

Original Research Article

Acculturation and Drinking Behavior among Chinese International College Students in the Midwestern United States

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ABSTRACT

Objective: This study is designed to examine the effect of acculturation on drinking behavior among Chinese students who are currently studying in US colleges or universities.

Participants: 687 study participants were conveniently recruited from Chinese international college students who were studying in four different universities located in three Midwestern states in the U.S. during September – October, 2011.

Methods: Statistical analyses were carried out by using SAS 9.3. Chi-square tests were used to examine associations between the dependent variable and other categorical variables of interest in order to identify variables for logistic regression analyses. Sequential multinomial logistic regressions were conducted for the changes in the amount of drinks consumed after coming to the United States to examine adjusted odds ratios of acculturation as well as other major covariates after controlling for other documented correlates of drinking.

Results: 17% of the respondents reported an increase in the amount of drinks after they came to the United States. The acculturation score was higher in the students who reported an increase in the amount of drinks than those who reported a decrease in the amount of drinks.

Conclusions: This study contributes to the literature by showing the significant effects of acculturation on Chinese students' drinking behavior after they come to the U.S. This study can be used as an evidence for future drinking intervention program focusing on Chinese or foreign students who are studying in the U.S.

Keywords: *Acculturation; Drinking; Chinese International Students; College Health.*

INTRODUCTION

Drinking alcoholic beverages is always considered as a common feature of people's social lives. [1] Nevertheless, the behavior of alcohol consumption may bring both serious health-related problems [2] and adverse social consequences [3] especially

among college students. Study shows that alcohol use among college students is now a major public health concern. [4] Research indicates that 1,825 college students between the ages of 18 and 24 die from alcohol-related unintentional injuries, including motor vehicle crashes, 599,000

students between the ages of 18 and 24 are unintentionally injured under the influence of alcohol, more than 150,000 students develop an alcohol-related health problem, and 3,360,000 students between the ages of 18 and 24 drive under the influence of alcohol. ^[5]

Binge drinking is defined as “a pattern of drinking alcohol that brings blood alcohol concentration to 0.08 gram-percent or above.” ^[6] For a typical adult, this pattern corresponds to consuming 5 or more drinks for males, or 4 or more drinks for females, in about 2 hours. ^[6] Statistic indicates that about 32–44% of American college students have engaged in binge drinking. ^[7] Studies conducted by the Centers for Disease Control and Prevention and other government agencies found that heavy intake of alcohol among college students in America are a serious problem. This is evident in the increasing number of death and unintentional injury among college students’ ages from eighteen to twenty-four. From the year 1998 to 2001, among the population of 18–24-year-old college students, alcohol-related unintentional injury deaths increased from nearly 1600 to more than 1700. ^[8] Alcohol use and drinking problems among international students who come from other countries and studying in the U.S are increasing significantly. According to the study conducted in 2011 among international students, 26% of the respondents consumed alcohol once per week or more, 36% of participants reported one or more times of binge drinking in the past 2 weeks. ^[9]

Drinking behavior among students in American college has been caused by a variety of factors. Research shows that the perceived behavior of peers is strongly associated to student’s alcohol use. ^[10] Several studies have found negative correlation between parental communication problems and student's alcohol consumption.

^[11,12] Some students use drinking as a means of enhancing their social gatherings and celebratory events, ^[13] while others engages in the practice as a means of dealing with stress. ^[9] College student who engage in binge drinking may experience problems such as poor performance in class, destruction of property and poor grades. ^[14]

There are few documented studies, which investigate alcohol consumption among Asian-American college students (students who are Americans of Asian descent) in the U.S. A study shows that the rate of binge drinking increased significantly among Asian-American students in college. ^[15] A study conducted in 2003 among college students in the U.S. across five Asian subgroups found that rates of frequent binge drinking were highest for Korean-American students and lowest for Chinese-American students. ^[16] Another study conducted in 2001 also found that ethnic group had association with rates of binge drinking among college students. Rates were greater in Korean-American college students than in Chinese-American colleges’ students, with 30% of Korean-American students and only 7% of Chinese-American students reporting binge drinking. ^[17] However, one study comparing white and Asian subgroups indicated that among college students ages 18 years or older, the prevalence of increased drinking behaviors ranked highest for whites, followed by the Japanese or Filipinos, Koreans, Chinese, and Vietnamese. ^[18]

