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# **Housing Conditions and Psychological Distress Among Higher Education Students: a Systematic Literature Review**

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## **Abstract**

*Objective:* Housing has been identified as one of the most important areas related to individual well-being in emerging adults attending a tertiary educational institution. Thus, the purpose of this systematic review is to explore the relationship between students' housing conditions and students' psychical, mental, and emotional wellbeing. *Methods:* The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. *Results:* Outcomes were categorized into 10 categories: 1. homesickness and adaptation to college life; 2. overall health and distress; 3. sleep; 4. depression, anxiety, and other mental health conditions; 5. alcohol abuse; 6. substance abuse; 7. tobacco use; 8. internet addiction; 9. eating disorders; and 10. sexual behaviors. *Conclusions:* Student housing conditions play an important role in a variety of health and health-related problems. These findings

underscore the relationship between housing conditions and different facets of students' mental and physical wellbeing, emphasizing the importance of addressing housing conditions in mental health prevention and intervention programs.

**Keywords:** university students, housing conditions, mental health, addiction, sexual behaviors

## **Introduction**

Approaching the university context implies multiple transitions for the young adult, such as moving from home, new responsibilities related to academic performance and new social situations. A number of studies indicates high levels of psychological distress in university students, specifically depression, anxiety and suicide risk (Deb et al., 2016; Franzoi et al., 2020, 2021; Granieri et al., 2022; Oyekcin et al., 2017; Schofield et al., 2016; Tran et al., 2017). Moreover, students with psychological distress show a higher risk of academic failures and drop-out (Ishii et al., 2018; Jaisoorya et al., 2017).

Housing has been identified as one of the main domains relating to individual well-being (Sotgiu et al., 2011; van Praag et al., 2003). In particular, amongst higher education students, those living away from home or not owning the room they are living in showed higher psychological distress regardless of their parental financial support (Vershuur et al., 2004; Watson et al., 2016). Thus, even if separation from home does not necessarily have a negative impact on higher education students, it may be a risk factor for emerging adults with previous vulnerabilities who might experience increased anxiety and depression, with a negative effect on their overall health (Biasi et al., 2018; Stroebe et al., 2015; Thurber & Walton, 2012).

Therefore, we conducted a systematic review of existing literature and research considering the relationship between psychological distress and housing conditions among higher education students.

## **Methods**

### ***Search strategies***

The systematic review was conducted in accordance with the PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses – guidelines for search, systematization, and report of systematic reviews (Moher et al., 2009). Studies were identified by searching the following databases: Scopus, Web of Science, MEDLINE/PubMed, ProQuest Psychology Journals, PsycINFO and PsycARTICLES. We used a combination of the keywords (“university student\*” OR “college student\*” OR “campus student\*”) AND (“housing condition\*” OR “living condition\*” OR “living arrangement\*” OR “housing arrangement\*” OR “housing \*location”) AND (psych\* OR “mental health” OR “mental disorder\*” OR “mental disease” OR depress\* OR anx\* OR emotion\* OR wellbeing OR “well-being” OR “quality of life” OR distress OR stress). We used different search criteria considering the different search fields available in the databases considered. Specifically, keywords were searched into: (1) title, abstract and keywords for what concerns Scopus; (2) title and abstract for what concerns PubMed/MEDLINE; (3) all fields for what concerns Web of Science; (4) text through the PsycINFO and PsycARTICLES databases; and (5) all fields for what concerns ProQuest. We chose to include only Journal Articles published in the last decade (January 2010–September 2020) in English.

### ***Selection criteria***

Inclusion criteria were:

1. Quantitative or qualitative original research.
2. Research making an explicit reference to students’ housing conditions.
3. Research making an explicit reference to students’ psychological distress/mental health.
4. Publications within the given time interval (January 2010–September 2020).
5. Articles’ language limited to English.

Exclusion criteria were:

1. Studies not reporting original results (reviews, letters, editorials, and comments).
2. Dissertations.
3. Focus on limited sub-groups of students (i.e., students with mental and/or physical disabilities).

Any discrepancy regarding the inclusion/exclusion of articles was discussed within the research group until an agreement was reached. A list of excluded studies, including level and reasons of exclusion, was kept. References of included articles were manually checked for any study not retrieved by the automatic literature search: studies identified in this step underwent the same screening process of the papers retrieved by the database search. The entire procedure is displayed in Figure 1.

## **Data Analysis**

Data analysis was carried out through a standardized data extraction form that included: (1) general details (authors, title, publication source, year of publication); (2) type of study; (3) sample characteristics (e.g., age, gender, and country); (4) measures; and (5) results.

