

RISKY BUSINESS: AN EXAMINATION OF DRINKING GAMES IN COLLEGE SETTINGS AND THEIR IMPACT: A SYSTEMATIC REVIEW

NEGÓCIO ARRISCADO: UM EXAME DOS JOGOS DE BEBIDA EM AMBIENTES UNIVERSITÁRIOS E SEUS IMPACTOS: UMA REVISÃO SISTEMÁTICA

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ABSTRACT

This systematic review explores the prevalence and impact of Drinking Games (DG) among college students. DGs involve social drinking with the goal of heavy alcohol consumption and are associated with risky behaviours. the review aims to quantify the relationship between DG participation, alcohol consumption, and negative outcomes. it also investigates gender moderation and unexplored motivational factors for DG engagement. Following PRiSMA guidelines, 34 studies were included after screening 317 records. the studies comprised n = 34,197 participants and were analysed for various variables, including gender dynamics, motivations, and associated negative consequences. Gender convergence in DG participation was noted, emphasizing the importance of gender-specific interventions. Participants were aware of risks but often perceived negative outcomes as a badge of honour. Motivations for DGs were linked to social interaction and a sense of belonging. Personality traits like sensation seeking and identification with college drinking culture played significant roles in DG engagement and outcomes. the review underscores the need for targeted interventions to address shifting perceptions of negative consequences and consider personality traits when designing preventive measures. it also highlights the significance of gender-specific strategies. However, variations in DG measurement and possible selection bias among heavy drinkers participating in DGs remain limitations. this systematic review provides insights into DG prevalence and its link to negative outcomes among college students. the findings stress the importance of tailored interventions and further research to mitigate risk factors and promote healthier drinking behaviours in this demographic.

Keywords: Alcohol drinking. Games college Students. Gender Dynamics. Negative Outcomes.

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RESUMO

Esta revisão sistemática explora a prevalência e o impacto dos Jogos de Bebida (JB) entre estudantes universitários. Os JB envolvem consumo social de álcool com o objetivo de beber em grandes quantidades e estão associados a comportamentos de risco. A revisão busca quantificar a relação entre a participação em JB, o consumo de álcool e os desfechos negativos, além de investigar a moderação de gênero e fatores motivacionais pouco explorados relacionados ao envolvimento em JB. Seguindo as diretrizes PRISMA, 34 estudos foram incluídos após a triagem de 317 registros, totalizando $n = 34.197$ participantes, analisados quanto a dinâmicas de gênero, motivações e consequências negativas associadas. Observou-se convergência de gênero na participação em JB, reforçando a importância de intervenções específicas por gênero. Os participantes tinham consciência dos riscos, mas frequentemente percebiam resultados negativos como um símbolo de status. As motivações estavam ligadas à interação social e ao senso de pertencimento. Traços de personalidade como busca de sensações e identificação com a cultura universitária de consumo alcoólico influenciaram significativamente o envolvimento em JB e seus desfechos. A revisão destaca a necessidade de intervenções direcionadas que considerem mudanças na percepção das consequências negativas e os traços de personalidade, além de estratégias específicas por gênero. Entretanto, variações na mensuração dos JB e possível viés de seleção entre grandes consumidores de álcool permanecem como limitações. A revisão oferece insights sobre a prevalência de JB e sua relação com desfechos negativos entre universitários, ressaltando a importância de intervenções personalizadas e pesquisas adicionais para mitigar fatores de risco e promover comportamentos de consumo mais saudáveis.

Palavras-chave: Jogos de Bebida. Consumo de Álcool. Estudantes Universitários. Dinâmicas de Gênero. Consequências Negativas.

