



Master of Public Health

Master de Santé Publique

Alcohol consumption among university students in Lebanon and France through the Theory of Planned Behavior framework (TPB)

Ghiwa NASSAR

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Academic advisor:

Aymery CONSTANT, PhD, EHESP

Professional advisor:

Mathilde BERTHELOT, MD

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LIST OF ABBREVIATIONS

AUDIT-C	Alcohol Use Disorders Identification Test-Concise
CVE	Community Violence Exposure
ESPAD	European School Survey Project on Alcohol and Other Drugs
HED	Heavy Episodic Drinking
IBM	Integrated Behavioral Model
PBC	Perceived Behavioral Control
SN	Subjective Norms
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
WHO	World Health Organization

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ABSTRACT – ENGLISH

Introduction: Alcohol consumption among university student is a worldwide public health problem. This activity is part of the students' social life and sometimes results in excessive use. The Theory of Planned Behavior (TPB), a model widely used in social and behavioral sciences helps to explain and predict the motives behind engaging in a behavior. Its three elements: attitude, subjective norms, and perceived behavioral control, shape behavioral intention. This study aims to investigate potential similarities in engaging in drinking behavior among university students in two geographically and socially different countries: Lebanon and France, through the elements of the TPB.

Methods: A quantitative cross-sectional design was applied. 307 university students of which 165 attended university in France and 142 in Lebanon, responded to a questionnaire containing statements relative to the elements of the TPB and the AUDIT-C questionnaire to detect hazardous drinking.

Results: No significant difference was observed in both groups as to hazardous drinking (with 78.7% in France, and 72.5% in Lebanon). No significant difference was detected in comparing the mean scores for each element of the TPB for both countries. Attitude and subjective norms, but not perceived behavioral control, were significantly associated with intention to drink: in France Betas respectively were 0.427 and 0.238 (variance 28.9%), and 0.325 and 0.349 for Lebanon (variance 37.9%). Intention played a mediation role when added to model with the three elements.

Conclusion: Student populations engaging in alcohol consumption appear to be similar in different geographic and cultural contexts. Attitude and subjective norms were significantly associated with intention to drink. Public health interventions targeting alcohol consumption should focus on attitude and subjective norms dimensions. A longitudinal design and random sampling are recommended for future studies.

Key-words: Theory of Planned Behavior, alcohol consumption, university students, France, Lebanon.

ABSTRACT – FRENCH

Introduction : La consommation d'alcool chez les étudiants universitaires est un problème mondial de santé publique. Cette activité fait partie de la vie sociale des élèves et se traduit parfois par un abus. La théorie du comportement planifié (TCP), un modèle largement utilisé en sciences sociale et comportementale, aide à expliquer et à prédire les motivations derrière un comportement. Ses trois éléments : l'attitude, les normes subjectives et le contrôle comportemental perçu, façonnent l'intention comportementale. Cette étude vise à étudier les similitudes potentielles dans l'engagement dans la consommation d'alcool chez les étudiants universitaires de deux pays géographiquement et socialement différents : le Liban et la France, à travers les éléments de la TCP.

Méthodes : Une étude quantitative transversale a été utilisée. 307 étudiants universitaires dont 165 en France et 142 au Liban, ont répondu à un questionnaire contenant des déclarations relatives aux éléments de la TPB et le questionnaire AUDIT-C pour détecter la consommation dangereuse d'alcool.

Résultats : Aucune différence significative n'a été observée dans les deux groupes quant à la consommation à risque (avec 78,7 % en France et 72,5 % au Liban). Aucune différence significative n'a été détectée en comparant les scores moyens pour chaque élément du TPB pour les deux pays. L'attitude et les normes subjectives, mais pas le contrôle comportemental perçu, ont été significativement associées à l'intention de boire : en France, les bêtas ont été respectivement 0,427 et 0,238 (variance 28.9%), et 0,325 et 0,349 pour le Liban (variance 37.9%). L'intention a joué un rôle de médiation lorsqu'elle a été ajoutée au modèle avec les trois éléments.

Conclusion : Les populations étudiantes consommant l'alcool apparaissent similaires dans des contextes géographiques et culturels différents. L'attitude et les normes subjectives étaient significativement associées à l'intention de boire. Les interventions de santé publique ciblant la consommation d'alcool devraient se concentrer sur les attitudes et les normes subjectives. Une conception longitudinale et un échantillonnage aléatoire sont recommandés pour les études futures.

Mots-clés : Théorie des comportements planifiés, consommation d'alcool, étudiants universitaires, France, Liban.

INTRODUCTION AND BACKGROUND

According to the World Health Organization (WHO), alcohol is a 'toxic and psychoactive substance with dependence producing properties'. Alcohol consumption has been broadly used across many cultures for centuries. The persistence of a planetary scale alcohol use implies that this practice must have adaptive benefits, but that does not imply that the practice is always beneficial. Drinking has always been a social activity which varies according to cultural context and attitude towards the behavior. I.e. Alcohol is associated with violence and antisocial behavior in the UK or Scandinavia, while drinking is regarded as peaceful and harmonious in the Mediterranean (1).