## **Results**

The electronic databases search identified 198 records while five articles were identified through previous literature knowledge. After duplicates were removed, 192 articles were identified. One hundred and thirty articles were excluded based on title and abstract because they either: (a) did not focus on housing conditions and/or university students, and/or psychological distress ( $n = 123$ ); (b) were not original research ( $n = 3$ ); (c) focused on students with mental or physical disabilities ( $n = 2$ ); (d) focused on interventions ( $n = 1$ ); or (e) were not in English ( $n = 1$ ). Another 29 articles were excluded based on full-

text evaluation because they either: (a) did not focus on housing conditions and/or university students, and/or psychological distress (n = 25); (b) focused on interventions (n = 1); or (c) were not in English (n = 3). The 36 articles resulting from electronic and manual literature searches underwent data extraction and qualitative analysis.

Results were classified into 10 categories according to their focus (each paper was included in all the pertaining categories): 1. Homesickness and adaptation to college life (3 papers); 2. Overall health and distress (3 papers); 3. Sleep (2 papers); 4. Depression, anxiety, and other mental health conditions (7 papers); 5. Alcohol abuse (13 papers); 6. Substance abuse (3 papers); 7. Tobacco use (3 papers); 8. Internet addiction (2 papers); 9. Eating disorders (1 paper); and 10. Sexual behaviors (1 paper). Table 1 summarizes the results.

#### *Homesickness and adaptation to college life*

Dazkir (2018) investigated the perception of living arrangements and its link to psychological distress in 33 students living in a residence hall and attending a single Turkish private university. He underlined how place meaning, place attachment and place personalization can preserve students' psychological well-being, with a positive effect on their academic achievements. In particular, 80% of females and 72% of males in this sample reported feeling homesick when they first started college and 21% of them revealed that they still struggled with homesickness. Being away from their families and homes, living in a new and unfamiliar environment, and feeling lonely and not having many interpersonal relationships were the reasons most frequently associated with homesickness. Moreover, students declared that creating new relationships with their peers and personalizing their new rooms helped them overcome their homesickness. The objects they used for personalizing their rooms were either pleasing to them or were connected to memories and meanings associated with their loved ones and their previous home. Moreover, a study conducted by Vasilenko and colleagues (2020) on 142 first-year students attending a single Russian university underline that satisfaction with living conditions influenced the adaptability of first-year students to university conditions. Finally, in a study on 432 college students attending two US

universities, Hong and Cui (2019) found that living arrangements moderated the association between perceived helicopter parenting (i.e., parenting characterized by excessive involvement, assistance, and control) and college students' psychological maladjustment, finding a stronger association in students who were still living with their family of origin than among those living away from their families.

### *Overall health and distress*

In a 2014 study, O'Connell highlighted that living arrangements were significantly linked to mental health in 90 students at a single US university. More specifically, students living in a single room were significantly less likely to report being sick than students living in a double room: they reported fewer days of acute illness, less runny noses and sneezing, and a lower overall illness burden. On the contrary, students who lived off-campus reported a significantly higher average of illness burden as well as higher rates of sore throats, runny noses, earaches, sneezing, and fatigue. Moreover, Henry and colleagues (2018) explored 397 college students attending a single US university and found that students living on campus reported lower levels of overall perceived health than those living off campus. Finally, a cross-sectional community-based survey on 4,839 Indian students conducted by Bhat and colleagues (2018) showed that students living with their families reported higher levels of psychological distress than those living away from their families of origin.

### *Sleep*

Research also focused on sleep quality and housing conditions. Peltz and Rogge (2016) focuses on sleep hygiene and environmental factors that disturb sleep as direct predictors of sleep disorders and indirect depressive disorders in a sample of 335 college students attending US universities. In both students living in a single room and living with a roommate, environmental noise and poor environmental hygiene

practices were directly associated with low sleep quality, and indirectly associated with increased depressive symptoms. Moreover, students living alone showed an indirect association between depression and the cognitive dimension of sleep hygiene (e.g., thinking about things to do when going to bed) while students living with a roommate showed indirect associations between depression and the physiological dimension (e.g., caffeine assumption before going to bed) and the environmental dimension of sleep hygiene (e.g., sleeping with lights off or on softly). Indeed, environmental dimensions impinge on feelings of efficacy to control over environmental factors, modulating one's relationships with others and the environment itself. For students living in a double room, the sources of environmental disturbance in their room (e.g., light, music, or television on) predict additional sleep disturbances and higher depressive symptoms. Moreover, longitudinal research from Galambos and colleagues (2013) on 186 Canadian university students showed that living away from home was linked to more sleep disturbances, later bedtimes, and later rise times, while living on campus was associated with later bedtimes and rise times.