Despite numerous studies on college students' drinking behavior, relatively very little attention has been paid to international students who come from other countries and currently are studying in the US. And the drinking behavior among Chinese international students has not attracted researchers' attention. In the fact, international student is a very big population among all the students in U.S colleges. In

terms of numbers in the year 2008 to 2009, the US has the highest number of international student for about 671,616. Among all the international students in the US, Chinese students have the biggest percentage for about 100,000. [19] However, there are very few studies focusing on the drinking behavior among international students who come from other countries and currently studying in the U.S and the effect of acculturation on their drinking behavior.

The term acculturation refers to the process is by the extent to which individuals learn the customs, attitudes, and behaviors characteristic of a host culture. [20] In most cases, acculturation normally takes place in situations whereby a minority group adopts some specific elements of one culture by a different cultural group including the introduction of forms of dress or personal adornment, music and art, religion, language, or behavior. [21] Theoretically, increased acculturation should be considered as a risk factor when a health risk behavior is more prevalent in the host culture comparing to the culture of origin. When the reverse is true, acculturation may serve as a protective influence. [22] Acculturation can make drinking behavior to be viewed as a norm; and therefore, even international students who initially did not engage in drinking due to their earlier socialization may find themselves doing so because of acculturation. They may adopt this popular culture in order to fit in with rest of the students in college. Study showed that acculturation and drinking behavior were significantly related. [8] International students who are studying in college have been recognized as a high-risk population, susceptible to acculturation related issues. [23] A study conducted in 2011 among international students studying in the U.S. indicated that 26% of the participants consumed alcohol once per week or more and 36% reported one or more incidents of

binge drinking in the past two weeks. [9] According to Berry's theory about stress and coping, acculturative stress is defined as “a stress reaction in response to life events that are rooted in the experience of acculturation”(p. 294). [24] When facing acculturative stress, international students use alcohol if they believe alcohol can provide good emotional changes and help with their stress coping. [24]

In summary, the process of acculturation is one of the main contributing factors in drinking among international students studying in American colleges. However, there is not enough literature focusing on alcohol use related to acculturative stress among international students. [8] And to our knowledge, there is no study focusing on the drinking behavior among Chinese international student who are studying in the U.S and the effect of acculturation on their drinking behavior.

This study is designed to examine the effect of acculturation on drinking behavior among Chinese students who are currently studying in US colleges or universities. We hypothesized that (1) Chinese students have different drinking behavior after they come to USA comparing with the drinking behavior in China. (2) Higher levels of acculturation are corresponding with higher rates of alcohol use among Chinese international students in USA.

MATERIALS AND METHODS

Participants and Procedures

Study participants were conveniently recruited from Chinese international college students who were studying in four different universities located in three Midwestern states in the U.S. during September – October, 2011. The investigators contacted and obtained cooperation for Offices of International Services and Chinese Student

Associations in the selected four universities to send out an email with an online survey link to Chinese international students on their mailing list. A total of 5425 students were invited and 687 (12.7%) participated in the survey from September 1, 2011 to October 31, 2011. The online survey took respondents about 8 to 10 minutes to complete. The study protocol was approved by the institutional review board of the university and informed consent was obtained from each study participant. Two exclusion criteria were established before data treatment. First, cases that showed systematic response patterns such as answering the same response option to all questions (so called “protest response”) were deleted. Second, cases that contained more than 10% of missing values were deleted. As a result of this procedure, a total of 52 questionnaires were dropped, reducing the sample size into 635 (response rate of 11.7%).

Measures

The survey instrument was developed through a combination of questions derived from validated scales that were documented in the literature and available. The dependent variable, alcohol consumption, was measured by using 6 questions adapted from the Daily Drinking Questionnaire. [25] A number of studies demonstrated adequacy of the psychometrics of the DDQ in measuring drinking behavior among college populations. [26] Participants reported the number of days in a typical week they drank alcohol when they were in China; the average number of drinks they consumed each time when they were in China; and the number of times in a month they had 5 or more (4 or more for women) drinks at one sitting (binge drinking) when they were in China. In order to compare drinking behavior before and after coming to the United States, participants were asked

the same drinking behavior questions after they came to the United States. The Cronbach alpha of 3 items that measured alcohol consumption when in China was 0.57; and the Cronbach alpha of 3 items measured alcohol consumption when in the United States was 0.65. A 3-level drinking variable (i.e., increased drinking, decreased drinking, and unchanged) was created by comparing the total number of drinks in a typical week plus the number of binge drinking before and after coming to the United States.