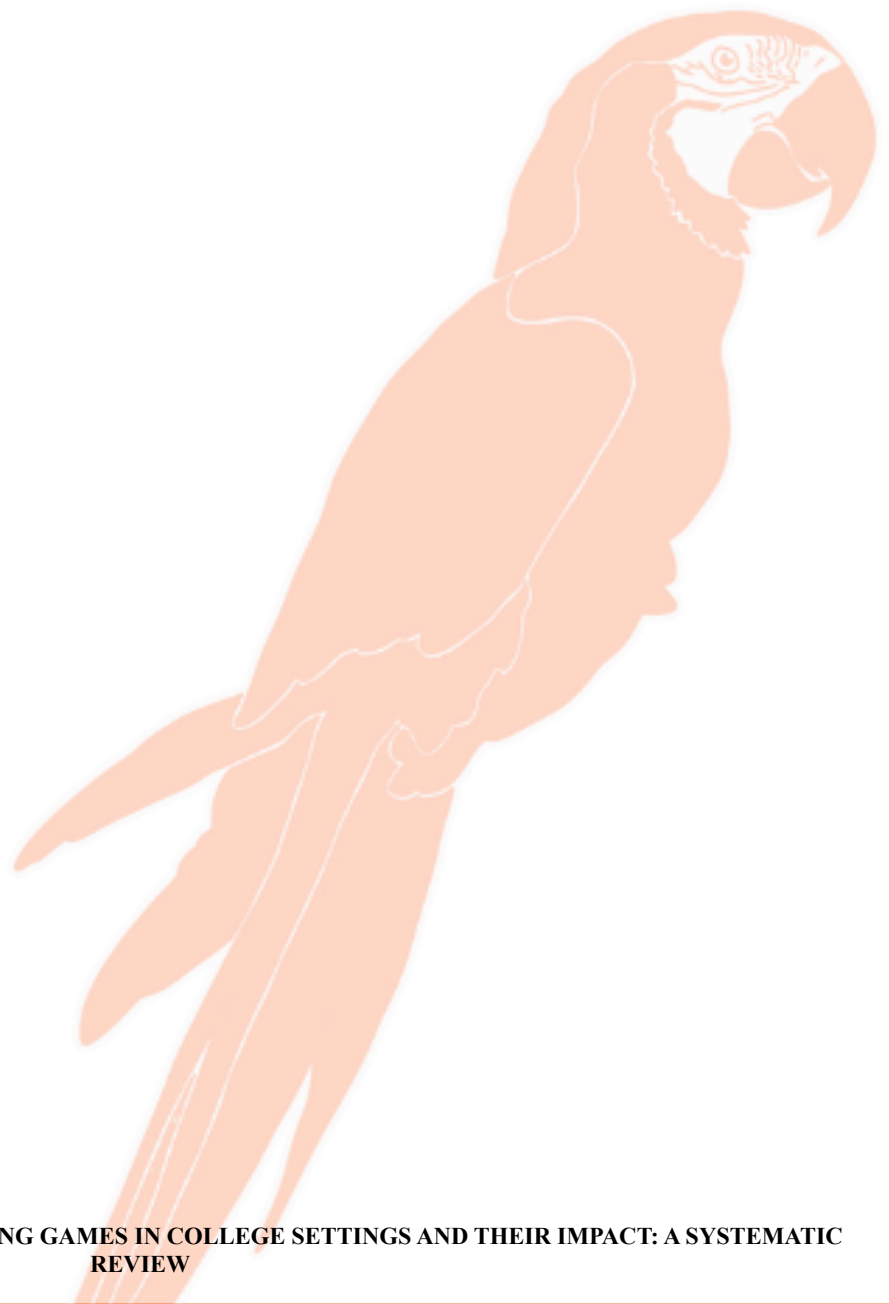
RESUMEN

Esta revisión sistemática explora la prevalencia y el impacto de los Juegos de Bebida (JB) entre estudiantes universitarios. Los JB implican consumo social de alcohol con el objetivo de beber en grandes cantidades y están asociados a conductas de riesgo. La revisión busca cuantificar la relación entre la participación en JB, el consumo de alcohol y los resultados negativos, además de investigar la moderación por género y factores motivacionales poco explorados relacionados con la participación en JB. Siguiendo las directrices PRISMA, se incluyeron 34 estudios tras examinar 317 registros, con un total de $n = 34.197$ participantes, analizados en cuanto a dinámicas de género, motivaciones y consecuencias negativas asociadas. Se observó una convergencia de género en la participación en JB, destacando la importancia de intervenciones específicas por género. Los participantes eran conscientes de los riesgos, pero frecuentemente percibían los resultados negativos como una especie de insignia de honor. Las motivaciones estaban vinculadas a la interacción social y al sentido de pertenencia. Rasgos de personalidad como la búsqueda de sensaciones y la identificación con la cultura de consumo de alcohol en la universidad influyeron significativamente en la participación en JB y en sus resultados. La revisión subraya la necesidad de intervenciones dirigidas que consideren los cambios en la percepción de las consecuencias negativas y los rasgos de personalidad, además de estrategias específicas por género. Sin embargo, las variaciones en la medición de los JB y el posible sesgo de selección entre consumidores intensivos siguen siendo limitaciones. La revisión ofrece una visión sobre la prevalencia de los JB y su relación con resultados negativos entre universitarios, resaltando la importancia de intervenciones adaptadas e investigaciones



adicionales para mitigar factores de riesgo y promover comportamientos de consumo más saludables.

Palabras clave: Juegos de Bebida. Consumo de Alcohol. Estudiantes Universitarios. Dinámicas de Género. Consecuencias Negativas.





1 INTRODUCTION

Drinking Games (DGs) involve a social drinking activity with the goal of heavy alcohol consumption, played according to rules that often entail mental and/or physical tasks. Youth engagement in drinking games raises concerns in comparison to other risky behaviours due to their explicit rules designed to pro-mote intoxication and their appealing nature to a specific population (Zamboanga et al., 2014). Gaming strongly correlates with binge drinking, a prevalent phenomenon among young individuals (Ford et al., 2022). This pattern exposes participants to adverse consequences and perilous situations such as physical health problems, unprotected sex, violence, accidents, antisocial conduct, and academic challenges (Hingson et al., 2017; Kuntsche et al., 2017; Slutske, 2005). Research has consistently linked binge drinking to alcohol dependence in adulthood and concurrent use of other psychoactive substances, as seen in Esser et al. (2021) and Tavoracci et al. (2019).

Given the widespread participation in DGs and the consequential health risks, the need for ongoing research on DG behaviours is evident. This systematic review investigates DG behaviours and alcohol-related variables, aiming to investigate the relationship between DG participation, alcohol consumption, and associated negative outcomes. Additionally, this review delves into unexplored aspects, including social, cul-tural, and behavioural factors that influence student engagement in DGs. Beyond gender's moderating impact on gaming, this review sheds light on motiva-tional elements, aiming to stimulate further research, inform prevention efforts, and guide interventions targeting alcohol use among college students.

2 METHODS

2.1 ELIGIBILITY

This review was conducted according to the Preferred Report Items for Systematic Reviews and Meta-analysis (PRISMA).

We included original studies published in English that reported on the practice of drinking games, pre-viously cited as 'DGs', among university students. We excluded case reports, review articles, commentaries, studies in languages other than English, and studies conducted in settings other than the university.

2.2 STUDY SELECTION AND DATA EXTRACTION

Two independent reviewers (GFS and JMCM) screened study titles and abstracts for inclusion reaching a consensus on selection criteria. Data extraction forms were developed and circulated to the author group before piloting and refining. All data were extracted by one



of the reviewers (GFS) and checked by a second reviewer (JMCM). The same reviewers resolved any remaining inconsistencies.

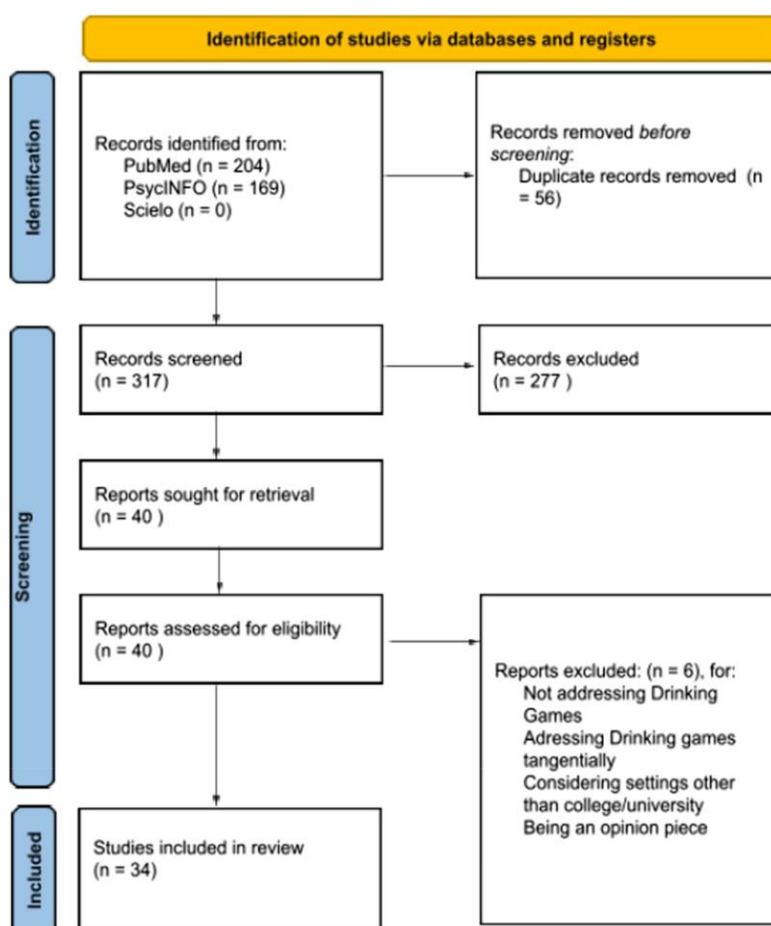
We gathered information on the following variables: sample size and mean age; main sociodemo-graphic characteristics; study design and methodology; main findings; study challenges and limitations.