#### *Depression, anxiety, and other mental health conditions*

Research underlined that students who are not satisfied with their housing conditions show higher levels of depression than those satisfied with their living arrangements in different countries: similar results were found by Deb and colleagues (2016) on 717 students attending four Indian universities, and by McIntyre and colleagues (2018) on 1,135 students attending a single English university. In a study on 4,184 undergraduate students attending a single French university, Tran and colleagues (2017) found that students who are not satisfied with their living conditions had higher risk of depression, and that students with depressive symptoms were more likely dissatisfied with their living conditions. Moreover, in a study on 308 students attending a single Guam university Ran and colleagues (2016) found that living alone or with friends are significant predictors of depressive symptoms, while in a study on 1,500 students attending a single Cypriot university, Sokratous and colleagues (2014) found that living condition quality



was associated with depressive symptoms and that students living alone showed greater prevalence of clinically significant symptoms of depression compared to students living with other people. On the contrary, a study conducted by Shamsuddin and colleagues (2013) on 506 Malaysian students attending four public universities found no association between depression and living accommodations or living conditions. However, the study underlined that depression scores were significantly higher among students born in rural areas than among those born in urban areas. The same study found no association between anxiety and living conditions, but it underlined higher anxiety scores among students born in rural areas than among those born in urban areas. Finally, Kono and colleagues (2015) focused on 726 international students attending a single university in Japan, identifying that poor housing conditions were statistically associated with a higher risk of developing depressive symptoms. For what concerns anxiety, in their study on 1,135 students, McIntyre and colleagues (2018) found that a low level of satisfaction with housing conditions was connected to higher levels of anxiety as well as higher levels of paranoia. Moreover, in their research on 4,184 undergraduate students, Tran and colleagues (2017) found that students living alone had increased levels of anxiety. Moreover, in a community-based study conducted by Seelman (2016) on 2,316 US transgender adults who identified as transgender during their college years, higher levels of suicide attempts emerged in those who lived on college campuses and who did not have access to adequate and specific toilets for transgender people, even controlling for interpersonal victimization.

### *Alcohol abuse*

A research conducted by Cleveland, Turrisi and colleagues (2018) on 295 first-year students on multiple campuses on a state-wide university system showed that freshmen living on-campus reported higher rates of alcohol use compared to their peers living at home. Moreover, in cohort study on 4,662 young Swiss men, Bähler and colleagues (2016) reported a strong association between moving from their family of origin and the initiation of monthly risky single-occasion drinking, and in a research on 983

undergraduates attending a single Polish university, Rogowska (2018) showed excessive alcohol drinking among students living in a dorm or an apartment, and living in an urban area. A study conducted by Miller and colleagues (2016) on 305 students who had violated campus alcohol policy reported that students exhibited significantly lower alcohol consumption during the summer. In this season, students most likely lived with their families of origin; thus, living with a parent resulted in lower alcohol consumption. Furthermore, Boot and colleagues (2010) investigated differences between students living with their parents and students living alone or with peers in a sample of 8,258 Belgian students and 27,210 Dutch students, finding that students living with peers showed greater alcohol consumption. Moreover, a study by Quinn and Fromme (2012) on 1,833 non-abstaining students attending a single US university reported that students who live on campus drive less after drinking than those who do not. A study conducted by Tyler and colleagues (2018) on 1,448 undergraduate students attending two US universities underlined that students living in fraternity housing had higher rates of heavy drinking and perceived their close friends as engaging in more risky drinking compared to students with different housing conditions. Moreover, a research conducted by Lorant and colleagues (2013) on 7,015 students at a single Belgian college showed that living on campus or in a dormitory with a higher number of roommates leads to excessive drinking patterns. However, a study by Iwamoto and colleagues (2012) on 1,575 Asian American undergraduates from a public university revealed that living off-campus was associated with higher binge drinking, a higher quantity of alcohol consumption and higher alcohol-related problems. Roemer and Walsh (2014) examined the influence of living arrangements on problematic alcohol use among 139 university students at a single Canadian university. They found that students living with parents show an association between self-esteem and both binge drinking and alcohol-related problems, which is not observed in students living on campus or off campus without parents. Another study of Cleveland, Mallet and colleagues (2018) on 1,706 students attending a single US university found that students who remained in on-campus spaces during their first two years more likely showed no consequence for their drinking behavior over time compared to those who moved to a fraternity or off-campus housing. On the contrary, students who remained in on-campus spaces were the least likely to

belong to the group of students characterized by physical consequences for their drinking behavior, even if non repeated. Moreover, students who moved to fraternity housing were less likely to have multiple consequences for their drinking behavior compared to students in off-campus arrangements, and were more likely to belong to the group of students with repeated and multiple consequences for their drinking behaviors compared to students living in on-campus and off-campus spaces. Contrary to other research, Nasui and colleagues (2015) conducted a study on 468 students attending a single Romanian university and found no statistically significant difference in alcohol consumption depending on their living conditions. At the same time, Hallet and colleagues (2013) conducted a study on 942 undergraduate students studying on campus at an Australian university and found that housing conditions are only connected to sexual consequences of alcohol consumption: students living with parents report fewer unpleasant sexual encounters than those living in shared apartments or dormitories. Moreover, high alcohol consumption leads students who live alone to engage in more sexual encounters without precautions, controlling for other demographic (e.g., age, gender, citizenship) and academic variables (e.g., year level, faculty, residence status), smoking status, drinking frequency, and the amount of alcohol consumed on a typical occasion.

