CI*	*P*	*OR*	*95% CI*	*P*
Model 1	Negative expectancy	0.736	0.588–0.920	0.007	0.609	0.433–0.855	0.004
	Positive expectancy	1.685	1.328–2.137	<0.001	1.847	1.293–2.638	0.001
Model 2	Negative expectancy	0.800	0.626–1.022	0.075	0.633	0.443–0.902	0.012
	Positive expectancy	1.544	1.196–1.933	0.001	1.710	1.186–2.466	0.004
Model 3	Negative expectancy	0.783	0.609–1.006	0.056	0.633	0.443–0.904	0.012
	Positive expectancy	1.559	1.204–2.018	0.001	1.756	1.220–2.528	0.002
Model 4	Negative expectancy	0.822	0.628–1.074	0.151	0.686	0.473–0.997	0.048
	Positive expectancy	1.411	1.071–1.860	0.014	1.659	1.129–2.438	0.010

Notes: *Model 1 was a crude model, and the independent variable only contained alcohol expectancy. Other models were all adjusted models. The independent variables of model 2 were added with gender, grade level and residence on the basis of model 1. The independent variables of model 3 were added with parental marital status and sibling situation on the basis of model 2. The independent variables of model 4 were added with AFD and parents' drinking situation on the basis of model 3.

Table 6 Association Between Alcohol Expectancy and Drinking Patterns: Ordinal Logistic Regression Analysis (N = 487)

Model (Reference=None)*			Drinking Last One Year			Summer Vacation Drinking		
			OR	*95% CI*	*P*	*OR*	*95% CI*	*P*
Occasional	Crude model	Negative expectancy	0.864	0.694–1.076	0.192	0.603	0.473–0.768	<0.001
		Positive expectancy	1.791	1.423–2.255	<0.001	1.171	0.915–1.498	0.0210
	Adjusted model	Negative expectancy	0.833	0.641–1.082	0.172	0.616	0.469–0.809	<0.001
		Positive expectancy	1.639	1.246–2.155	<0.001	0.959	0.731–1.258	0.762
Light	Crude model	Negative expectancy	0.621	0.461–0.836	0.002	0.525	0.359–0.766	0.001
		Positive expectancy	2.539	1.838–3.508	<0.001	1.868	1.261–2.768	0.002
	Adjusted model	Negative expectancy	0.627	0.439–0.896	0.010	0.591	0.394–0.888	0.011
		Positive expectancy	2.284	1.556–3.351	<0.001	1.429	0.940–2.171	0.094
Moderate	Crude model	Negative expectancy	0.727	0.491–1.077	0.112	0.527	0.284–0.980	0.043
		Positive expectancy	2.666	1.751–4.062	<0.001	2.153	1.135–4.085	0.019
	Adjusted model	Negative expectancy	0.831	0.519–1.332	0.442	0.628	0.332–1.190	0.154
		Positive expectancy	2.390	1.451–3.937	0.001	1.753	0.883–3.480	0.108
Heavy	Crude model	Negative expectancy	0.080	0.020–0.319	<0.001	0.189	0.061–0.582	0.004
		Positive expectancy	5.738	1.865–17.651	0.002	5.476	1.863–16.100	0.002
	Adjusted model	Negative expectancy	–	–	0.977	–	–	0.896
		Positive expectancy	–	–	0.982	–	–	0.916

Notes: *The independent variable of the crude model only contained alcohol expectancy. The adjusted model were added with gender, grade level, residence, parental marital status, sibling situation, AFD and parents' drinking situation on the basis of the crude model.

Discussion

Drinking Behaviors in Summer Vacation Among College Students

Among the study population, 86.24% had been exposed to alcohol in the past. Compared with that of the American college students (18–22, 58.0%),[2] the alcohol exposure rate of the study group was at a higher level (standardized). In China, the alcohol exposure rate of this group was also at a high level.[46,47] This might have something to do with the prevalence of wine culture in the Sichuan-Chongqing region of China. Compared with that of the last year (63.24), the drinking rate of the study population in summer vacation decreased (29.57%). The alcoholism rate (23.20% vs 8.42%) and drunkenness rate (26.08 vs 8.21) also showed a similar trend. It showed that in the study population, the summer vacation was not a period of concentrated drinking. The period of concentrated drinking might be during the winter vacation or other holidays. It existed some differences from other studies.[13,14,16] In addition, after comparing the data, we found that 92.50% (37/40) of students whose drinking patterns were classified as moderate and heavy drinking in the past year also had drinking behavior during the summer vacation. The light and low drinkers rarely drank alcohol during the summer vacation. Heavy drinkers in the past year were also heavy drinkers during the summer vacation. It means that if alcohol intervention is to be carried out in colleges during summer vacation, college students with moderate or heavy drinking levels are the key targets.

