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**ALCOHOL CONSUMPTION IN COLLEGE: HEALTH,  
KNOWLEDGE AND MOTIVATIONAL CHARACTERISTICS**

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*Abstract*

College students present behaviors of alcohol consumption, that could lead to social and health problems. Changing these behaviors (e.g. health education) may decrease future social and health related problems. We aim to identify the relationship between the alcohol consumption behaviors presented by college students with their health behaviors, with their perceived knowledge levels about consumption consequences and drinking motives. A cross-sectional study was performed through a convenience sample (n=338) The questionnaire included socio-demographic, consumption behaviors and health related variables, and the Drinking Motives Questionnaire - Revised (DMQ-R). To verify the distribution of categorical variables, qui-square tests were performed. Odds ratios were calculated in order to measure the association between alcohol consumption and the outcomes. A significance level of 0.05 was established. As for the results, it was found that students who drink are more likely to have smoking habits and higher scores on DMQ-R Enhancement, Coping, Conformity and Social domains. Regardless of any significant relationship found, better health behaviors (diet and physical activity) and knowledge levels in students who drink were verified. Also, these students presented higher proportions of chronic conditions and self-medication. In conclusion, it is observed that students with consumption behaviors are those who have enhancement, coping, conformity and social motives. Additionally, by observing a higher proportion of consumption in students who have better levels of knowledge and health behaviors, may sustain the relevance of the development of health education interventions to enhance and change behaviors, developing students' empowerment.

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## 1. Introduction

Substance use, such as the consumption of alcoholic beverages, is a problem among young adults, often associated with social, financial and health problems. These consumptions may have health effects in terms of comorbidities, mortality and quality of life (World Health Organization, 2014).

These consumptions present a direct relationship with the development of chronic diseases, psychosocial problems (aggression, sexual risk behaviors), accidents, antisocial behavior, decreased academic performance and / or school dropout (Davoren, Shiely, Byrne, & Perry, 2015).

The consumption of alcoholic beverages represents one of the main causes of mortality in the general population, not only having an impact on health, but also on the cognitive and behavioral level (Cooke, Sniehotta, & Schüz, 2007; Davoren et al., 2015).

In the United States of America (USA), alcohol consumption among college students is common (Wolfson et al., 2012). In 2009, alcohol consumption presented a proportion of 40% (Johnston, O'Malley, Bachman, & Schulenberg, 2009). Consistent with these binge-drinking behavior, a cross-sectional study found that the proportion consumption increased from 33% to 54% after the start of the academic year (Eisenberg, Golberstein, & Whitlock, 2014).

From an European perspective, in England, data from the "2008 Health Survey for England" verified that 40% of individuals aged 16-24 years exceeded the daily intake limits of alcohol (National Centre for Social Research, University College of London, 2013). Also in the United Kingdom, a cross-sectional study of college students verified a proportion of 63.4% and 69.5% of ethyl consumption, respectively in males and females (Underwood, Fox, & Manogue, 2010).

In Portugal, the 2014 Annual Report of the Intervention Service on Addiction Behaviors and Dependencies (SICAD, 2015) verified the prevalence of regular consumption in the young adult population of 61%.

## 2. Problem Statement

Alcohol consumption is frequent in college students (Wolfson et al., 2012), presenting a problem among individuals who are transitioning from adolescence to young adulthood (O'Malley & Johnston, 2002).

The high school-college transition period is characterized by the presence of individual factors, such as the development of autonomy and independence, creation and maintenance of a new social network and the development of a social identity and sense of belonging (McGloin, Sullivan, & Thomas, 2014; Scott-Sheldon, Carey, Elliott, Garey, & Carey, 2014); as well as environmental factors, such as the academic-social environment, where alcoholic beverages may be present and where there is a propensity to consume (Reed, McCabe, Lange, Clapp, & Shillington, 2010).

Moreover, alcohol drinking, as well as binge-drinking behaviors, may be influenced by perception of the consumption behaviors of their peers (Borsari & Carey, 2003), by perceptions of the approval of certain consuming behaviors (Scott-Sheldon et al., 2014), by social factors (influence and peer pressure, group approval, social identity) (Rimal, 2008) and personal factors (e.g. consumptions intentions) (Andersson, Johnsson, Berglund, & Öjehagen, 2009).