The toxicity of this substance affects the central nervous system, digestive and cardiovascular systems. Alcohol has carcinogenic and immunosuppressant properties. It is responsible for 3 million yearly deaths worldwide (5.3% of global deaths), and accounts for 5.1 % of the global burden of disease and injury. There is a causal relation between alcohol consumption and numerous health and behavioral disorders, such as non-communicable diseases (liver cirrhosis, cardiovascular diseases, and some cancers), infectious diseases (tuberculosis, HIV/AIDS), dependence, injuries caused by violence, road accidents, clashes, child neglect, and suicides, which tend to occur in relatively younger age groups.

Alcohol consumption not only affects the individual, but also has an impact on family, friends, co-workers, and strangers.

Beside the health and behavioral consequences of alcohol consumption, additional social and economic burdens result in engaging in this activity, namely due to the fiscal burden of the consumption.

Negative health and behavioral outcomes are subject to the volume of alcohol consumed over a lifetime, as well as the frequency of the consumption and amount consumed per occasion. The outcomes are largely increased in a dose-dependent manner (2).

Alcohol consumption impacts the health of younger populations. Particularly, in the 20–39 years' age group, alcohol is responsible for 13.5 % of the total deaths. Drinking habits acquired as young adult are likely to be maintained throughout adulthood, yet alcohol consumption is a preventable health behavior, especially for young adults who represent the right age group for health-promotion initiatives and program, with the aim of implementing health habits and eventually

reduce the long-term morbidities of this behavior (3). Before designing a health promotion program to reduce this behavior, it is important to understand the motives preceding the behavior.

The European Union represents the heaviest drinking region in the world. Over one fifth of the European population aged 15 years or more reported heavy episodic drinking at least once a week (4). Yet although Europeans are among the world's top consumers of alcohol, very little research has focused on social and cultural aspects of drinking in this part of the world (1).

France has one of the highest alcohol consumption rates in Europe, with a strong drinking culture that is highly attributable to wine. In France, the total alcohol consumption per capita per year (2018) was 12.33 liters of pure alcohol, for 15+ years of age. It is estimated that more than 30% drink excessively (more than two glasses of wine per day and more than five days a week). This trend has gone up during the Covid-19 pandemic, amidst weak governmental control and strong influence of lobby and the alcohol industry (5).

Despite the widespread alcohol culture and strong alcohol industry lobbying, developed countries such as France do have regulations to control this consumption. In other parts of the world, especially in less developed countries, the alcohol consumption culture lacks these regulations. Such an example of these countries is Lebanon. Lebanon, is a country in the Eastern Mediterranean and part of the Middle East. It has the highest proportion of Christian population (around 40% of the total population), and has enjoyed for a long time a relative openness and vitality compared to other middle eastern countries (7). In Lebanon the total alcohol consumption per capita per year was estimated at 1.71 liters (6). No law specifying a legal age for purchase of alcohol exists. In addition, exposure to alcohol marketing and advertising is not regulated. Alcoholic beverages in Lebanon are relatively affordable (7,8). The national prevalence of alcohol dependence in Lebanon is 5%, with a higher risk for men, unmarried, aged between 18 and 34 years old, students, employed, with a low income. Alcohol abuse was higher among Christians and Druze compared to Muslims (9).

Alcohol consumption among university students

Alcohol consumption is a prevalent activity among university students worldwide (10). University students consume alcohol more than their peers in the non-university students' category (11). This substance is easier to access than other substances (often illegal). According to the 2019 European School Survey Project on Alcohol and Other Drugs (ESPAD) report, the perceived

average availability to alcohol was 78%, the highest among other substances, and largely in front of other substances (12). In addition to the health, behavioral and social disorders cited above, alcohol consumption has particular impacts on this sub-group. It affects the students' academic achievements, class attendance, and sleep patterns (13–15), and is associated with illicit drug abuse (16–18).

The particularities about this new phase in life is characterized by independence, integration into new circles of friends which can have different social norms than the parental norms, taking more decisions, balancing academic and social life, and often living with new people (19). University students may additionally experience academic burnout, and resort to alcohol consumption as a coping strategy, as indicated by a systematic review on academic burnout and substance use among medical students (20). The same findings were reported among medical students was burnout (and in particular emotional exhaustion and depersonalization) was highly associated with alcohol abuse (21).

Some studies focused on other reasons behind university students engaging in drinking behavior. Social camaraderie was found to be the most commonly supported reason for alcohol consumption, especially for female students (22). University students report being influenced by their peers more than adults, and results found that peer norms have the highest influence on alcohol consumption, especially among more socially integrated students who tend to drink most heavily (23).

Alcohol consumption among French university students

The majority of studies on alcohol consumption and university students are undertaken for the US (24). To explore a different cultural context, a study undertaken on university students in Paris on perceived social norms and Heavy Episodic Drinking (HED) yielded that perceived peer prevalence of HED (consuming at least 6 standard drinks on one occasion) is associated to the frequency of HED, and that students had an overestimation of their peers' HED activity. Other perceived social norms associated with HED were perceived friends' approval and perceived friends' prevalence of drinking (25).