### *Substance abuse*

The study conducted by Rogowska (2018) in 983 undergraduates revealed excessive substance use among students living in a dormitory or an apartment, and living in an urban area, while living at home showed healthier habits. Moreover, the study conducted by Boot and colleagues (2010) on 8,258 students in Belgium and 27,210 students in Denmark showed that the consumption of recreational drugs was associated with living with peers. A study conducted by Kolar and colleagues (2018) on 1,713 undergraduate students at three university campuses showed that living off campus with parents or in residences did not have an impact on cannabis use.

### *Tobacco use*

The study conducted by Boot and colleagues (2010) showed that the consumption of tobacco was associated with living with peers. Moreover, the research on 4662 young men conducted by Bähler and colleagues (2016) reported a strong association between moving from their family of origin and the consumption of tobacco. Living with peers emerged as a strong predictor of daily smoking. Finally, a research conducted by Sa and colleagues (2013) explored the prevalence of cigarette smoking among 1,201 South Korean international college students in different US universities, showing that students living off-campus were more frequent smokers than those living on campus and more likely reported an increase in smoking.

### *Internet addiction*

A study conducted by Tao and colleagues (2016) on 1,048 college students attending a single Chinese university showed that anxiety connected to high-density living conditions had a strong impact on Internet addiction, higher than that of other factors, such as the size of the dormitory room. However, research on 556 students at a single Turkish university conducted by Odaci (2013) revealed that problematic Internet use was not connected with whether students were living with their families or not.

### *Eating disorders*

Research conducted by Tao and colleagues (2016) on 1,048 students showed that binge eating scores and the frequency of compensatory behaviors were significantly predicted by anxiety caused by high-density living conditions.

### *Sexual behaviors*

Research conducted by Hittner and Kryzanowski (2010) on 410 college students attending a single US public university revealed that males living on-campus engaged in more frequent casual sex than males living off-campus while the casual sex frequency for females did not vary as a function of residential status.

### **Discussions**

The university years can be a formative time for young students, associated with the transition from family to private life and moving between different circles of friends and social networks (Weigold et al., 2020; Cavanagh et al., 2018; Lile et al., 2018; Vaez & Laflamme, 2002). However, the increasing number of students in higher education has led to a growing concern about their mental health problems worldwide (Busari, 2012; Chen et al., 2013; Pidgeon et al., 2014; Pozos-Radillo et al., 2014; Shamsuddin et al., 2013). A variety of health and health-related problems have been identified among college students, particularly problems related to diet, sleep patterns, sexual behavior, and alcohol and drug abuse. Being a college student during emerging adulthood has been identified as a risk for excessive alcohol use due to a combination of individual, family, peer, and cultural factors (Schulenberg and Maggs, 2002). Attending college can be a source of strain or stress for some students, who often report that college life is more stressful than they expect (Gall et al., 2000). Among these risk factors, student housing plays an important role. Within this framework, we cannot ignore the impact of the coronavirus pandemic (Covid-19), which increased fears and anxieties worldwide, leading to an increase in the frequency and severity of mental health problems (Granieri et al., 2020; 2021; Serafini et al., 2020; Xiong et al., 2020; Pan et al., 2021). The ease of transmission required immediate isolation, and as expected, many infrastructures lacked adequate resources. This created new and unexpected challenges for university students (Araújo

et al., 2020; Sahu et al., 2020), leading to disruption of the educational pathway (UNESCO, 2020). Most students were forced to stay at home with limited access to study resources and little to no opportunities for interactions. This unusual situation led to deep isolation, anxiety, depression, and uncertainty for the future (Granieri et al., 2021; Tull et al., 2020; Arima et al., 2020). Relatedly, a study by Flaudias and colleagues (2020) reported that university students resorted to maladaptive behaviors such as substance and alcohol abuse during the lockdown connected to the actual pandemic. Results of a more recent study by Sutton (2021) conducted on 312 university students during the lockdown showed that students who moved home from living with friends significantly decreased the number of days they drank per week, while students who continued to live with peers increased the number of days they drank per week; in general, the total number of drinks consumed per week decreased among students who moved home due to campus closures.