Alcohol Expectancy in Summer Vacation Among College Students

The average negative expectancy of the study group was 3.26 ±0.87 points, while the average positive expectancy was 2.63 ±0.66 points. Compared with that of a group of middle school students who used the same drinking expectation scale in China (2.80 ± 0.51/2.54 ± 0.99), the average level of negative and positive expectancy was higher.[39] At present, there were relatively few studies on alcohol expectancy, especially among young adults. Therefore, it is difficult to analyze the alcohol expectancy level of the study group at home and abroad. In our study, gender, father drinking, mother drinking and parental drinking affected the level of negative expectancy, while gender, father drinking, parental drinking, and AFD affected the level of positive expectancy. As mentioned earlier, drinking behavior throughout the life cycle and its cognitive structure might play an important role in future drinking. Our study also supported this point. Especially in childhood, the impact of drinking behavior might be more profound.[48] Similarly, premature exposure to alcohol might be a dangerous signal to start drinking continuously.[49] The group whose first exposure to alcohol was under the age of 12

had the highest level of positive expectancy in our study. The later the age of alcohol exposure, the lower the level of positive expectancy. It might be that in the early stages of life, individuals' perception of alcohol is based more on their behavior than on the nature of the alcohol itself. In other studies, early drinking was also associated with higher positive expectancy.[49,50] Therefore, it is better to start drinking interventions for individuals as soon as possible.

Association Between Alcohol Expectancy and Drinking Behaviors

In drinking last year, the higher positive expectancy of college students was associated with a higher risk of drinking. The effect of negative expectancy on last year's drinking did not seem to be reflected in our study. In contrast, in summer vacation drinking, college students' higher negative expectancy was associated with a lower risk of drinking. However, the effect of positive expectations on drinking during summer vacation was not reflected. Among drinkers, alcohol expectancy is thought to be automatically stored in memory.[51] In some cases, positive and negative expectancy could change.[52,53] Our study results supported this point. Alcohol expectancy indeed has different effects on drinking behavior at different times of the year. Positive expectancy and negative expectancy existed at the same time and were influenced by each other. It is possible that when positive expectancy fluctuated, negative expectancy was suppressed. And vice versa. This inhibition might vary from individual to individual or from scene to scene. In binge drinking last year, there was only a statistically significant association between positive expectancy and binge drinking. In binge drinking during summer vacation, negative expectancy, and positive expectancy showed an impact at the same time. For us, it may be crucial to explore what is affecting the "struggle" between negative expectancy and positive expectancy. In the past studies, few studies have compared the alcohol expectancy of daily and special periods at the same time,[12–14] so this difference may be underestimated or even ignored. We also compared the drinking patterns of college students in different periods. We found that when the drinking level reached moderate or above, the influence of alcohol expectancy may be masked by other factors. Whether drinking alcohol last year or on summer vacation, there was no statistically significant association between alcohol expectancy and moderate, heavy drinking compared with non-drinkers. The role of alcohol expectancy in our study was only reflected between non-drinkers and light and below-level drinkers. In drinking last year, compared with that of non-drinkers, positive expectancy was a risk factor for occasional and light drinking. In summer vacation drinking, compared with those of non-drinkers, negative expectancy was a protective factor for occasional drinking, while negative expectancy and positive expectancy were also influencing factors for light drinking. Such study results once again proved that negative and positive expectancy might change with the drinking period and individual. At the same time, when the level of drinking is above moderate, individuals may have begun to develop alcohol dependence. The effect of alcohol expectancy may no longer be significant. Alcohol dependence would prompt individuals to start drinking.[54] In this case, the effect might no longer be obvious only by educational intervention.

Strengths and Limitations

This study focused on the drinking behavior of college students during summer vacation and compared it with the drinking behavior last year. Relevant research suggested that accurate alcohol consumption was very important when evaluating the harm of alcohol to health.[12] Therefore, we also obtained the alcohol consumption of college students in different periods to divide their drinking patterns and to explore the association between alcohol expectancy and individual drinking patterns at a deeper level. Our study was also the first to explore the association between alcohol expectancy and summer drinking behavior among college students, which provided Asian data support for the field of holiday drinking.

Our study is a cross-sectional study, so it is difficult to analyze the causal association between alcohol expectancy and drinking behavior. Although we set the investigation time to the end of summer vacation to minimize the influence of recall bias, it is still difficult to avoid recall bias.

Conclusion

The overall drinking rate of the study population in the past year was high. Compared with those of the past year, the drinking rate, alcoholism rate, and drunkenness rate of the study group decreased during the summer vacation. In the

study population, positive alcohol expectancy was related to drinking behavior in the past year. In contrast, negative alcohol expectancy was related to drinking behavior in summer vacation.

Data Sharing Statement

This article contains the original contributions put forward in the study. Further inquiries can be made to the corresponding author.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflicts of interest in this work.

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