In order to understand consuming behaviors, the reasons for consumption cannot be disregarded. The consumptions motives might be described by the valence (positive or negative) and the source (internal or external) of the results that the individual attempts to achieve with the consumption. Within the scope of the valence, the individual might consume to obtain positive results (e.g. positive reinforcement) or to avoid a negative outcome (e.g. negative reinforcement). Regarding the source, the consumptions might be due to internal (manipulation or management of the emotional state) or external rewards (Cooper, 1994).

Also in this context, there is a relationship between consumption behaviors and health literacy. Since it is verified that inadequate levels of health literacy are associated with unhealthy behaviors (e.g., excessive alcohol consumption, smoking, low levels of physical activity, and inadequate diet) (Friis, Vind, Simmons, & Mairdal, 2016).

Thus, knowledge in health or health literacy (the ability to perceive, understand and use information for the promotion and maintenance of good health), as well as health behaviors can be improved through health education. This change and improvement of students' knowledge and behavior in the academic period may be possible because they are at a stage of life where they may be receptive to changes in their lifestyle (Epton et al., 2013; Stewart-Brown et al., 2000).

At the behavioral level, adherence or non-adherence to potentially healthy behaviors / attitudes and lifestyles, may influence the adherence to consuming behaviors due to the presence of the clustering effect of poor health behaviors. This effect, referenced in different studies (Conry et al., 2011; Vermeulen-Smit, Ten Have, Van Laar, & De Graaf, 2015), occurs with the aggregation of poor health behaviors such as excessive alcohol consumption, inadequate diet, smoking, physical inactivity/lack of physical exercise, consumption of substances, being associated in greater or lesser extent with poor health outcomes (Kwan, Faulkner, Arbour-Nicitopoulos, & Cairney, 2013).

In addition to the factors of health literacy and behavioral aspects, the determinants of alcohol consumption have been widely studied, often associated with sex, age and previous consumption of substances, causing financial, social and health problems (morbidities, co-morbidity and mortality) (World Health Organization, 2014).

Thus, the study of the influence of individuals' personal factors (health motivations and behaviors, and health literacy), complemented by the study of explanatory models and predictive factors of alcohol consumption presented by students at this period of life may assist in the design and development of psycho-educational and health education interventions. Consequently, with an improved understanding of the associations of different intrinsic and extrinsic determinants may provide tools to better intervene in this population, especially in those considered to be at greater risk for adherence to harmful health behaviors.

### **3. Research Questions**

Understanding the association between health literacy and motivational factors with alcohol consumption can provide valuable information not only in the management of interventions to prevent consumption but also on health education in this population, in order to improve health behaviors. Thus,

this research paper was based on the following research question: What is the relationship between health, knowledge and motivational factors with alcohol consumption among college students?

#### **4. Purpose of the Study**

The main goal of the present study is to identify the relationship between the alcohol consumption behaviors presented by college students with their health behaviors, their perceived knowledge levels about consumption consequences and drinking motives.

#### **5. Research Methods**

##### **5.1. Sample**

A quantitative, descriptive, cross-sectional study was developed. The study population was composed by college students from a Portuguese university enrolled in the 2016/2017 school year, attending undergraduate courses (N = 8842).

##### **5.2. Data collection instrument**

Data was collected using a self-reported questionnaire. For its elaboration, a literature review was performed to create a synthesis of the variables used to examine alcohol and other substances consumption among college students.

The questionnaire is structured in two main parts. The first part includes variables related to socio-demographic and academic performance; variables related to alcohol and tobacco consumption and health related variables.

Regarding health issues, the student's perception of i) the health status was questioned on a Likert scale (weak, reasonable, good, very good, optimal); (ii) the presence of illness or chronic health condition; and (iii) self-medication. Regarding adherence to healthy lifestyles, the question was: i) whether they currently practice any type of sport or physical exercise (including walking or walking for leisure), and ii) their perception about the quality of their diet, on a Likert scale (weak, reasonable, good, very good, optimal).

In the absence of validated instruments for Portugal on the evaluation of the level of knowledge about health consequences and harms from alcohol and tobacco consumption, it was questioned how students evaluate it, in Likert type response (weak, reasonable, good, very good, optimal).