In a study on medical students' alcohol and other substances consumption in Paris, 74.8% of students reported at least one hazardous alcohol consumption in the last two weeks of the data collection (2.4 episodes on average). The study found a significant association between the

number of risky drinking events and the maximum consumption of alcoholic drinks. High-risk students consumed alcohol most often in a festive context and sought to escape from daily concerns (18).

Alcohol consumption among Lebanese university students

Studies on alcohol consumption among university students in Lebanon fall under studying alcohol use as one substance among others, or among other health behaviors such as diet. Some findings of these studies reveal the following:

Ever-using alcohol prevalence (20.9%) scored the highest among Lebanese university students compared to cannabis, tranquilizers, or other substances (26).

According to a study on the health status assessed over three Lebanese universities, the prevalence of alcohol consumption was 91.6% (27). In another cross-sectional study on health behaviors among university students 33.5% declared consuming alcohol, with higher rates in private versus public universities (28).

Alcohol binge drinking has the strongest correlation with Community Violence Exposure (CVE), a particular aspect of life in Lebanon (29). Such exposure can cause internalizing effects, like psychological issues, or externalizing effects like smoking or drinking (30).

Moreover, in the Lebanese university student's population, a study on the knowledge of the long-term effects of drinking and alcohol consumption indicated a strong inverse association between awareness of the harms of alcohol use and hazardous consumption (31).

Salamé J. et al. concluded that older Christian male students, attending a private university, and enrolled in a non-health specialty and residing in the top 2 economically developed regions: Beirut or Mount Lebanon, were associated with a higher risk of harmful alcohol use. Beliefs about alcohol consumption peers' opinions had a significant association with this harmful behavior (32).

The Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is a cognitive theory developed by Icek Ajzen in 1985 to explain and predict human behavior, over which one has volitional control. It built on the Theory

of Reasoned Action (TRA), which was developed in 1980 (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The TPB links beliefs to behavior in a causal pathway, passing through intention to behave. It has three main components: attitudes toward the behavior, subjective norms, and perceived behavioral control, which influence behavioral intention (the strength of the individual's prior to perform or not perform a specific behavior), and ultimately behavior.

Attitudes toward the behavior are the sum of an individual's knowledge, information, prejudice and position about a certain behavior. They are influenced by behavioral beliefs or belief that a behavior produces a certain outcome and the evaluation of this outcome.

Subjective norms (SN) refer to how we see others' attitude about a certain behavior (friends, family, colleagues...). They are under the effect of normative beliefs which include the motivation to comply with important peoples' norms.

And perceived behavioral control (PBC) implies how much one has the power to control his or her behavior. Control beliefs impact perceived behavioral control and include abilities, information, and opportunity to achieve the behavior (33–35) (Figure 1.). Perceived behavioral control is in accordance with the concept of self-efficacy, a term coined by Albert Bandura (1977), and defined as an individual's ability to master their functioning and their life events. According to the author self-efficacy is a predetermined component to coping and behavior change (36). High self-efficacy is associated with resilience to stress, better performance at work (37), and engagement in healthy habits (38).

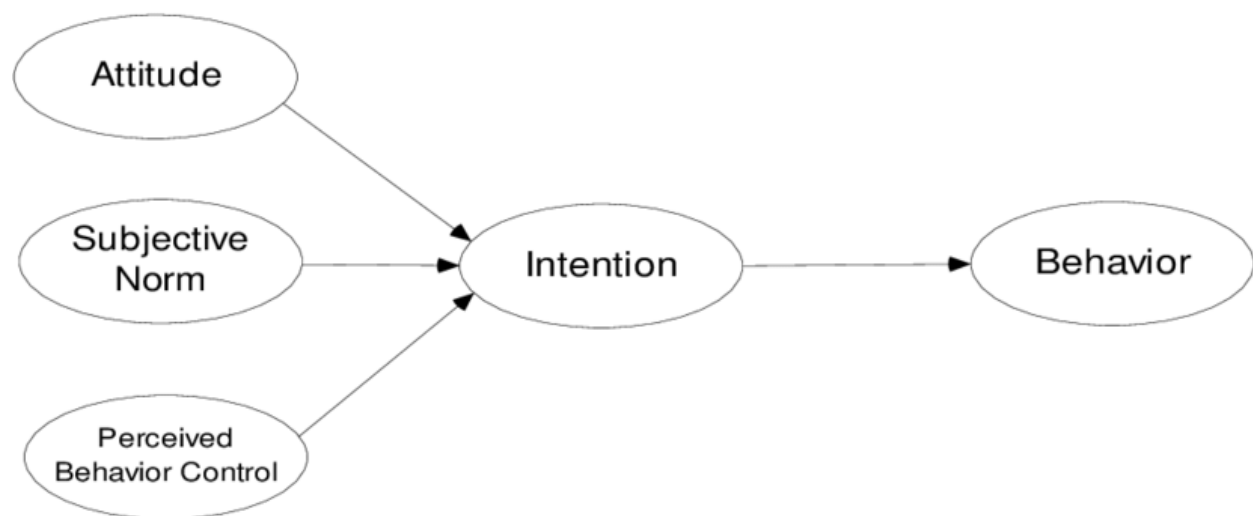


Figure 1. The diagram of the Theory of Planned Behavior (34)

TPB has been widely used as a theoretical framework in Public Health, among many other fields, and specifically in health promotion programs, to explain health-related behaviors, such as smoking, drinking, substance use, health services utilization, breastfeeding, exercise, contraceptives use, among others (39).