The major independent variable acculturation was measured by using 13 questions adopted from the Suinn-Lew Asian Self-Identity Acculturation (SL-ASIA) Scale. [27] The SL-ASIA is the most widely used method of assessing acculturation among Asian American populations and has shown adequate levels of reliability and validity. [28-30] Response options ranged from 1 (low acculturation/high Asian identification) to 5 (high acculturation/low Asian identification). The Cronbach alpha of the 13 acculturation items was 0.71 and the mean score was used for data analysis. As literature indicates that duration of stay in a foreign country has to do with acculturation. [31] and the SL-ASIA does not measure the duration of stay, so this study also included a question asking students’ duration of stay in the United States.

Covariates that were measured in this study to control for possible confounding included age, sex, marital status, currently enrolled educational program (bachelor’s degree, master’s degree, or doctorate), current housing, drinking problems in family members, and smoking behavior.

Data analysis

Statistical analyses were carried out by using SAS 9.3. The 3-level drinking variable (i.e., increased drinking, decreased

drinking, and unchanged) served as the dependent variable. Frequencies and percentages of the dependent variable as well as current drinkers were examined by correlates. Chi-square tests of independence were used to examine associations between the dependent variable and other categorical variables of interest in order to identify variables for logistic regression analyses. Variables that showed a significant bivariate association at the .05 level were entered into the regression analyses. Sequential multinomial logistic regressions were conducted for the changes in the amount of drinks consumed after coming to the United States to examine adjusted odds ratios (AORs) of acculturation as well as other major covariates after controlling for other documented correlates of drinking. The variable entry in the sequential model was made in the order of 1) age and sex, 2) drinking problems in family, 3) current housing, 4) smoking after coming to the United States, and 5) acculturation. The order of the variable entry into the regression equation was based on prior findings in the literature and the variable of research concern. The variables the association of which is well documented and demographic or hard-to-intervene variables, such as age, sex, and drinking problems in family, were entered first. The variable of research concern (i.e., acculturation) was entered to the regression last to examine its effect on drinking above and beyond the effect of all the variables included in the model. In terms of the variable that measured acculturation, the duration of stay in the United States was excluded from the regression due to the concern about multicollinearity. [32] Instead, the mean score of the 13-item acculturation scale was used to measure acculturation.

RESULTS

Descriptive and Bivariate Findings

The mean age of the respondents was 22.2 years ($SD = 3.4$) with the range of 18 to 37 years. Sixty percent of them ($n = 378$) were female. As shown in Table 1, 17% of the respondents reported an increase in the amount of drinks and 31% a decrease after they came to the United States. Duration of stay in the United States was associated with changes in the drinking behavior (chi-square = 40.6, $df = 8$, $p < .001$). Of the students who reported an increase in the amount of drinks, 55% stayed in the United States 3 years or longer. Of the students who reported a decrease in the amount of drinks, 75% stayed in the United States 2 years or shorter. The acculturation score was higher in the students who reported an increase in the amount of drinks than those who reported a decrease in the amount of drinks ($p = .003$).

Multivariate Analyses

As shown in Table 2, while controlling for all other variables in the model, acculturation was predictive of changes in alcohol consumption among Chinese international college students after coming to the United States. Students who showed a high level of acculturation were more likely to report an increase in the amount of drinks than those with a low level of acculturation (AOR = 2.51). Also, students who were older (AOR = 1.08) and smoked more cigarettes after coming to the United States (AOR = 8.01) were more likely to report an increase in the amount of drinks than their counterparts, respectively.