The second part includes the Drinking Motives Questionnaire – Revised (DMQ-R) (Cooper, Kuntsche, Levitt, Barber, & Wolf, 2015) to assess students' drinking motives, validated to Portuguese student population (Fernandes-Jesus et al., 2016). An internal consistency, assessed by the Cronbach's alpha, between 0.701 and 0.912 was obtained through a Confirmatory Factor Analysis. The results for configural invariance revealed a good fit to the model. The same factorial structure of the original scale was obtained, excluding 2 items with a comparative fit index of 0.917 and a root mean square error of approximation of 0.034 (see Fernandes-Jesus et al., 2016).

### 5.3. Procedures (sampling)

Using convenience sampling, students were approached during high attendance classes, and those who agreed to participate in the study were included in the sample.

Thus, the sample comprised 400 students and the study was conducted from February to May 2017. The returned questionnaires that had missing information were excluded (considered important to be treated to respond to the objective of this study), obtaining a total response of 338 students with valid questionnaires (Table 1). The sample consisted of 51.8% male students, with a mean age of 20.6 years (sd 3.4) and a proportion of alcohol consumption of 65.9% (n = 213).

**Table 01.** Sample Characterization (n=322)

Variable		n (%)
<b>Gender</b>	Male	175 (51,8)
	Female	163 (48,2)
<b>Age</b>	<19 years old	65 (19,3)
	[19;20] years old	139 (41,4)
	>20 years old	132 (39,3)
<b>Alcohol consumption</b>	No	110 (34,1)
	Yes	213 (65,9)
<b>Academic performance</b>	Bad-mediocre	36 (10,7)
	Regular	157 (46,4)
	Good-very good	145 (42,9)
<b>Academic performance compared to peers</b>	Bad-mediocre	49 (14,5)
	Regular	145 (42,9)
	Good-very good	42 (42,6)
<b>Knowledge of tobacco consumption consequences</b>	Poor-regular	14 (4,3)
	Good-very good	315 (95,7)
<b>Knowledge of alcohol consumption consequences</b>	Poor-regular	21 (6,3)
	Good-very good	312 (93,7)
<b>Health status</b>	Poor-regular	76 (22,5)
	Good-very good	262 (77,5)
<b>Chronic condition</b>	No	277 (82,7)
	Yes	58 (17,3)
<b>Self-medication</b>	No	219 (65,4)
	Yes	116 (34,6)
<b>Physical activity</b>	No	93 (27,7)
	Yes	243 (72,3)
<b>Diet</b>	Poor-regular	128 (37,9)
	Good-very good	210 (62,1)
<b>Smoke</b>	No	152 (45,1)
	Yes	185 (54,9)

### 5.4. Data analysis

The data analysis was performed using SPSS version 23. Categorical variables were calculated in absolute and relative frequencies. To verify the independence of variables, chi-square test was used.

The score of each component of Portuguese DMQ-R was transformed into a scale, ranking 0 to 100, meaning that the higher the score, the higher the consumption reasons. DMQ-R is composed by 4 domains: Enhancement (internally generated, positive reinforcement motives, e.g. drinking to enhance positive mood or well-being), Coping (internally generated, negative reinforcement motives, e.g. drinking to cope with negative emotions), Conformity (externally generated, negative reinforcement motives, e.g. drinking to conform or avoid social censure and rejection) and Social externally generated, positive reinforcement motives, e.g. drinking to obtain positive social rewards) (Fernandes-Jesus et al., 2016; Kuntsche, Knibbe, Gmel, & Engels, 2006).

Then, the variables of score were then categorized to verify the relationship between the different domains of the DMQ-R scale with alcohol consumption, using multivariate logistic regression models, ascertaining the adjusted Odds Ratio (OR) and the respective 95% confidence intervals (95% CI). A significance level of 0.05 was used for all data analysis.

## 6. Findings

Table 2 shows the main results of the relationship between alcohol consumption with socio-demographic variables, variables related to health knowledge, health related and reasons for alcohol consumption.

**Table 02.** Relation between Socio-demographic, knowledge, health and drinking motives related variables with alcohol consumption (n=322)