2.3 REGISTRATION

The methodology of this systematic review was registered in the Open Science Framework (OSF), under the following code: yks4h (29 April 2022). Available online: <https://osf.io/yks4h/>.

Figure 1

PrIsMa diagram



3 RESULTS

Following the removal of duplicates, 317 records were identified, and 34 studies were ultimately included in the review (see Figure 1 for the PRISMA diagram). These selected 34 studies encompassed a total of 34,197 participants, which are summarized in Table 1.



3.1 SAMPLE CHARACTERISTICS

The majority of studies focused on traditional-aged college students (18–25 years old). Only two studies, George et al. (2018) and McInnes and Blackwell (2021), reported including students over 25 years old. The engagement of alcohol users in drinking games ranged between 65% and 92%. While the practice of drinking games was slightly more common among men, this gender difference appeared to be progressively less significant. In 10 out of 34 studies, gender didn't substantially affect game participation. However, regarding negative outcomes linked to such practice, women tended to experience them more frequently, as observed in the majority of studies.

3.2 INFLUENCE OF RESIDENCE AND CULTURAL FACTORS

The literature highlights the impact of students' place of residence on drinking games participation. George et al. (2018) and Mulligan et al. (2016) found that living on a university campus significantly increased the likelihood of participating in drinking games. Residing with roommates, regardless of campus location, also correlated with higher game involvement. An American cultural aspect known as 'Greek Affiliation', involving participation in college fraternities, was significantly associated with higher chances of joining drinking games, as indicated by LaBrie et al. (2013).

3.3 DIFFERENT GAME TYPES AND CATEGORIES

Several categorization schemes have been proposed to summarize various types of drinking games. The Hazardous Drinking Games Measure (HDGM) by Borsari et al. (2003) comprehensively assesses participation, negative consequences, and specific types of games, including 'card games', 'dice games', 'verbal games', 'media games', 'board games', 'skill games', 'team games', and 'consumption games'. Similarly, Polizzotto et al. (2007) categorized drinking games as 'competitive vs. non-competitive games' and 'games of skill vs. games of chance', with competitive games of skill being the most common.

3.4 NEGATIVE OUTCOMES AND MOTIVATIONS

The literature frequently reports negative outcomes like loss of consciousness, feeling hungover, nausea/ vomiting, and embarrassing situations. Despite recognizing the potential harm, students often consider these outcomes as 'badges of honour' (Polizzotto et al., 2007). Certain personality traits, such as sensation-seeking and impulsivity, influence the perception of negative outcomes related to drinking games (Diulio et al., 2014; Johnson & Cropsey, 2000). The motivations for participation in drinking games and pre-drinking are



centred around social elements, with a focus on facilitating interaction and reducing social pressure. The role of personality traits, social factors, and cultural influences (such as Greek Affiliation) is prominent in driving engagement in drinking games (LaBrie et al., 2013).

3.5 SOCIAL ANXIETY AND INTERNALIZATION OF COLLEGE DRINKING CULTURE

While studies generally show no positive association between social anxiety and game participation (George et al., 2019; Mulligan et al., 2016), some studies have found a negative association (Ham et al., 2010). Socially anxious individuals tend to experience more negative outcomes when participating, especially when their aim was to reduce social tension (George et al., 2019; Kenney et al., 2014; Mulligan et al., 2016). The concept of the Internalization of the College Drinking Culture (ICDC) measures the extent to which individuals identify with the university's drinking culture. High identification with the ICDC is linked to risky drinking practices and negative outcomes after drinking (Moser et al., 2014).

4 DISCUSSION

This systematic review aimed to examine the intricate interplay between participation in DG, alcohol consumption patterns, and the subsequent negative outcomes among college students. After screening and inclusion of 34 studies involving a total of 34,197 participants, several key findings emerged. Notably, the prevalence of DG participation among alcohol users ranged between 65% and 92%, with a gender discrepancy that tended to diminish across the selected studies. While men participated slightly more often, the impact of gender on game engagement was less significant in a substantial portion of the studies. However, in terms of associated negative outcomes, women experienced these consequences more frequently across the majority of the studies. Residence and cultural factors also played a role, with university campus living and Greek affiliation being associated with increased DG participation. Categorization schemes revealed different game types and categories, and motivations for participating in DGs were linked to social interaction and a desire to alleviate social pressure. Personality traits such as sensation seeking and impulsivity influenced the perception of negative outcomes. Additionally, the concept of the Internalization of the College Drinking Culture (ICDC) emerged as a factor influencing engagement in DGs, as high identification with this culture was linked to risky drinking practices and negative outcomes. These findings lay the groundwork for the ensuing discussion on gender convergence, risk awareness, personality traits, and social anxiety, contributing to a comprehensive understanding of the nuanced relationships within this context.