As mentioned in the previous section, many studies associated alcohol consumption of university students with peer influence or group pressure. This aspect would fall under the Subjective Norms element of the TPB. However, it would be interesting to explore the rest of the element of the TPB with alcohol consumption among this sub-population.

The Theory of Planned Behavior and alcohol consumption

TPB has been successfully applied as a framework to explain and predict alcohol consumption behavior. The most recent systematic review, published in 2022 explored drinking behavior with the objective of enlightening health promotion programs. It investigated TPB and its derivative, the Integrated Behavioral Model (IBM) to understand and predict alcohol consumption behavior. IBM is an evolved model of the TPB. It adds four elements into consideration, which are: skills, importance of the behavior, environmental restraints, and habit.

The model predicted 26% to 90% of drinking behavior, with an emphasis on attitudes as the stronger predictor for intention to behavior, and that the elements of the models predicted 45% to 75% variance for intentions (40). In another systematic review and meta-analysis, intentions had the strongest association with attitudes, followed by subjective norms and perceived behavioral control. Intention had the strongest association with alcohol consumption. Moreover, females had a stronger attitude–intention association than males (41).

In the context of university students, a study performed to predict excessive engaging in alcohol and cannabis consumption, yielded support for the TPB as an underlying mechanism linking different personal and environmental factors to intention to adopt alcohol and cannabis use, as well as support for the perceived control constituents (42). Another study on heavy episodic drinking among university students found that Self-efficacy and attitudes significantly predicted intention to behave (43). In undergraduate students, mainly attitude and self-efficacy explained 75% of the variance in binge drinking intentions (44).

Descriptive norms (perception of how others behave) among university students in fraternities or sororities significantly predicted actual alcohol consumption, and injunctive norms (perception of peer approval) significantly predicted alcohol consumption at one-year follow-up (45). Both descriptive and injunctive norms resemble the 'subjective norm' component of the TPB.

Research question

With paucity of studies on alcohol consumption among university students in France and in Lebanon, especially in the context of the TPB, this study aims to link alcohol consumption behavior to the elements of the TBP in the context of France and Lebanon. The research question is what is the relation between intention to drink and the three elements of the TPB: attitude, subjective norms, and perceived behavioral control to alcohol consumption among Lebanese university students, compared to French students. And are there similarities on the TPB and alcohol consumption among the sub-population of university students, between two culturally different countries?

Answering these questions would ultimately help design and implement public health intervention programs based on some/all elements of the TPB, aiming to influence changing behavior among university students regarding alcohol consumption.

The objective of this study

The main objective of this study is to evaluate the association between the three elements on the TPB (independent variables): attitudes, subjective norms, and perceived behavioral control, with the intention to drink (dependent variable) a predetermined element to the behavior, for the two groups, through a comparative analysis: students in Lebanese universities and students in French universities. The other comparative evaluation is the association with the 4 elements of the TPB (attitudes, subjective norms, and perceived behavioral control, and intention) with the behavior as an outcome variable.

We hypothesize that there is an association between all or some of the elements: attitudes, subjective norms, perceived behavioral control and intention to drink (which ultimately determines

the behavior of alcohol consumption), and an association with the some or all 4 elements of the TPB and drinking behavior.

The other objective is to detect and compare hazardous consumption of alcohol between both populations.

METHODS

Data collection

Participants in this study were recruited via social media networks featuring groups of university students, with a voluntary, snowball sampling method. By order of importance, WhatsApp groups for students, Facebook groups for students, individual link sharing on Instagram, and sharing via email addresses were the means of questionnaire distribution. Participants were sent a link to the survey including the questions for data collection. They were asked to fill out the survey if they fulfilled the following criteria: currently a university student, had at least one drink in the last year, aged 18 and above.

Information about the interest and objectives of the study was provided. Anonymity, confidentiality and voluntary participation were clarified.

Three hundred and seven participants met the inclusion criteria for participation, among them 165 students formed the France group and 142 students formed the Lebanon group.

Instruments

A questionnaire including questions on socio-demographic characteristics, AUDIT-C questions, and questions on the elements of the TBP is used.

For detecting hazardous alcohol consumption, the Alcohol Use Disorders Identification Test-Concise (AUDIT-C) questionnaire was used. It reliably identifies hazardous drinkers or active alcohol use disorders. The AUDIT-C consists of 3 questions and is scored on a scale of 0-12. Each question has 5 possible Likert scale answers ranging from 0 to 4. For men, a score of 4 or more is considered positive, optimal for identifying hazardous drinking or active alcohol use

disorders. For women, a score of 3 or more is considered positive. The higher the score, the more likely it is that a person's drinking is affecting his or her safety (46).