This data are in line with the results of our review of existing literature and research on the relationship between students' housing conditions and students' psychical, mental and emotional wellbeing. Indeed, living with parents resulted a protective factor for alcohol consumption and dangerous sexual behaviors (Hallet et al., 2013). Consistently, several studies reported higher rates of alcohol use among students living on campus or in fraternity housing compared to their peers living at home (Bähler et al., 2016; Cleveland, Turrisi et al., 2018; Tyler et al., 2018). Moreover, university students are often engaged in risky sexual behavior, such as unprotected sex or using unreliable contraceptive methods, which can lead to negative consequences on their mental health and on their academic performance (Grace, 1997; Hightow et al., 2005; Lechner et al., 2013; Scholly et al., 2005). In particular, literature highlighted that students living with their parents reported fewer unpleasant sexual encounters than those living in shared apartments, and that high alcohol consumption led students who live alone to engage in more unprotected sexual encounters (Boot et al., 2010; Evans-Polce et al., 2017; Hallet et al., 2013; Roemer & Walsh, 2014). Moreover, living in a dormitory or living with peers was associated with excessive substance use (Boot et al., 2010; Rogowska, 2018). In this regard, lifetime rates of regretted sexual experiences (RSE) for college students is between 29%-71.9%, with 31.8% (Merrill et al., 2018; Oswalt et al., 2005).

Regret, when linked to risky sexual behavior can lead to heightened symptoms of anxiety and depression (Roese et al., 2009). A recent study evidenced that university students are more likely to experience sexual regret when involved in a fraternity or sorority, college athletics, and with a history of sexual victimization (Johnson et al., 2021). Leaving their family house and starting a new life in college seems to lead to great emotional distress. Research confirmed that living arrangements were significantly linked to mental health (O'Connell, 2014). More specifically, living in a single room or with a roommate was associated with low sleep quality and depressive symptoms (Peltz & Rogge, 2016). Moreover, living alone and in poor housing conditions was a significant predictor of depressive symptoms (Kono et al., 2015; Ran et al., 2016). Likewise, higher levels of anxiety emerged in students living alone or those who were not satisfied with their housing conditions (McIntyre et al., 2018; Tran et al., 2017), even if such results are controversial (Shamsuddin et al., 2013). A recent study on university students (De Man et al., 2021) showed that, during the lockdown for Covid outbreak, living together with others and being in a steady relationship were associated with lower depressive symptoms severity scores. This could be due to social interaction preventing depressive tendencies, but they may also relate to the important of social support in a period of psychological and academic stress. Similar associations have been shown in other studies (Cao et al., 2020; Wörfel et al., 2016). Besides, students born in rural areas reported higher depression, anxiety and stress compared to students with an urban upbringing (Bayram & Bilgel, 2008) possibly because of poorer family economic situations.

Our results underscore the connection between housing conditions and many facets of mental and physical wellbeing, but they also highlight the need for a more robust and systematic attention to this issue. Indeed, only 1 out of 36 (2.78%) paper considered housing conditions as the key variable impacting on students' health behavior (i.e., hazardous drinking), another study (2.78%) explored the connection between students' perception of the place they live in and their wellbeing and seven studies (19.44%) considered housing or living conditions as main variables, including them in their titles. All the other articles (27, 75.00%) include housing and living conditions in their analyses, but were only tangentially focused on exploring these facets. Moreover, housing conditions and living arrangements were

conceptualized in many ways both between and within studies: 13 studies (36.11%) considered living with families vs living with peers vs living alone; 11 studies (30.56%) distinguished between living on campus and living off campus; 4 studies (11.11%) focused on the presence of a roommate; 3 studies (8.33%) considered urban vs rural environments; 3 studies (8.33%) distinguished between students living with parents and in a dormitory; 3 studies (8.33%) focused on the satisfaction about one's living conditions and arrangements; 2 studies (5.56%) considered students living with their families or not; while room sizes, access to adequate and specific toilets, place meaning and personalization, and poor vs good living conditions were considered only 1 study each (2.78%). Research also had very different sample sizes: Dazkir (2018) enrolled 33 participants while Boot et al., (2010) enrolled 27,210 students in Belgium and 8,258 students in the Netherlands. Moreover, studies were based on very heterogeneous designs: 33 (91.67%) projects were national studies, 2 studies (5.56%) were conducted in different US states and 1 study (2.78%) was an international study; 24 (66.67%) were monocentric research while 12 (33.33%) were multicentric studies; only 1 study (2.78%) specifically targeted international students. All these facets deeply mine the generalizability of their conclusion. Moreover, the relationship between housing/living conditions and the evolution of mental and physical wellbeing over time is still understudied: only 4 (11.11%) studies had a longitudinal design, while all the other ones were cross sectional studies (32, 88.88%).