Table 1

Main findings of the studies included in the systematic review

author and year	sample	study type	Methods	results	limitations
1 - Zamboanga et al., 2010.	N = 2230; Age : 18-25; Gender : women: 70% Men: 30%; Setting : 30 different U.s. colleges and universities.	cross sectional.	Measures : self-report questionnaires via the internet, reporting frequency of engagement in drinking games and quantity of alcohol consumed during the practice. the negative outcomes related to alcohol consumption were assessed using the alcohol Use Disorders Identification test (aUDIt). Interventions : none.	high quantity of alcohol consumed was a significant predictor of negative drinking consequences for high-frequency gamers, but not for low-frequency gamers.	Data were collected from self-report surveys, so participants may have under or over-estimated their answers. additionally, the variability in specific drinking games was not addressed.
2 - Polizzotto et al., 2007.	N = 256; Age : 18-25; Gender : 54% female, 46% male; Setting : faculties of law, medicine, science, engineering, arts and commerce in western australian university.	cross sectional.	Measures : semi structured interview questioning patterns of participation in drinking games, details of games played, situations in which games were played, factors contributing to participation and adverse outcomes. Based on the information gathered from the interview, a questionnaire was developed to collect quantitative data, such as quantity of alcohol consumption and frequency of participation in drinking games. analysis of background alcohol consumption used categories of risk of harm from the national health and Medical research council of australia (nhMrc). Interventions : none.	the most frequent drinking games described were competitive games of skill. students were motivated to engage in drinking games mostly by boredom and social lubrication. the practice of drinking games was associated with both high levels and rates of alcohol consumption, and with drinking binges (on average 70% of games played were associated with a binge). 91% of game players acknowledged drinking games as potentially hazardous. however, the majority of students considered it a socially acceptable and appealing activity.	the study's sample is generally small and relied on self-report data.
3 - George et al., 2018.	N = 254; Age : 18-46; Gender : 62% female, 38% male; Setting : australian university.	cross sectional.	Measures : online self-report questionnaire including measures of alcohol use and related behaviours. General alcohol consumption was measured via the alcohol Use Disorders Identification test-consumption (aUDIt-c) scale. the Motives for Playing Drinking Games (MPDG) measure was used to assess the motives for playing drinkings games among students. Gaming-specific consequences experienced in the prior 6 months were assessed via an adaptation of the Brief young adult alcohol consequences (B-yaac). Interventions : none.	competition, enhancement/thrills, social lubrication, sexual pursuit and boredom motives were all positively correlated with the frequency of drinking game participation. however, only competition motives were positively associated with the typical amount of alcohol consumed during drinking games.	the university sample limits the generalisability to other populations of interest and the aUDIt-c items were not restricted to assessment of drinking when not playing drinking games.
4 - McInnes and Blackwell, 2021.	N = 306; Age : 18-29; Gender : 72.2% female, 27.8% male; Setting : university students of five different countries studying on social work degree programs.	cross sectional.	Measures : self-report questionnaire concerning participation in drinking games, types of games played and reasons behind playing. Interventions : none	the most frequently cited type of drinking game was Beer Pong, popular across all five countries. the context for students primarily playing drinking games were social occasions including birthday parties and playing before going out (predrinking). 85% of the participants reported lifetime drinking games participation, and 69% played it in the prior 6 months. the most commonly reported negative gaming consequence was a hangover, reported by 79% of the participants.	the sample is representative of a specific type of student and of a particular age group, which makes it difficult to extrapolate the findings to a larger more generic population.
5 - George et al., 2018.	N = 252; Age : 18-24; Gender : 67% female, 33% male; Setting : australian university.	cross sectional.	Measures : alcohol consumption was assessed by the aUDIt consumption subscale (aUDIt-c). the types of drinking games played were determined by the hazardous Drinking Games Measure (hDGM). Interventions : none.	the most common outcome reported by the students was 'drinking enough to stumble' and 'drinking enough to pass out'. the men in the study had approximately twice the odds of extreme heavy drinking than women and students who partied more often had greater odds of extreme drinking. Drinking games were positively associated with extreme drinking.	the sample was small, with a higher proportion of female students and the non-representative nature of the sample limiting generalisability to other populations.
6 - fairtie et al., 2015.	N = 399; Age : mean age = 21.48 years (sD = 0.40); Gender : 57% female, 43% male; Setting : U.s.a., including american citizens students residing within 25 miles of campus.	cross sectional.	Measures : one extensive web survey, followed by a daily-level investigation of up to 14 consecutive daily brief web surveys, indicating quantity of alcohol consumption when prepartying, participation in drinking games and drinking behavior outcomes. Interventions : none.		



author and year	sample	study type	Methods	results	limitations
7 - Moser et al., 2014.	N=936; Age: mean age = 18.06 years old (sD = 0.29); Gender: 50% male, 50% female; Setting: Mid-atlantic universities.	cross sectional.	Measures: secondary data analysis of a randomized controlled trial of an Internet-delivered alcohol questionnaire and intervention. Personality traits were assessed using the substance Use risk Profile scale (sUrPs); the college life alcohol salience scale (class) assessed the Internalization of the college Drinking culture (IcDc); alcohol-related problems during the past 30 days were assessed with the Brief young adult alcohol consequences Questionnaire. Interventions: 1-hour video about the effects of alcohol on the body, alcohol-related policies and laws and personalized feedback over the internet.	there were no significant differences in demographics, age, drinks per week, pBac, or alcohol-related problems between intervention and assessment only groups. IcDc was significantly associated with all risky drinking practices (predrinking, drinking games and tailgating).	IcDc is a relatively new construct that is not directly targeted in alcohol interventions. Modest internal consistency of the personality measure.
8 - schwartz et al., 2014.	N=1397; Age:18-25; Gender: 75% female; 25% male; Setting: 30 colleges and universities in 20 different U.s. states.	cross sectional.	Measures: cultural Practices were assessed using the stephenson Multigroup acculturation scale. cultural Identifications were measured using the Multigroup ethnic Identity Measure (MeIM) and the american Identity Measure (aIM). Drinking game participation, alcohol consumption and its negative consequences were indexed using the alcohol Use Disorders Identification test (aUDIt) Interventions: none.	Greater endorsement of U.s. practices and lower endorsement of hispanic practices are associated with more frequent engagement in drinking games among women.	self report allows under-report or over-report of risky behaviors. Important predictors of heavy alcohol use, such as parental alcoholism, Greek affiliation and antisociality, were not included in the data. the strengths of the regression coefficients reported in the study are modest.
9 - George et al., 2019.	N=224; Age: 18-25; Gender: 63% female; 37% male; Setting: australian university.	cross sectional.	Measures: General alcohol consumption was measured via the alcohol Use Disorders Identification test-consumption (aUDIt-c) scale. the Motives for Playing Drinking Games (MPDG) measure was used to assess the motives for playing drinkings games among students. Gaming-specific consequences experienced in the prior 6 months were assessed via an adaptation of the Brief young adult alcohol consequences (B-yaac). the social Interaction anxiety scale (slas) was used to assess social anxiety among college students. Interventions: none.	social anxiety was not associated with drinking game consumption, but was positively associated with drinking game consequences.	the cross-sectional data does not allow any inferences about causality or the temporal order of the relationships.
10 - Mulligan et al., 2016.	N=227; Age: 18-24; Gender: 73% female, 27% male; Setting: metropolitan university in australia.	cross sectional..	Measures: the social Interaction anxiety scale (slas) was used to assess social anxiety among college students. Drinking motives were measures using cooper's Drinking Motives Questionnaire revised. Interventions: none.	students living on campus reported significantly greater frequency of drinking game participation than those living in other living arrangements. only coping motives emerged as a significant predictor of drinking game participation. the relationship of social anxiety with frequency of drinking game participation was dependent on drinking to cope. Despite prior findings, almost all of the women in this study did not feel pressured by their peers to engage in drinking games. conversely, they expressed readiness to and interest in playing.	the study did not consider the different types of drinking games played by students.
11 - Murugiah and scott, 2014.	N=20; Age:18-21; Gender: 100% female; Setting: regional university in armidale, new south wales, australia.	Qualitative.	Measures: semi structured questionnaire inquiring about students' drinking experience, social behaviors, negative consequences and perception of binge drinking. Interventions: none		the study only focused on caucasian female students at on particular university; therefore, the findings may not be relevant to other populations.