Table 1. Characteristics of the sample by correlates (N = 635)

Predictor	All		Current drinkers		Those who drank more in the U.S.		Those who drank less in the U.S.	
	N	% ^a	N	% ^a	N	% ^a	N	% ^a
Overall	635	100.0	276	43.5	110	17.3	195	30.7
Sex								
Male	257	40.5	135	48.9	35	31.8	107	54.9
Female	378	59.5	141	51.1	75	68.2	88	45.1
Marital status								
Married	51	8.0	23	8.4	9	8.2	19	9.8
Not married	583	92.0	252	91.6	101	91.8	175	90.2
Enrolled educational program								
Bachelor's degree	327	52.3	122	45.0	51	46.8	109	56.8
Master's degree	150	24.0	76	28.0	33	30.3	32	16.7
Doctorate	148	23.7	73	26.9	25	22.9	51	26.6
Duration of stay in the U.S.								
Less than 1 year	240	37.8	83	30.1	22	20.0	78	40.0
1-2 years	198	31.2	87	31.5	28	25.5	68	34.9
3-4 years	150	23.6	80	29.0	45	40.9	41	21.0
5 years or longer	47	7.4	26	9.4	15	13.6	8	4.1
Current housing								
College dormitory	187	29.4	49	17.8	17	15.5	61	31.3
Other college housing	82	12.9	31	11.2	19	17.3	20	10.3
Off-campus house or apartment	366	57.6	196	71.0	74	67.3	114	58.5
Drinking problems in family members								
Yes	38	6.3	16	6.0	6	5.6	18	9.2
No	565	93.7	250	94.0	101	94.4	168	86.2
Smoking behavior								
Current smoker	48	7.6	28	10.8	14	12.7	6	25.0
Nonsmoker	587	92.4	231	89.2	96	87.3	18	75.0
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Acculturation score	2.48	0.35	2.51	0.36	2.58	0.40	2.45	0.33

Note. ^aThe percentages may not add to 100 due to missing data or rounding errors.

Comments

This was one of the first studies to investigate the effect of acculturation on alcohol use among Chinese students who are currently in the U.S. In contrast with most previous studies with Asian Americans, [33,34] we observed an association of acculturation and drinking quantity/frequency among Chinese international student in the U.S. This finding extends previous knowledge by suggesting that acculturation is a universal risk factor for drinking in this group. The acculturation score was higher in the students who reported an increase in the amount of drinks than those who reported a decrease in the amount of drinks. The findings in this study also contribute to a growing body of literature showing that relationships between acculturation and health outcomes are significant. Most studies suggest that acculturation is a risk factor for alcohol use among Asian Americans, [35,36] the present findings suggest that acculturation is a causal factor of the changes in alcohol consumption among Chinese international

college students. Students with a high level of acculturation are more likely to increase their alcohol consumption after coming to the United States. The finding also indicated that smoking behavior is associated with drinking behavior among Chinese international students who are studying in the U.S. Students who smoke more after coming to the U.S are more likely to drink more as well.

Results of this study have valuable implications for future research. This study suggests that Chinese students increase alcohol consumption after coming to the U.S mainly because of the influence of acculturation. Future research might seek to identify within group differences in order gain more accurate and valuable information. [23] Adding assessments of personality and stress coping skills would detect the information missed in this study. [9] In addition, future longitudinal studies are needed to identify temporal junctures at which environmental factors interact with acculturation factors in predicting alcohol use in this population. [36]

Table 2. Sequential multinomial logistic regression of drinking behavior changes in Chinese international students (N= 635)