Recognizing the heterogeneity, the limitations and the weaknesses of current research on the relationship between housing conditions and university students' wellbeing put emphasis on the need to develop further studies specifically aimed to investigate such issues, monitoring their evolution over time and their relationship with other sociodemographic, clinical, academic and contextual features. Indeed, the impact of housing conditions on students' mental and physical wellbeing can vary according to students' intrapsychic and interpersonal characteristics, their social and cultural context, the characteristics of human and non-human environment in which they live and so on. Moreover, it would be very interesting to explore the importance of specific variables connected to living arrangements and housing conditions in different cultural and social backgrounds: for example, living on campus or off campus may have a



different impact on students' wellbeing in Countries where most students live off campus compared to Countries where most students live in campus. Finally, none of the studies included in our literature review considered the relationship between university staff, housing conditions and students' mental health. Further research should include also the role of academic and administrative personnel, since it has a fundamental impact in the relationship between students and the human and non-human environment they live in.

### **Limitations**

The present study presents several limitations. Although the studies reviewed met the inclusion criteria, they exhibit differences in methods and dependent variables. Moreover, the heterogeneity of the articles, their results cannot be generalized. It is also plausible that many important results have been missed in this review. Furthermore, this study only considered publications in English, impoverishing the number of research useful to corroborate the reported data.

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## References

- Araújo, F., de Lima, L., Cidade, P., Nobre, C. B., & Neto, M. (2020). Impact of Sars-Cov-2 and its reverberation in global higher education and mental health. *Psychiatry Research*, 288, 112977. <https://doi.org/10.1016/j.psychres.2020.112977>
- Arima, M., Takamiya, Y., Furuta, A., Siriratsivawong, K., Tsuchiya, S., & Izumi, M. (2020). Factors associated with the mental health status of medical students during the COVID-19 pandemic: a cross-sectional study in Japan. *BMJ Open*, 10(12), e043728. <https://doi.org/10.1136/bmjopen-2020-043728>
- Bähler, C., Foster, S., Estévez, N., Dey, M., Gmel, G., & Mohler-Kuo, M. (2016). Changes in living arrangement, daily smoking, and risky drinking initiation among young Swiss men: a longitudinal cohort study. *Public Health*, 140, 119–127. <https://doi.org/10.1016/j.puhe.2016.07.011>
- Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Social Psychiatry and Psychiatric Epidemiology*, 43(8), 667–672. <https://doi.org/10.1007/s00127-008-0345-x>
- Bhat, U. S., Amaresha, A. C., Kodancha, P., John, S., Kumar, S., Aiman, A., Jain, P. A., & Cherian, A. V. (2018). Psychological distress among college students of coastal district of Karnataka: A community-based cross-sectional survey. *Asian journal of psychiatry*, 38, 20–24. <https://doi.org/10.1016/j.ajp.2018.10.006>
- Biasi, V., Mallia, L., Russo, P., Menozzi, F., Cerutti, R., & Violani, C. (2018). Homesickness experience, distress and sleep quality of first-year university students dealing with academic environment. *Journal of Educational and Social Research*, 8(1), 9-17. <https://doi.org/10.2478/jesr-2018-0001>
- Boot, C. R. L., Rosiers, J. F. M, Meijman, F. J., & Van Hal, G. F. G. (2010). Consumption of tobacco, alcohol, and recreational drugs in university students in Belgium and the Netherlands: the role of

living situation. *International Journal of Adolescent Medicine and Health*, 22(4).  
<https://doi.org/10.1515/IJAMH.2010.22.4.527>

Busari, A. (2012). Identifying difference in perceptions of academic stress and reaction to stressors. *International Journal of Humanities and Social Science*, 2(14), 138-146.

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, 287, 112934.  
<https://doi.org/10.1016/j.psychres.2020.112934>

Cavanagh, A. J., Chen, X., Bathgate, M., Frederick, J., Hanauer, D. I., & Graham, M. J. (2018). Trust, growth mindset, and student commitment to active learning in a college science course. *CBE—Life Sciences Education*, 17(1), ar10.

Chen, L., Wang, L., Qiu, X. H., Yang, X. X., Qiao, Z. X., Yang, Y. J., & Liang, Y. (2013). Depression among Chinese university students: prevalence and socio-demographic correlates. *PLoS One*, 8(3).  
<https://doi.org/10.1371/journal.pone.0058379>

Cleveland, M. J., Mallett, K. A., Turrisi, R., Sell, N. M., Reavy, R., & Trager, B. (2018). Using latent transition analysis to compare effects of residency status on alcohol-related consequences during the first two years of college. *Addictive Behaviors*, 87, 276–282.  
<https://doi.org/10.1016/j.addbeh.2018.06.002>

Cleveland, M. J., Turrisi, R., Reavy, R., Ackerman, S., & Buxton, O. M. (2018). Examining parent and peer influences of alcohol use: A comparison of first-year community college and baccalaureate students. *Journal of Alcohol and Drug Education*, 62(2), 64-89.