Variable	Alcohol Drinking		p-value	
	No n(%)	Yes n(%)		
<b>Sociodemographic variables</b>				
Gender	Male	50 (19,4)	120 (70,6)	0,063
	Female	60 (39,2)	93 (60,8)	
Age	<19 years old	25 (41,7)	35 (58,3)	0,360
	[19;20] years old	42 (31,3)	92 (68,7)	
	>20 years old	42 (33,1)	85 (66,9)	
Academic performance	Bad-mediocre	9 (26,5)	25 (73,5)	0,382
	Regular	56 (37,6)	93 (62,4)	
	Good-very good	45 (32,1)	95 (67,9)	
Academic performance compared to peers	Bad-mediocre	10 (22,2)	35 (77,8)	0,109
	Regular	45 (32,8)	92 (67,2)	
	Good-very good	55 (39,0)	86 (61,0)	
<b>Knowledge related variables</b>				
Knowledge of tobacco consumption consequences	Poor-regular	4 (28,6)	10 (71,4)	0,633
	Good-very good	105 (34,8)	197 (65,2)	
Knowledge of alcohol consumption consequences	Poor-regular	5 (23,8)	16 (76,2)	0,305
	Good-very good	104 (34,8)	195 (65,2)	
<b>Health related variables</b>				
Health status	Poor-regular	26 (35,1)	48 (64,9)	0,823
	Good-very good	84 (33,7)	165 (66,3)	

Chronic condition	No	92 (35,0)	171 (65,0)	0,456
	Yes	17 (29,8)	40 (70,2)	
Self-medication	No	78 (37,1)	132 (62,9)	0,150
	Yes	32 (29,1)	78 (70,9)	
Physical activity	No	28 (31,1)	62 (68,9)	0,502
	Yes	81 (35,1)	150 (64,9)	
Diet	Poor-regular	38 (30,9)	85 (69,1)	0,347
	Good-very good	72 (36,0)	128 (64,0)	
Smoke	No	60 (42,9)	80 (57,1)	0,004
	Yes	50 (27,3)	133 (72,7)	
<b>Drinking motives variables</b>				
DMQ-R Enhancement	<10	60 (59,4)	41 (40,6)	<0,001
	≥10	49 (22,2)	172 (77,8)	
DMQ-R Coping	<6,25	88 (40,2)	131 (59,8)	<0,001
	≥6,25	21 (20,4)	82 (79,6)	
DMQ-R Conformity	<6,25	54 (54,5)	45 (45,5)	<0,001
	≥6,25	55 (24,7)	168 (75,3)	
DMQ-R Social	<10	58 (55,8)	46 (44,2)	<0,001
	≥10	51 (23,4)	167 (76,6)	

Alcohol consumption by college students did not show any significant relationship with socio-demographic variables, related to knowledge about consumption consequences and variables related to health.

It was verified that the consumption of alcoholic drinks is independent of gender ( $p = 0.063$ ) and age ( $p = 0.360$ ). A higher (non-significant) proportion of alcohol consumption was observed in students with better levels of perception of academic performance (67.9% vs. 32.1%) and with better levels of perception of academic performance compared to their peers (61.0% vs. 39.0%).

There was also a higher proportion of alcohol consumption among students who had better perceived knowledge about the consequences of smoking (65.2% vs. 34.8%) and drinking (65.2% vs. 34.8%).

Within the health-related variables, there was a higher proportion of alcohol consumption in students with better health status (66.3% vs. 33.7%), with chronic health conditions (70.2% vs. 29.8%), in those who were self-medicated (70.9% vs. 29.1%), those who practiced physical activities (64.9% vs. 35.1%) and among those having a good/very good diet (64.0% vs. 36.0%).

However, it was verified that the consumption of alcoholic beverages in students is not independent of smoking and the reasons for alcohol consumption. The students who smoke (72.7% vs. 27.3%,  $p = 0.004$ ) and those who consumed alcoholic beverages presented higher scores of enhancement (77.8% vs. 22.2%;  $p < 0.001$ ), of coping (79.6% vs. 20.4%;  $p < 0.001$ ), of conformity (75.3% vs. 24.7%;  $p < 0.001$ ) and social motives (76.6% vs. 23.4%;  $p < 0.001$ ) are those students who present alcoholic beverage consumption.

Table 3 shows that after adjustment for sex, age, perception of health status and health knowledge, students with higher levels of enhancement motives (OR 6.0, CI 95% 3.5, 10, 3), coping (OR 2.8, CI 95% 1.6, 4.8), conformity (OR 3.9, CI 95% 2.3, 6.5) and social (OR 4.5, CI 95% 2.7, 7.5) are more likely to present alcohol consumption.