author and year	sample	study type	Methods	results	limitations
12 - Dumbili and williams, 2016.	N = 31; Age: mean age = 19-23; Gender: 70% male, 30% female; Setting: a university located in a city of anambra state, in south-eastern nigeria.	Qualitative.	Measures: In-depth interviews questioning students' knowledge about drinking games, their drinking patterns, the spaces where they drink and the factors that engender alcohol consumption. Interventions: none.	while the women in this study engaged in drinking games for fun motives, men's motivations, conversely to other studies, extended to impulsive reward seeking and social and enhancement motives. consuming large quantities of alcohol without showing signs of intoxication conferred a superior masculine status. sensation seeking and impulsivity are positively associated with frequency of playing drinking games. Both sensation seeking and impulsivity displayed direct and indirect associations with drinking games consequences.	the study's sample is generally small and relied on self-report data.
13 - Diulio et al., 2014.	N = 831; Age: mean age = 20.38 years old; Gender: 71% female, 29% male; Setting: a public southeastern University.	cross sectional.	Measures: Impulsivity measures were assessed by the eysenck Impulsiveness scale (ePI); Zuckerman's sensation seeking scales was used to assess sensation seeking; the hazardous Drinking Games Measure (hDGM) was used to measure frequency and negative consequences of drinking games. Interventions: none.	there were significant differences in the number of problems experienced by pregame status, validating prior findings that pregame is a particularly high risk drinking practice. regression results suggest that this risk may be above and beyond what is explained by quantity and frequency indices alone.	ePI assesses personality as a unitary construct. Impulsivity measures that assess distinct components of impulsivity would allow for the evaluation of more specific correlates of drinking game behavior.
14 - haas et al., 2012.	N = 1171; Age: mean age = 18 years old; Gender: 50% male, 50%female; Setting: a private university in the san francisco Bay area.	cross sectional.	Measures: overall alcohol involvement was assessed by the Quantity frequency variability (QfI); heavy episodic Drinking (heD) was used to measure heavy drinking in preceding 2 weeks; expectancies regarding drinking behaviors were assessed using the alcohol expectancy Inventory (ael). Interventions: none.	women drank 41% more drinks on game playing days and were 50% more likely to binge drink when playing drinking games than on non-game drinking days.	there are measures in the study that deviates semantically from measures used in other surveys (i.e. pregameing).
15 - Pedersen, and laBrie, 2006.	N = 105; Age: 18-22; mean age = 18.84years old (sD = 0.88); Gender: 33% male, 67% female; Setting:	cross sectional.	Measures: Brief questionnaire assessing demographic and drinking variables; the revised college alcohol Problem scale (caPs-r) assessed alcohol problems in the last month; rutgers alcohol Problem Index (raPI) assessed problems encountered during the past month either during or due to drinking. Interventions: none.	female student athletes' drinking games involvement is based in part on their subjective positive evaluations of liquid courage expectancy.	reliance in self-reported data.
16 - Zamboanga et al., 2005	N = 187; Age: 18-22; Gender: 100% female; Setting: an all-women's college in the northeastern United states.	cross sectional.	Measures: alcohol Use Disorders screening test was used to assess alcohol-related problems; the comprehensive effects of alcohol scale (ceoa) was used to measure participants' perceived positive and negative drinking expectancies. Interventions: none.	although social anxiety was inversely associated with involvement in drinking games, socially anxious students expecting alcohol to reduce tension played drinking games more frequently than those who did not endorse such alcohol outcome expectancy.	the study consisted of female student athletes only.
17 - ham et al., 2010.	N = 715; Age: mean age = 19.46 years old (sD = 1.22); Gender: 74.8% female, 25.2% male; Setting: 8 U.s. colleges from fall 2005 to spring 2007.	cross sectional.	Measures: the social Interaction anxiety scale (slas) was used to assess social anxiety among college students; the comprehensive effects of alcohol scale (ceoa) was used to measure participants' perceived positive and negative drinking expectancies. Interventions: none.	Drinking game participation is much more common among students who start drinking at an early age and those who drink more frequently and in greater amounts. Marijuana use is also associated with drinking game experience, which suggests that students willing to use marijuana may also be willing to participate in drinking games.	although drinking games have a variety of different characteristics, only 2 items were used to assess drinking game involvement.
18 - Borsari et al., 2010.	N = 1252; Age: mean age = 19.46 years old (sD = 1.22); Gender: 53% female, 47% male; Setting: a large northeastern university in the U.s, over three consecutive years: 1998, 199 and 2000.	cross sectional.	Measures: the college-Bound student health risk Behavior survey, created for this study, assessed alcohol and other drugs use. Interventions: none.		the survey used in the study was a novel instrument that was created for this project, but the measure had had no formal validation.



author and year	sample	study type	Methods	results	limitations
19 - laBrie et al., 2013.	N= 3421; Age: 18 - 25; Gender: 58% female, 42% male Setting: two Usa west-coast campuses, one a large public university and the other a private mid-sized university	cross sectional.	Measures: rutgers alcohol Problem Index (raPI) assessed problems encountered over the past three months either during or due to drinking. Interventions: none.	women participated in DG just as frequently as men. the most popular category of drinking game was even competition Games, with nearly three quarters of all DG players participation in the past month. chance and skill Games were also common, with 50% and 25% of players respectively participating in one of them. the results suggest that males, whites and greek-affiliated students have a greater tendency than their counterparts to engage in peak DG drinking during even competition games. students who scored higher on the Disinhibition subscale of the sss played drinking games more frequently and drank more alcohol when they played than students lower in Disinhibition.	Drinking games rules and styles of play vary by region, therefore it is possible some DG definitions were influenced by regional nuances.
20 - Johnson and cropsey, 2000.	N=256; Age: female mean age = 20.07 years old (sD = 3.66); Male mean age = 20.21 years old (sD = 4.16); Gender: 67% female, 33% male; Setting: american university.	cross sectional.	Measures: Zuckerman's sensation seeking scales (sss) was used to assess sensation seeking Interventions: none.	1/3 of drinkers engaged in pregaming, and did so frequently (about once weekly). the practice was positively associated with other risky drinking behaviors, in particular drinking games. reasons such as surmount legal and financial barriers to obtaining alcohol emerged among students.	the wording of some of the items in the survey could have discouraged participants from endorsing them, either due to vagueness of the items or because they appeared to refer to nonconsensual sex. time frame was not assessed in the study.
21 - read et al., 2010.	N= 159; Age: mean age = 19.3 years old (sD = 1.2) Gender: 52% female, 48% male; Setting: american university.	cross sectional.	Measures: Daily alcohol consumption and estimated blood alcohol concentrations were assessed using the calendar-based timeline followback method (tlfb); Gaming-specific consequences experienced in the prior year were assessed via the young adult alcohol consequences Questionnaire (yaacQ); Drinking Motives Questionnaire (DMQ) was used to assess drinking motivations among students. Interventions: none.		
22 - DeJong et al., 2010.	N= 110; Age: 64.9% underage (younger than 21 years old). Gender: 51.8% female, 48.2% male; Setting: 10 Pennsylvania different colleges.	cross sectional.	Measures: Interventions: none.		several students in the study were recruited from alcohol education classes for students being disciplined for violating the institution's alcohol policy. that sample may not represent the average student population.
23 - Zamboanga et al., 2021.	N= 1134; Age: 18-25, Mean age = 20.2 years. Gender: 72.6% female, 27.4% male; Setting: university students from argentina, australia, canada and new Zealand who reported weekly alcohol consumption.	cross sectional.	Measures: total drinks per week were measured with the Daily Drinking Questionnaire (DDQ); Interventions: none.	the first study to examine cross-country differences in DG participation among university students. results from the logistic regressions indicated that age (being younger) was associated with increased odds of past month participation in PD and DGs while gender was not significantly related to either outcome variable.	Participants were convenience samples identified using non-random sampling techniques, and consisted of predominantly women, as is typical in research on drinking patterns among university samples recruited from psychology and other related social science disciplines.