A 6-point Likert scale ranging from 'strongly disagree' (score 1) to 'strongly agree' (score 6) is used for the questions related to the elements of the TBP.

Four statements on attitudes were included: 'Drinking alcohol is enjoyable', 'Drinking alcohol is relaxing', 'Drinking alcohol improves my self-esteem', and 'Drinking alcohol helps me cope with stress'. 3 statements on subjective norms: 'Drinking alcohol is a socially accepted activity in my social circle', 'Drinking alcohol is encouraged amongst my friends/peers', and 'Most people who are close to me approve of my drinking habits'; and 4 statements on perceived behavioral control: 'I am confident that I can control my alcohol consumption', 'I am likely to say no to alcohol consumption when I'm feeling angry', 'I am likely to say no to alcohol consumption when I'm feeling sad', and 'I am likely to say no to alcohol consumption when a friend suggests it', were included.

For the outcome variable, intention to drink, one statement is included: 'I intend to use alcohol in the next month'.

The choice of the statements constituting the different elements of the TPB was based on studies investigating TPB as a framework for substance or alcohol use (41,47).

Statistical analysis

SPSS V.23 was used for statistical analysis. For continuous variables the mean and the standard deviation were used. Frequencies and percentages were reported for categorical variables. χ^2 test and t-test were used to compare socio-demographic variables between France and Lebanon accordingly. Cronbach's alpha was tested in each dimension (4 questions in attitude, 3 questions in social, and 4 questions in perceived control) accounting a significant level of >0.7 to establish reliability. Pearson correlation coefficients were obtained from the correlation between the three dimensions: attitude, social, perceived control and the dependent variable of intention to drink. A multivariable linear regression was further performed to corroborate these assumptions in the overall population and by country of studies. P-values <0.05 were assumed as statistically significant.

RESULTS

Socio-demographic characteristics of the groups and their Audit-C scores

Table 1 summarizes the socio-demographic characteristics of the two groups and the whole sample. The majority of the participants were females. For the France group, participants were older than the Lebanon group, with most participants enrolled in a Master program and a public university. For both groups most students followed health-related studies, with no significant differences between both groups. In the Lebanon group, most students lived with their parents, while in the France group it was the opposite. Both groups had almost the same Audit-C score. Both groups did not show a significant difference for the outcome Audit-C score and its categories. In the France group, 78.7% were hazardous drinkers, and 72.5% were hazardous drinkers in the Lebanon group.

Table 1. Socio-demographic characteristics of the populations and comparison between France and Lebanon

Variables	Total population N=307	France N=165	Lebanon N=142	p value
Age (years)	M 23.98 (SD 5.23)	M 26.18 (SD 5.65)	M 21.44 (SD 3.17)	<0.001
	N(%)	N(%)	N(%)	
Gender				0.001
Female	226 (73.6)	133 (80.6)	93 (65.5)	
Male	79 (25.7)	30 (18.2)	49 (34.5)	
Study program				<0.001
Bachelor	128 (41.7)	16 (9.7)	112 (78.9)	
Other	179 (58.3)	149 (90.3)	30 (21.1)	
Type of university				<0.001
Public	170 (55.4)	135 (81.8)	35 (24.6)	
Private	137 (44.6)	30 (18.2)	107 (75.4)	
Type of studies				0.092
Health-related	225 (73.3)	114 (69.1)	111 (78.2)	
Non health-related	82 (26.7)	51 (30.9)	31 (21.8)	
Living				<0.001
with parents	143 (46.6)	19 (11.5)	124 (87.3)	
alone/with peers/partner	164 (53.4)	146 (88.5)	18 (12.7)	
Student job				0.007
Yes	121 (39.4)	77 (46.7)	44 (31.0)	
No	186 (60.6)	88 (53.3)	98 (69.0)	
Audit-C score (0-12)	M 4 (SD 1.64)	M 4.04 (SD 1.56)	M 3.96 (SD 1.73)	0.704
Hazardous drinking	N(%)	N(%)	N(%)	0.229
Female	176 (75.5)	108 (83.1)	68 (66)	
Male	55 (23.6)	20 (15.4)	35 (34)	

Notes: M Mean, SD Standard Deviation, values in bold indicate a non-significant association (p values for χ^2 test for all variables except age and Audit-C score where t-test was used)

The characteristics of the elements of the TPB according to each group

The mean, Standard Deviation (SD) and the Cronbach's alpha values for the elements of the TPB are summarized in table 2. All elements with sets of questions (attitude, SN, and PBC) achieved a Cronbach's alpha superior to 0.7, accounting for a significant level of reliability. In the France group, participants scored higher on all elements except for SN. For both groups, and for all

statements participants mean answers were >3 (crossing to the 'agree' category) except for two statements for the Lebanon group, where the mean score was below 3: 'Drinking alcohol improves my self-esteem' (mean score 2.69) and 'Drinking alcohol helps me cope with stress' (mean score 2.67). in the France group, the highest score per statement belonged to 'Drinking alcohol is a socially accepted activity in my social circle' (5.24), and in the Lebanon group the highest mean statement score belonged to 'I am confident that I can control my alcohol consumption' (5.75). both groups scored the lowest for the two Attitude statements: 'Drinking alcohol improves my self-esteem' and 'Drinking alcohol helps me cope with stress'.