**Table 03.** Multivariate regression models between alcohol consumption and DMQ-R different factors. OR adjusted for: model 1 - age and gender; model 2 - model 1 plus health status; model 3 - model 2 plus knowledge of alcohol consumption consequences

Variable	Score	Model 1	Model 2	Model 3
		Adjusted OR (95%CI)	Adjusted OR (95%CI)	Adjusted OR (95%CI)
Enhancement	<10	1	1	1
	≥10	5,7 (3,4; 9,7)	5,8 (3,4; 9,8)	6,0 (3,5; 10,3)
Coping	<6,25	1	1	1
	≥6,25	2,7 (1,6; 4,8)	2,7 (1,6; 4,8)	2,8 (1,6; 4,8)
Conformity	<6,25	1	1	1
	≥6,25	3,8 (2,3; 6,3)	3,8 (2,3; 6,3)	3,9 (2,3; 6,5)
Social	<10	1	1	1
	≥10	4,3 (2,6; 7,1)	4,3 (2,6; 7,1)	4,5 (2,7; 7,5)

## 7. Conclusion

The relationship between the consumption of alcoholic beverages, verified in the present study, with the reasons of enhancement, coping, conformity and social, is in agreement with the literature (Kuntsche, Knibbe, Gmel, & Engels, 2006).

Despite the non-significant relationship, a higher proportion of consumption was observed in students who reported better healthy lifestyles (having a proper diet and physical activity), better health-related knowledge (knowledge of the consequences for the health that comes from consumptions) and with better perceptions of academic performance.

A non-observation of an association between alcohol behaviors with health knowledge and lifestyles may be explained by the influence of the injunctive norms in these students. Therefore, the perception of the level of approval of a certain behavior by their peers, may influence the adherence to alcohol consumption, represented by the significant association with the different domains of consumption motives. In this context of peers' influence, the students will be able to choose their social network based on consumptions' behaviors (Ferrer, Dillard, & Klein, 2011), which may influence both injunctive and descriptive norms. In this social influence and peer pressure, there may be a group of students, considered by others as a behavioral role model, that establish affinities in the group they belong to, influencing the group alcohol consumption's social norms (Valente, Unger, & Johnson, 2005).

On the other hand, the significant association between adherence to consumption behaviors and the reasons for consuming alcoholic beverages may be due to the influence of injunctive norms and peer pressure. From the Social Norms Theory perspective (Perkins, 2002), the perceptions that the students have about the consumption behavior of the group they belong to, may have influence in their own consumptions. During college, peers represent means of support and guidance that can influence the alcohol consumption (Borsari & Carey, 2001, 2003). Thus, several studies verified that these social influences represent an alcohol consumption predictive in college students (Borsari & Carey, 2003; Wood, Read, Palfai, & Stevenson, 2001).



The findings of this study have verified that the consumption of alcoholic beverages by higher education students may consist of a complex network of determinants, where the level of health literacy and lifestyles may not be directly associated with consumption.

Also, despite the higher levels of academic performance and knowledge levels regarding the health consequences, the greater proportion of students' consumption may be due to the existence of an academic environment favorable to alcohol consumption (Nolen-Hoeksema, 2004) and to the influence of peers in adherence to consumption behaviors (Borsari & Carey, 2003).

However, the non-significant higher proportion of consumption among students reporting chronic health conditions and self-medication may be due to the effect of the aggregation of poor health outcomes (Busch, Van Stel, Schrijvers, & de Leeuw, 2013).

The present research may be limited by the fact that questionnaire is self-reported which may influence the response to sensitive questions (in variables related to consumption habits, health status and levels of knowledge) and consequently, a response bias may have occurred due to the social desirability effect (Bryman, 2012). Furthermore, the fact that it was not possible to use an instrument measuring the level of knowledge on health consumption consequences could be a limitation. However, despite these limitations, the observed results were not discrepant with those found in the literature.

Thus, the main results of the present study have verified that the alcohol consumption is related to the concomitant consumption of tobacco and with enhancement, coping, conformity and social motives. The highest proportion of alcohol consumption in students with better perceptions of academic performance; knowledge of health consequences; health status; chronic health conditions; self-medication; tobacco consumption and better lifestyles (diet and physical activity) may indicate the need for psycho-educational sessions.

Future research may focus on the study of the influence of misconceptions in different domains of health literacy, health status and health lifestyles in adherence to alcohol consumption behaviors.

This paper presents as main research implications the study of the role of different reasons for alcohol consumption, which should be aim of different interventions (health sessions, psycho-educational interventions, cognitive-behavioral therapies, among others) in order to empower, change and/or improve social norms consumption perceptions (demystifying the consumption behaviors of their social group).

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