Dazkir, S. S. (2018). Place Meaning, Sense of Belonging, and Personalization Among University Students in Turkey. *Family & Consumer Sciences*, 46(3), 252-266. <https://doi.org/10.1111/fcsr.12253>

- Deb, S., Banu, P.R., Thomas, S., Vardhan, R.V., Rao, P.T., & Khawaja, N. (2016). Depression among Indian university students and its association with perceived university academic environment, living arrangements and personal issues. *Asian Journal of Psychiatry*, 23, 108-117. <https://doi.org/10.1016/j.ajp.2016.07.010>
- De Man, J., Buffel, V., van de Velde, S., Bracke, P., Van Hal, G. F., & Wouters, E. (2021). Disentangling depression in Belgian higher education students amidst the first COVID-19 lockdown (April-May 2020). *Archives of Public Health*, 79(1). <https://doi.org/10.1186/s13690-020-00522-y>
- Evans-Polce, R. J., Maggs, J. L., Staff, J., & Lanza, S. T. (2017). The age-varying association of student status with excessive alcohol use: ages 18 to 30 years. *Alcoholism, Clinical and Experimental Research*, 41(2), 407–413. <https://doi.org/10.1111/acer.13294>
- Flaudias, V., Zerhouni, O., Pereira, B., Cherpitel, C. J., Boudesseul, J., de Chazeron, I., Romo, L., Guillaume, S., Samalin, L., Cabe, J., Bègue, L., Gerbaud, L., Rolland, B., Llorca, P. M., Naassila, M., & Brousse, G. (2021). The early impact of the COVID-19 lockdown on stress and addictive behaviors in an alcohol-consuming student population in France. *Frontiers in Psychiatry*, 12. <https://doi.org/10.3389/fpsy.2021.628631>
- Franzoi, I. G., Sauta, M. D., & Granieri, A. (2020). State and trait anxiety among university students: a moderated mediation model of negative affectivity, alexithymia and housing conditions. *Frontiers in Psychology*, 11, 1255. <https://doi.org/10.3389/fpsyg.2020.01255>
- Franzoi, I.G., D'Ovidio, F., Costa, G., d'Errico, A., Granieri, A. (2021). Self-Rated Health and Psychological Distress Among Emerging Adults in Italy: A Comparison Between Data on University Students, Young Workers and Working Students Collected Through the 2005 and 2013 National Health Surveys. *International Journal of Environmental Research and Public Health*, 18: 6403. <https://doi.org/10.3390/ijerph18126403>

- Galambos, N. L., Lascano, D. I. V., Howard, & A., Maggs, J. L. (2013). Who Sleeps Best? Longitudinal Patterns and Covariates of Change in Sleep Quantity, Quality, and Timing Across Four University Years. *Behavioral Sleep Medicine*, 11(1), 8-22. <https://doi.org/10.1080/15402002.2011.596234>
- Gall, T. L., Evans, D. R., & Bellerose, S. (2000). Transition to first-year university: Patterns of change in adjustment across life domains and time. *Journal of Social and Clinical Psychology*, 19(4), 544–567. <https://doi.org/10.1521/jscp.2000.19.4.544>
- Grace, T. W. (1997). Health problems of college students. *Journal of American College Health*, 45(6), 243–250. <https://doi.org/10.1080/07448481.1997.9936894>
- Granieri, A., Bonafede, M., Marinaccio, A., Iavarone, I., Marsili, D., & Franzoi, I. G. (2020). SARS-CoV-2 and Asbestos Exposure: Can Our Experience With Mesothelioma Patients Help Us Understand the Psychological Consequences of COVID-19 and Develop Interventions?. *Frontiers in psychology*, 11, 584320. <https://doi.org/10.3389/fpsyg.2020.584320>
- Granieri, A., Casale, S., Sauta, M.D., Franzoi, I.G. (2022). Suicidal Ideation among University Students: A Moderated Mediation Model Considering Attachment, Personality, and Sex. *Journal of Environmental research and Public Health*, 19, 6167. <https://doi.org/10.3390/ijerph19106167>
- Granieri, A., Franzoi, I. G., & Chung, M. C. (2021). Editorial: Psychological Distress Among University Students. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.647940>
- Hallett, J., Howat, P., McManus, A., Meng, R., Maycock, B., & Kypri, K. (2013). Academic and personal problems among Australian university students who drink at hazardous levels: web-based survey. *Health Promotion Journal of Australia: Official Journal of Australian Association of Health Promotion Professionals*, 24(3), 170–177. <https://doi.org/10.1071/HE13094>