author and year	sample	study type	Methods	results	limitations
24 - Kenney et al., 2014.	N =976; Age: 18-24years, Mean age = 20.11(sD =1.35) Gender: 63.6% female, 36.4% male; Setting: students from two different universities on the west coast of the Us taking part in a larger alcohol intervention study.	cross sectional.	Measures: social anxiety was assessed using the social Interaction anxiety scale (slas); a revised adolescent version of the Drinking refusal self-efficacy Questionnaire (DrseQ) was used to assess self-efficacy beliefs; alcohol use was measured using the Daily Drinking Questionnaire (DDQ); negative alcohol-related consequences were measured using a modified version of the original Brief young adult alcohol consequences Questionnaire (ByaacQ); Interventions: none.	Drinking games were associated with event-level consequences for students who reported higher levels of social anxiety, but not for students low in social anxiety. the current findings show that students with elevated social anxiety experience greater problems as a result of their participation.	the present sample included only heavy drinkers who reported prepartying in the past month, which may not be representative of all college students. this study provides insight into the effects of drinking games when they are played during a drinking event that does not include prepartying. Prepartying and playing drinking games are distinct high-risk activities; however, drinking games are often played for the purpose of prepartying.
25 - ford et al., 2022.	N =482; Age: 18–25; Mean age = 22.56 Gender: 44.2% female, 55.8% male; Setting: young adults from amazon's Mechanical turk.	cross sectional.	Measures: participants reported on how many days in the past 30 days they prepartied, the average number of drinks they consumed on prepartying days, and in what ways they typically preparty, with response options being “playing drinking games, alone while getting ready to go out, and with friends/ roommates while getting ready to go out”; to measure typical alcohol use, participants completed the alcohol Use Disorders Identification-consumption subscale (aUDIt-c); the types of drinking games played were determined by the hazardous Drinking Games Measure (hDGM). Interventions: none.	those who played DG as a form of prepartying consumed more alcohol while prepartying than those who prepartied alone or with friends. also, those who played card games (e.g. Kings) while prepartying consumed more drinks than those who do not typically play card games.	the study was unable to directly compare alcohol consumption across DG types since participants could indicate that they typically participated in more than one DG type. Besides, it is possible that participants drank slightly more or less alcohol on occasions when playing DG while prepartying since they reported their average prepartying alcohol consumption.
26 - santos et al., 2022.	N =1575; Age: 18-24years Gender: Bra: 59.1% enG: 65.3% female; Setting: liverpool John Moores University (LJMU) in the UK and federal University of são Paulo (Unifesp) in Brazil;	cross sectional.	Measures: questionnaire covering sociodemographic characteristics, pre-drinking characteristics, nightlife drinking patterns and past 12 months experience of alcohol-related harms in the nightlife context; Interventions: none.	Pre-drinking was more prevalent in england (82.8%) than Brazil (44.0%), yet Brazilian students drank more units of alcohol than British students when pre-drinking (Bra 17.6, enG 12.1).	there are differences between Brazil and england regarding type of drinks, alcohol strengths and serving sizes.
27 - Zamboanga et al., 2022.	N =11839; Age: 18 - 25 Gender: 54.1% female, 45.9% male; Setting: student-athletes from 165 national collegiate athletic association (ncaa) member institutions;	cross sectional.	Measures: Participants completed the Daily Drinking Questionnaire, which measures the typical number of drinks ingested on each day of a week in the past 30days; Participants completed three out of the five 2 questions on the hazardous Drinking Game Measure; Interventions: none.	the study found no sex differences in frequency of drinking game participation. Being a white (vs. Black or hispanic) student-athlete was associated with more frequent drinking game participation. Being a Black (vs. white) student-athlete was associated with more drinking game consumption. among white, aaPI, and hispanic student-athletes, being a male student-athlete was associated with more drinking game consumption. finally, female student-athletes had a higher likelihood of experiencing one or more negative consequences from drinking games than did male student-athletes.	Participants may have under- or over-reported their drinking game behaviors.