Standard deviation was below 1.7 for every question for all four elements. Since all sets of questionnaires achieved a significant reliability level, p values were calculated for each element to compare the differences in the scores between the countries. They were: 0.164 for attitude, 0.081 for subjective norms, and 0.159 for perceived behavioral control. Hence, no significant difference in the mean scores for each element was observed between the two countries.

Table 2. Mean value and SD of each element of the TBP and the values of Cronbach's alpha

Element	France		Lebanon		Total population		Cronbach
	Mean	SD	Mean	SD	Mean	SD	
Attitude							
Drinking alcohol is enjoyable	4.60	1.14	4.03	1.33	4.34	1.26	0.757
Drinking alcohol is relaxing	4.00	1.31	3.36	1.48	3.7	1.42	
Drinking alcohol improves my self-esteem	3.21	1.48	2.69	1.57	2.97	1.54	
Drinking alcohol helps me cope with stress	3.06	1.53	2.77	1.65	2.93	1.59	
Mean of Attitude (sum)	14.87	3.95	12.85	4.73	13.93	4.44	
Subjective Norms							
Drinking alcohol is a socially accepted activity in my social circle	5.24	1.06	4.25	1.74	4.79	1.50	0.722
Drinking alcohol is encouraged amongst my friends/peers	4.18	1.43	3.72	1.56	3.96	1.50	
Most people who are close to me approve of my drinking habits	4.72	1.28	4.23	1.64	4.49	1.48	
Mean of Subjective Norms (sum)	16.69	4.30	18.92	4.33	17.71	4.45	
Perceived Behavioral Control							
I am confident that I can control my alcohol consumption	5.12	1.21	5.75	0.71	5.41	1.06	0.716
I am likely to say no to alcohol consumption when I'm feeling angry	4.10	1.60	4.71	1.63	4.38	1.64	
I am likely to say no to alcohol consumption when I'm feeling sad	3.93	1.68	4.55	1.61	4.21	1.67	
I am likely to say no to alcohol consumption when a friend suggests it	3.54	1.55	3.9	1.65	3.71	1.60	
Mean of Behavioral Control (sum)	14.13	2.89	12.19	4.02	13.23	3.59	
Intention to behave							
I intend to use alcohol in the next month	4.88	1.34	3.7	1.65	4.33	1.6	

Score range for each statement 1-6, SD: Standard Deviation, TPB: Theory of Planned Behavior

The association between Attitude, SN, PBC as covariates and Intention to drink as an outcome variable

The results of these associations are summarized in table 3. In all 3 populations: France, Lebanon and overall, attitude and SN were positively associated with the intention to drink.

Attitude has the highest weight in the France group with a standardized Beta higher than the one for SN. For the Lebanon group, SN Beta coefficient is slightly higher than the one for Attitude. And in the overall population, attitude has more weight than SN.

Moreover, in the France group, the covariates explained 28.9% of the variance in intention. In the Lebanon group, they predicted 34.8% of intention to drink, and in the overall population 37.9% of the variance.

Table 3. Relation between intention to drink and the 3 elements of the TPB (attitude, SN, PBC), a multiple linear regression

		Variable	Beta	p value	Adjusted R ²
France	Intention	Intercept	-	0.167	0.289
		Attitude	0.427	<0.001	
		SN	0.238	0.001	
		PBC	0.038	0.592	
Lebanon	Intention	Intercept	-	0.110	0.348
		Attitude	0.325	<0.001	
		SN	0.349	<0.001	
		PBC	-0.098	0.180	
Total population	Intention	Intercept	-	0.067	0.379
		Attitude	0.371	<0.001	
		SN	0.331	<0.001	
		PBC	-0.067	0.169	

PBC: Perceived Behavioral Control, SN: Subjective Norms, TPB: Theory of Planned Behavior

The association between Attitude, SN, PBC and Intention to drink as covariates, and the intensity of drinking behavior as an outcome variable

As shown in table 4, no significant association was highlighted between the riskiness of the drinking behavior, measured on the Audit-C scale, and the elements of the TBP. The intention variable seems to play a meditation role, as presented in the TPB.