	Increased Drinking		Decreased Drinking	
	AOR	95%CI	AOR	95%CI
Model 1 (Age and Sex)				
Age	1.10**	1.03-1.17	1.00	0.95-1.06
Sex				
Male	0.79	0.50-1.27	2.27***	1.57-3.26
Female	1.00	Reference	1.00	Reference
Model 2 (Model 1 + drinking problems in family), -2 LL difference = 47.49 (df= 2), p < .001				
Age	1.09**	1.03-1.16	1.01	0.95-1.07
Sex				
Male	0.82	0.51-1.32	2.26***	1.55-3.29
Female	1.00	Reference	1.00	Reference
Drinking problems in family				
Yes	1.31	0.49-3.52	2.21*	1.06-4.62
No	1.00	Reference	1.00	Reference
Model 3 (Model 2 + current housing), -2 LL difference = 130.70 (df= 4), p < .001				
Age	1.06	0.99-1.14	1.01	0.95-1.08
Sex				
Male	0.83	0.51-1.34	2.25***	1.54-3.30
Female	1.00	Reference	1.00	Reference
Drinking problems in family				
Yes	1.33	0.49-3.59	2.21*	1.05-4.62
No	1.00	Reference	1.00	Reference
Currently Housing				
College dormitory	0.51*	0.27-0.96	1.08	0.68-1.72
Other college housing	1.15	0.62-2.15	0.96	0.52-1.78
Off-campus house or apartment	1.00	Reference	1.00	Reference
Model 4 (Model 3 + smoking after coming to the U.S.), -2 LL difference = 86.16 (df= 4), p < .001				
Age	1.07*	1.00-1.15	1.01	0.95-1.07
Sex				
Male	0.74	0.45-1.21	2.08***	1.42-3.07
Female	1.00	Reference	1.00	Reference
Drinking problems in family				
Yes	1.34	0.49-3.69	2.22*	1.06-4.67
No	1.00	Reference	1.00	Reference
Currently Housing				
College dormitory	0.49*	0.26-0.94	1.06	0.67-1.70
Other college housing	1.15	0.61-2.16	1.00	0.54-1.85
Off-campus house or apartment	1.00	Reference	1.00	Reference
Smoking after coming to the U.S.				
Increased	8.27***	2.66-25.74	2.84	0.92-8.75
Decreased	0.88	0.34- 2.33	2.22*	1.18-4.15
Unchanged	1.00	Reference	1.00	Reference
Model 5 (Model 4 +acculturation), -2 LL difference = 487.51 (df= 2), p < .001				
Age	1.08*	1.01-1.16	1.01	0.95-1.07
Sex				
Male	0.74	0.45-1.22	2.09***	1.42-3.07
Female	1.00	Reference	1.00	Reference
Drinking problems in family				
Yes	1.27	0.46-3.49	2.25*	1.07-4.73
No	1.00	Reference	1.00	Reference
Currently Housing				
College dormitory	0.51*	0.27-0.96	1.07	0.67-1.70
Other college housing	1.13	0.60-2.15	1.00	0.54-1.86
Off-campus house or apartment	1.00	Reference	1.00	Reference
Smoking after coming to the U.S.				
Increased	8.01***	2.55-25.2	2.84	0.92-8.78
Decreased	0.90	0.34- 2.38	2.21*	1.18-4.14
Unchanged	1.00	Reference	1.00	Reference
Acculturation	2.51**	1.33- 4.73	0.85	0.48-1.51

Note. Each model was compared to the immediate previous model.
AOR = adjusted odds ratio; CI = confidence interval; LL = log likelihood.
* p < .05, ** p < .01, *** p < .001

Limitations

This study is limited by some factors. Firstly, other studies [32] found that the effects of acculturation on drinking were mediated or moderated by psychosocial factors; however psychosocial factors were not assessed in this study. Therefore, the findings reported here could differ when examined in other cohorts or in the context of other psychosocial influences. Secondly, this study used self-reported questionnaire, so the data may include bias given that

participants do not always report their behaviors or respond to questions accurately. Also, this study has relatively low response rate, however it is not uncommon in studies using online survey as the data collection method. One study conducted in 2011 about smoking behavior among young adults invited 4,606 people, 248 (5.4%) provided smoking data and 181 (3.9) completed the entire survey. [37] Finally, the present results suggest that acculturation is universal risk factor for

drinking among Chinese international students. Continued research is needed to clarify the conditions under which acculturation promotes increased or decreased risk for alcohol use. There is consensus that efforts are needed to identify the mechanisms by which acculturation influences health outcomes. [22,32,38,39] The use of prospective designs and examination of mediating and moderating variables in future studies will likely aid in clarifying these processes.

CONCLUSIONS

Despite these limitations, this study contributes to the literature by showing the significant effects of acculturation on Chinese students' drinking behavior after they come to the U.S by examining cross-level interactions between predictors. This study can be used as an evidence for future drinking intervention program focusing on Chinese or foreign students who are studying in the U.S.

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