author and year	sample	study type	Methods	results	limitations
28 - hoyer and correia, 2022.	N =553; Age: M age = 19.29; Gender: 78% female, 22% male; Setting: a large public southeastern university (Usa), 54% of the students were Greek-affiliated;	cross sectional.	Measures: the Daily Drinking Questionnaire was used to measure the frequency and amount of drinking among students within the past 28 days; the DMQ-r was used to measure how often an individual chooses to drink alcohol for coping, enhancement, social, and conformity motives. Interventions: none.	the study adds a unique contribution to the literature in measuring general drinking motives of individuals across three specific contexts: drinking game participation, tailgating, and prohibited in-stadium alcohol consumption. coping and enhancement drinking motives were associated with higher reports of the number of drinks consumed while tailgating. conformity motives were linked to riskier drinking game outcomes. alcohol use was significantly greater among males than females. there was a significant age difference in drinking game participation, with the subjects age 18 years or younger playing more frequently. In general, expectancies of alcohol effects were significantly associated with both alcohol use and problems only for the younger subjects, particularly males the most important new findings of this study were that changes in drinking game playing are predictive of changes in cognitions about alcohol use, alcohol use levels, and alcohol use problems for first-year college students.	the sample of individuals was primarily comprised of white, female college students. studies with more diverse samples are needed to determine how well results generalize and represent the true impact of drinking game participation.
29 - adams and nagoshi, 2014.	N =195; Age: Mean age for males = 20.0; Mean age for females = 19.5 Gender: 62% female, 38% male; Setting: undergraduate students from introductory psychology classes at arizona state University in 1992-93;	cross sectional.	Measures: the questionnaire was a modification of one used in the study by nagoshi et al and contained the following items: Drinking Game, alcohol use, Problems with alcohol use, alcohol expectancies, reasons for drinking alcohol, reasons for not drinking alcohol, Perceived norms for alcohol use and eysenck 1.7 (measuring impulsivity and venturesomeness/sensation seeking) Interventions: none.	Males endorsed greater participation in DG and cited "team" and "motor" games more often than females. "Gambling" games were endorsed equally by both sexes, but resulted in increased consequences for females only. a significant difference was found for gender, with more males endorsing participation in DG than females. regarding the average number of Drinks Per week, a significant difference was noted only for females, with female players exhibiting a higher mean number of drinks per week compared to female non-players. among the participants who reported recent drinking game participation, males and females did not significantly differ in the frequency of participation. however, males reported consuming significantly higher amounts of alcohol during a typical occasion of drinking game participation.	the sample of convenience and the use of self-report measures limits the generalizability of the present findings, and directions of causality and third-variable effects are debatable.
30 - alfonso and Deschenes, 2013.	N =154; Age: 18-25 years, with a mean age of 18.80 (sD: 1.13); Gender: 58% male, 42% female; Setting: undergraduate students mandated to receive an alcohol intervention at a large public university in the southeastern United states;	cross sectional.	Measures: alcohol use was measured using the alcohol timeline followback (tlfb) procedure; the 23-item rutgers alcohol Problem Index (39) was the primary instrument used to assess negative alcohol-related consequences; Interventions: none.	the study adds a unique contribution to the literature in measuring general drinking motives of individuals across three specific contexts: drinking game participation, tailgating, and prohibited in-stadium alcohol consumption. coping and enhancement drinking motives were associated with higher reports of the number of drinks consumed while tailgating. conformity motives were linked to riskier drinking game outcomes. alcohol use was significantly greater among males than females. there was a significant age difference in drinking game participation, with the subjects age 18 years or younger playing more frequently. In general, expectancies of alcohol effects were significantly associated with both alcohol use and problems only for the younger subjects, particularly males the most important new findings of this study were that changes in drinking game playing are predictive of changes in cognitions about alcohol use, alcohol use levels, and alcohol use problems for first-year college students.	Despite participants being assured anonymity at the baseline assessment during which the data collected for this study was obtained, it is possible that participants underreported information related to alcohol use.
31 - cameron et al., 2010.	N =133; Age: at least 19 years old, average age 20.0; Gender: 68% female, 32% male; Setting: undergraduate students at a large southeastern university who attended national alcohol screening Day activities;	cross sectional.	Measures: the Daily Drinking Questionnaire (DDQ) was used to assess the average quantity of alcohol, as well as the maximum amount of alcohol, participants consumed for each day of the week during the past 4 weeks; a modified version of the rutgers alcohol Problem Index (raPI) was used to assess negative consequences experienced as a result of alcohol use; a 13-item questionnaire was used to assess participation in and drinking behaviors related to drinking games; Interventions: none.	the study adds a unique contribution to the literature in measuring general drinking motives of individuals across three specific contexts: drinking game participation, tailgating, and prohibited in-stadium alcohol consumption. coping and enhancement drinking motives were associated with higher reports of the number of drinks consumed while tailgating. conformity motives were linked to riskier drinking game outcomes. alcohol use was significantly greater among males than females. there was a significant age difference in drinking game participation, with the subjects age 18 years or younger playing more frequently. In general, expectancies of alcohol effects were significantly associated with both alcohol use and problems only for the younger subjects, particularly males the most important new findings of this study were that changes in drinking game playing are predictive of changes in cognitions about alcohol use, alcohol use levels, and alcohol use problems for first-year college students.	results were based on self-reported behavior.



author and year	sample	study type	Methods	results	limitations
32.1 - Grossbard et al., 2007.	N = 1395; Age: mean (sD) age of 18.4 (0.55) years; Gender: 60% female, 40% male; Setting: first-year college students at a large west coast campus;	cross sectional.	Measures: alcohol consumption was measured by items from the Quantity-frequency and Peak alcohol Use Index and the Daily Drinking Questionnaire; alcohol-related negative consequences were assessed using the rutgers alcohol Problem Index; Drinking game participation was assessed by a question from the young adult alcohol Problem severity test (yaaPst); Interventions: none.	overall, results indicated significantly greater weekly consumption, typical and peak Bacs, and negative consequences in intramural athletes compared with nonathletes. Intramural athletes also reported significantly more drinking game participation than nonathletes. examination of the interaction for weekly drinking between gender and intramural athlete status revealed greater weekly consumption for male intramural athletes compared with female intramural athletes, yet this difference was not apparent in nonathletes. thus, intramural athletic participation had a greater impact on weekly consumption in male intramural athletes than in female intramural athletes, although this was a small effect. Drinking game participation accounted for the significant relationship between intramural athlete status and all measures of consumption and consequences. Intramural and intercollegiate athletes reported greater levels of consumption and consequences than nonathletes. Drinking game participation was positively associated with all consumption and consequence variables, and both intramural and intercollegiate athletes reported greater drinking game participation than nonathletes. female intramural athletes reported significantly greater consumption than female nonathletes. for intramural and intercollegiate athletes, drinking game participation accounted for the higher levels of alcohol consumption as compared with nonathletes. Men and women consume similar amounts when playing DGs which would result in higher Bacs for women when alcohol is consumed. whereas all gamers may make antagonizing comments to fellow players to entice them to drink more, women may retrospectively perceive those actions to be embarrassing or regretful, whereas men may perceive such actions in a neutral or even positive light.	the use of self-report measures is an limitation of this research, as students may not accurately report alcohol-related information.
32.2 - Grossbard et al., 2007.	N =6055; Age: mean age of 21.2 (4.6); Gender: 63% female, 37% male; Setting: college students enrolled in a longitudinal study at three west coast colleges;	cross sectional.	Measures: alcohol consumption was measured by items from the Quantity-frequency and Peak alcohol Use Index and the Daily Drinking Questionnaire; alcohol-related negative consequences were assessed using the rutgers alcohol Problem Index; Drinking game participation was assessed by a question from the young adult alcohol Problem severity test (yaaPst); Interventions: none.	Intramural and intercollegiate athletes reported greater levels of consumption and consequences than nonathletes. Drinking game participation was positively associated with all consumption and consequence variables, and both intramural and intercollegiate athletes reported greater drinking game participation than nonathletes. female intramural athletes reported significantly greater consumption than female nonathletes. for intramural and intercollegiate athletes, drinking game participation accounted for the higher levels of alcohol consumption as compared with nonathletes.	the use of self-report measures is an limitation of this research, as students may not accurately report alcohol-related information.
33 - ray et al., 2014.	N = 336; Age: 18 - 20; Mean age of 18.20years (sD = 0.44); Gender: 53% male, 47% female; Setting: first-year students at a large, public university in the northeast United states;	cross sectional.	Measures: event-specific alcohol use was assessed with an open-ended question asking participants to indicate the number of drinks they consumed on the previous friday and saturday; to assess event-specific DG play, participants were asked to indicate DG participation (0= no, 1=yes) on each event they reported alcohol use; event-specific consequences were assessed by an adaptation from the young adult alcohol consequences Questionnaire (yaacQ); Interventions: none.	Men and women consume similar amounts when playing DGs which would result in higher Bacs for women when alcohol is consumed. whereas all gamers may make antagonizing comments to fellow players to entice them to drink more, women may retrospectively perceive those actions to be embarrassing or regretful, whereas men may perceive such actions in a neutral or even positive light.	this study relied on self-report data and accurate recall could be affected on nights of elevated alcohol use.