Table 4. Relation between the Audit-C scores, and the four elements of the TPB, a multiple linear regression

		Variable	Beta	p value
France	Audit-C	Intercept	-	<0.001
		Attitude	0.037	0.702
		SN	-0.011	0.903
		PBC	-0.059	0.479
		Intention	-0.163	0.083
Lebanon	Audit-C	Intercept	-	<0.001
		Attitude	0.195	0.064
		SN	-0.099	0.321
		PBC	-0.020	0.822
		Intention	0.013	0.899
Total population	Audit-C	Intercept	-	<0.001
		Attitude	0.119	0.105
		SN	-0.044	0.424
		PBC	-0.050	0.516
		Intention	-0.073	0.316

PBC: Perceived Behavioral Control, SN: Subjective Norms, TPB: Theory of Planned Behavior

DISCUSSION

The main findings of this study are the following: in both countries, among university students who consume alcohol, 78.7% were hazardous drinkers in France, and 72.5% were hazardous drinkers in Lebanon. No statistically significant difference was observed between both groups for this measure. The scores for each element of the TPB for both groups yielded no statistically significant difference. Of the elements of the TPB, Attitude and subjective norms were significantly associated with intention to drink in the overall population and in both countries. Attitude had a higher weight in the France group compared to SN, while SN had a slightly higher weight in the Lebanon group. In Lebanon, they predicted 34.8% of the intention to drink, while in France 28.9%. No significant association was achieved between PBC and intention to drink. There was no association between the 4 elements of the TPB and the riskiness or intensity of the drinking

behavior. Since intention to change/ behave is represented in the TPB framework as a mediator, it was expected to observe non-significant results when the intention variable in the model.

The high incidence of hazardous drinking among university students in both countries highlights the seriousness of the public health impact of the drinking behavior among the student population. This result was in accordance with the WHO numbers mentioned previously. While the per capita per year alcohol consumption is relatively much higher in France than in Lebanon for the general population (12.33 liters versus 1.71), this comparison however does not stand for the drinking population, specifically the drinking students population. As a matter of fact, alcohol consuming culture in Lebanon is accepted among the Christian community (32.4% of the total population (48)) for lack of religious taboo, and among a small proportion of the non-religious Muslim community. In this study, students responding to the questionnaire had to part of the drinking community. Because of similarities in the numbers between both countries on the Audit-C scores and risky drinking behavior, the TPB provides a high interest in explaining this behavior. Although differences in socio-demographic characteristics have been noted between the two groups, nonetheless, the groups are comparable by type of university since in Lebanon 64.27% of students attend private universities (49), against 23.1% in France (49). The groups are also comparable by 'living with' category because it is culturally normal for young adults to live with their parents in Lebanon until they get married, or even after (50). The similarities in the results for both group support the findings indicating the importance of alcohol in university student life as demonstrated by a cross-cultural study on university students in three different countries exploring the perception of 'normal' drinking through the College Life Alcohol Salience Scale (CLASS). Similarities in perception were reported among the USA, Spain and Argentina (51).

There were discrepancies in previous studies as to which of the elements of the TPB had significant associations and to how strong was this association, nonetheless with an emphasis on attitude being the most associated with intention. On the other hand, when investigating the TPB as model to predict alcohol consumption, Bhoohibhoya A. and Branscum P. concluded that elements of the TPB predicted 45% to 75% variance for intentions, in the general population, and according to Norman P. et al. attitude and self-efficacy explained 75% of the variance in binge drinking intentions. The variances observed in this study concerning the university students' population were below 45% (34.8% for Lebanon, and 28.9% for France). The difference between

this study and Norman P. et al.'s is that the intention variable here was intention to drink and not intention to engage in binge drinking. Otherwise Norman P. et al.'s study concerned only undergraduate students. Other elements, not related to the motives to drinking described by the TPB can be responsible for the intention to drink, such as accessibility, habit, or other.

In the systematic review and meta-analysis papers on alcohol consumption in the general population, attitude was the strongest predictor to intention according to Bhochhibhoya A. and Branscum P. (40). And according to Cooke R. et al. (41), attitude had the strongest correlation with intention ($r_+ = 0.62$), followed by SN ($r_+ = 0.47$), and PBC ($r_+ = 0.31$). The findings were consistent with this study, albeit with smaller coefficients of correlation, and mainly for the France group. Yet no association was statistically significant between PBC and intention, in this study. Further investigations with a different study design and sampling method is required to better explore the association between PBC and intention to drink.

More precisely, when looking into studies conducted among university students and drinking activities, the common outcome of measure is binge drinking or Heavy Episodic Drinking (HED) and the most studied variable is SN. No direct comparison can be made between the behavior outcome of this study, represented as the severity of drinking, reported for past behavior, and binge drinking or HED for a number of reasons. First, the outcome binge drinking or HED is not represented as a scale, unlike the Audit-C scale in the present study, but as an event occurring in time. Secondly, most studies were longitudinal studies assessing a measured behavior that occurred at a future point in time (binge drinking or HED), explained by a previous questionnaire on the elements of the TBP. Nonetheless, some results were consistent with the present study. Larimer M. E. et al. emphasized on SN as a predictor of present or future drinking among fraternity/sorority students (45). In a study on group norms among university students, Johnston K. et al supported that SN predicted intentions to binge-drink, especially for students with high identification with a group. Both studies focus on students involved in student life groups, which highlights the importance of the SN element. This study did not specify if the participants were members of a social group the university or not.

According to a study by Collins S. et al on university binge drinking the TPB model explained better binge drinking compared to TPB and past behavior as predictors. Attitude and self-efficacy predicted intention (43). In the one study focused on SN among French university students and HED, an overestimation of friends' HED, friends' acceptance of HED and other substances were associated with HED. This is in relative accordance with the results of this study as the importance of SN. This study does not associate other unhealthy behaviors or substance use with the TPB

and alcohol consumption. For future studies, it would be interesting to include other substances along with alcohol in the TPB framework.

The results of this study cannot be directly compared with the studies conducted upon university students in Lebanon on alcohol consumption, for lack of studies using the TPB to explain and predict this behavior. Nonetheless the results confirm the association between peer opinion (a component of SN) and harmful alcohol use as described by Salamé J. et al. (32). On the other hand, all the studies mentioned before on university students in Lebanon, were conducted before 3 major events: The Covid-19 pandemic, the worst economic crisis that the country ever witnessed (since 2019) and the Beirut port explosion in 2020 (52). Those events might have had an influence on the elements of the TPB concerning alcohol consumption, and hence affected the participants' answers in this study, compared to pre-2019 studies. Unlike the majority of the studies on university students in both countries or in general, this study added more elements of investigation to alcohol consumption, than only Subjective Norms. One of the points of interests of this study is hence the focus on not only subjective norms and their relation to drinking, but also on other elements, namely attitudes and perceived behavioral control.

Strengths and limitations

One of the strengths of this study is the investigation of the applicability of the Theory of Planned Behavior not only among two populations in one country, but in two countries with differences in culture, demographics, size, History and general perception of alcohol drinking. No previous study has undertaken this task, at least for a negative health behavior, and more precisely for alcohol consumption. However, as demonstrated by the similarity of the results, when perception is narrowed down to the behavior and intention to behave as the key measures, the TPB has a potential of being a universal framework for explaining and predicting a behavior in spite of the differences. In addition, no study had investigated the TPB among university students in Lebanon regarding alcohol consumption and only one study used the TPB framework for alcohol consumption in French universities.

Overall, the TPB adds more elements to investigate drinking behavior among university students beside Subjective Norms, and its related categories such as peer influence, peer perception of behavior, ...

Yet this study has limitations. First for the sampling method, a snowball sampling being a non-random method can limit representativeness of the population in general and on a stratified level. It was however chosen as a data collection method due to constraints in time and resources. Another limitation is a relatively small sample size for both groups that was achieved at the end of the data collection phase.

There was a limitation relative to the TPB itself. No standardized questionnaire relative to TPB existed. And like for other studies a questionnaire has to be built and adjusted to the study.

A longitudinal design would have been a more robust design to assess the predictive aspect of the TPB, placing the outcome (a concretely measured behavior) in a posterior position to the predictors, or the elements of the TPB.

CONCLUSION AND PERSPECTIVE

Alcohol consumption among university students is a worldwide public health issue. As demonstrated previously, as well as in this study, the Theory of Planned Behavior is a framework which helps shed a better understanding on engaging in this behavior for this population. This study yielded higher numbers of hazardous drinkers among students who consume alcohol in 2 different countries, with no significant differences in both countries. Similarities extended to the elements of the Theory of Planned Behavior between both countries as to the drinking behavior. Attitude and Subjective Norms were significantly associated with Intention to behave. We can extend this conclusion to recommendations of health behavior design and interventions by suggesting that interventions to reduce alcohol consumption among university students in different countries can be framed through the TPB, and specifically based on targeting Attitude and Subjective Norms towards the behavior. This study being conducted on university students in two different countries support an aspect of universality of the TPB and risky health behaviors. Although comparing only two countries, recommendations for comparing TPB in 3 or more countries could be made, in the context of risky health behavior in general, and alcohol consumption is particular. Further studies with better study design and data collection methods are recommended for future investigations on alcohol consumption or engaging in risky health behavior among university students in general.

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ANNEXES

AUDIT- C

1. How often do you have a drink containing alcohol?

- | | |
|--|---|
| <input type="checkbox"/> Never | <input type="checkbox"/> 2-3 times a week |
| <input type="checkbox"/> Monthly or less | <input type="checkbox"/> 4 or more times a week |
| <input type="checkbox"/> 2-4 times a month | |

2. How many standard drinks containing alcohol do you have on a typical day?

- | | |
|---------------------------------|-------------------------------------|
| <input type="checkbox"/> 1 or 2 | <input type="checkbox"/> 7 to 9 |
| <input type="checkbox"/> 3 to 4 | <input type="checkbox"/> 10 or more |
| <input type="checkbox"/> 5 to 6 | |

3. How often do you have six or more drinks on one occasion?

- | | |
|--|--|
| <input type="checkbox"/> Daily or almost daily | <input type="checkbox"/> Less than monthly |
| <input type="checkbox"/> Weekly | <input type="checkbox"/> Never |
| <input type="checkbox"/> Monthly | |

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