author and year	sample	study type	Methods	results	limitations
34 - Zamboanga et al., 2017.	N =686; Age : 18 - 23; Mean age= 19.45; Gender : 73.8% female, 26.2% male Setting : students from eight U.S. colleges/universities: one public university in the southeast, two private liberal arts colleges in the northeast (a coeducational and a women' s college), one private liberal arts university on the west coast (coeducational), and private religious affiliated liberal arts institutions in the northwest (coeducational), the south (coeducational), and the Midwest (a women' s college and a men' s university);	cross sectional.	Measures : MPDG measure was used to assess students' motives for playing DGs; Participants reported how often they played drinking games using an 8-point scale; the Drinking Motives Questionnaire-revised was used to measure the frequency with which students consume alcohol for social, enhancement, coping, and conformity reasons; to measure typical alcohol use, participants completed the alcohol Use Disorders Identification-consumption subscale (aUDIt-c); Interventions : none.		





4.1 GENDER CONVERGENCE

A chronological analysis of the articles shows that female participation in drinking games has been increasing in the university setting. Contrary to prior belief, the difference between genders in the participation of DGs has been gradually disappearing. (Alfonso & Deschenes, 2013; Cameron et al., 2010; Ford et al., 2022; Hoyer & Correia, 2022; LaBrie et al., 2013; McInnes & Blackwell, 2021; Pedersen & LaBrie, 2006; Polizzotto et al., 2007; Zamboanga et al., 2021). The gender convergence observed might be explained by the increase in female participation inside the university, for example reports from The Wall Street Journal showing women making up 59.5% of all US college students.

Additionally, the relationship women have with alcohol has been changing. Alcohol use and misuse among women are increasing in general, therefore it is expected that such an increase also involves the university setting (Ham & Hope, 2003). Data from two nationally representative surveys, conducted by Grant et al. (2017), 10 years apart, showed that the overall prevalence of binge drinking and alcohol use disorder increased at a strikingly higher rate in women than in men.

Slutske (2005) found a significantly stronger association between college attendance and the combined diagnosis of alcohol dependence or alcohol abuse and the alcohol abuse symptom of having serious problems at home, work, or school that were caused by alcohol among women than men.

Alcohol has also been related, in the university setting, to lower grades and missing classes. Wechsler et al. (1995) found that women, after an episode of binge drinking, were more likely to miss a class than were men who consumed the same amount of alcohol. These findings gain relevance as women start to have alcohol-related problems sooner and at lower drinking amounts than men, thus posing DGs as an important target of further investigation and intervention.

Another element found in the literature is the lack of recognition of an alcohol problem between women. For instance, as found by Wechsler et al. (1995), between drinkers who binged three or more times in the past 2 weeks, 22% of the men described themselves as heavy or problem drinkers, while only 8% of the women acknowledged the same problem. It is important to correct the underestimation of the extent and seriousness of drinking problems in women.

4.2 AWARENESS OF RISK AND PERSONALITY TRAITS

There was broad awareness of the potential hazards of drinking games, with participants placing particular emphasis on the risks of sustaining injury or becoming



involved in arguments or violence as a result of intoxication. However, this did not appear to affect the decision to engage in such practice. Many of the participants were proud of their extreme intoxication and regarded many negative outcomes, such as losing consciousness or vomit-ing, as ‘badges of honour’, as shown by Polizzotto et al. (2007).

These findings may be related to personality traits among university students: those with tendencies towards a desire to optimize positive affect (sensation seeking) and a propensity to take risks and act rashly (impulsivity) displayed a higher frequency of DGs participation and a greater endorsement of negative consequences (Diulio et al., 2014). It is also important to note that the age range of university students is classically known for being a period when young adults are drawn to display acts of bravery and rebel-liousness. Binge drinking and engaging in high risk alcohol practices, such as drinking games, might be examples of this tendency.

It thus follows that future intervention should focus not on bringing awareness to the risks intrinsic to the drinking games practice, as students have shown con-sciousness over the negative consequences, but on changing the perception of such negative conse-quences in students mindsets, especially targeting stu-dents with the aforementioned personality traits.

4.3 SOCIAL ANXIETY

Social anxiety was an important point of analysis for researchers, who initially hypothesized that socially anxious individuals would be more likely to partici-pate in drinking games, given the social motivations. However, most studies found no positive association between social anxiety and frequency of participation in games (George et al., 2019; Mulligan et al., 2016) with some even finding a negative association (Ham et al., 2010). These results can be interpreted consid-ering the global lower participation of socially anx-ious individuals in socializing events (Burke & Stephens, 1999; Morris et al., 2005; Myers et al., 2003). On the other hand, there was a strong association between socially anxious drinkers and negative out-comes related to drinking games (George et al., 2019; Kenney et al., 2014; Mulligan et al., 2016).

It is concluded that the socially anxious have a lower frequency of participation in games, but, when they do participate, they are more affected by negative outcomes.

5 IMPLICATIONS

Additional investigation and medical focus are neces-sary for college students who engage in DGs, as this activity has been demonstrated to be a risky drinking behaviour.



Pinpointing which emerging adult students are susceptible to consuming excessive amounts of alcohol while playing DGs is critical for intervention approaches that are tailored to this group. To offer guidance on reducing risk, it is essential for researchers to determine which factors (such as reasons for playing) in DGs are more significantly linked to adverse outcomes.

6 LIMITATIONS

The limitations of this systematic review must be taken into account when interpreting the results. Firstly, the absence of a uniform measure for DGs in various studies may impact the calculated associations. It is important to continue working towards establishing and verifying a consistent measure for DG behaviours and their associated outcomes. Additionally, although previous studies have indicated a positive correlation between DG participation and higher levels of alcohol consumption and negative consequences, even when considering overall alcohol use, it is plausible that heavy drinkers may be more likely to engage in DGs, thus posing a selection bias.

7 CONCLUSION

Overall, the review suggests that DGs are prevalent among college students and associated with various negative outcomes. While awareness of the risks is present, participants often view negative consequences as badges of honour. Personality traits and the college drinking culture play a role in DG participation and negative outcomes. Understanding these factors is crucial for developing targeted interventions to reduce risk and promote healthier drinking behaviours among college students engaging in DGs. However, the lack of a uniform measure for DGs and the possibility of selection bias among heavy drinkers participating in DGs are limitations of the reviewed studies.

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