- Henry, B, Cormier, C., Hebert, E. P., Naquin, M. R., & Wood, R. (2018). Health and health care issues among upper-level college students and relationships to age, race, gender, and living arrangements. *College Student Journal*, 52(1).
- Hightow, L. B., MacDonald, P. D. M., Pilcher, C. D., Kaplan, A. H., Foust, E., Nguyen, T. Q., & Leone, P. A. (2005). The unexpected movement of the HIV epidemic in the Southeastern United States: transmission among college students. *Journal of Acquired Immune Deficiency Syndromes*, 38(5), 531–537.
- Hittner, J. B., & Kryzanowski, J. J. (2010). Residential status moderates the association between gender and risky sexual behavior. *Journal of Health Psychology*, 15(4), 634–  
<https://doi.org/10.1177/1359105309357798>
- Hong, P., & Cui, M. (2020). Helicopter parenting and college students' psychological maladjustment: the role of self-control and living arrangement. *Journal of Child and Family Studies*, 29(2), 338-347.  
<https://doi.org/10.1007/s10826-019-01541-2>
- Ishii, T., Tachikawa, H., Shiratori, Y., Hori, T., Aiba, M., Kuga, K., & Arai, T. (2018). What kinds of factors affect the academic outcomes of university students with mental disorders? A retrospective study based on medical records. *Asian Journal of Psychiatry*, 32, 67-72.  
<https://doi.org/10.1016/j.ajp.2017.11.017>
- Iwamoto, D., Takamatsu, S., & Castellanos, J. (2012). Binge drinking and alcohol-related problems among U.S-born asian americans. *Cultur Divers Ethnic Minor Psychol.*, 18(3), 219–227.  
<https://doi.org/10.1037/a0028422>.
- Jaisoorya, T. S., Rani, A., Menon, P. G., Jeevan, C. R., Revamma, M., Jose, V., Radhakrishnan, K. S., Kishore, A., Thennarasu, K., & Sivasankaran Nair, B. (2017). Psychological distress among

college students in Kerala, India—Prevalence and correlates. *Asian Journal of Psychiatry*, 28, 28–31.

<https://doi.org/10.1016/j.ajp.2017.03.026>

Johnson, N. L., Corbett-Hone, M., Gutekunst, M. H., & Wolf, J. A. (2021). The grey zone of collegiate sexual regret: Questionable consent and sexual victimisation. *Culture, health & sexuality*, 23(2), 159-175.

Kolar, K., Erickson, P., Hathaway, A., & Osborne, G. (2018). Differentiating the drug normalization framework: a quantitative assessment of cannabis use patterns, accessibility, and acceptability attitudes among university undergraduates. *Substance Use & Misuse*, 53(1), 1-11.

<https://doi.org/10.1080/10826084.2018.1474226>

Kono, K., Eskandarich, S., Obayashi, Y., Arai, A., & Tamashiro, H. (2015). Mental health and its associated variables among international students at a Japanese university: with special reference to their financial status. *Journal of Immigrant and Minority Health*, 17(6), 1654–1659.

<https://doi.org/10.1007/s10903-014-0100-1>

Lechner, K. E., Garcia, C. M., Frerich, E. A., Lust, K., & Eisenberg, M. E. (2013). College students' sexual health: personal responsibility or the responsibility of the college?. *Journal of American College Health*, 61(1), 28–35. <https://doi.org/10.1080/07448481.2012.750608>

Lile, J. R., Ottusch, T. M., Jones, T., & Richards, L. N. (2018). Understanding college-student roles: Perspectives of participants in a high school/community college dual-enrollment program. *Community College Journal of Research and Practice*, 42(2), 95-111.

Lorant, V., Nicaise, P., Soto, V. E., & D'Hoore, W. (2013). Alcohol drinking among college students: college responsibility for personal troubles. *BMC Public Health*, 13, 615.

<https://doi.org/10.1186/1471-2458-13-615>

- McIntyre, J. C., Worsley, J., Corcoran, R., Woods, P. H., & Bentall, R. P. (2018). Academic and non-academic predictors of student psychological distress: the role of social identity and loneliness. *Journal of Mental Health, 27*(3), 1-10. <https://doi.org/10.1080/09638237.2018.1437608>
- Merrill, J. E., Rosen, R. K., Boyle, H. K., & Carey, K. B. (2018). The influence of context in the subjective evaluation of “negative” alcohol-related consequences. *Psychology of Addictive Behaviors, 32*(3), 350.
- Miller, M. B., Merrill, J. E., Yurasek, A. M., Mastroleo, N. R., & Borsari, B. (2016). Summer versus school-year alcohol use among mandated college students. *Journal of Studies on Alcohol and Drugs, 77*(1), 51–57. <https://doi.org/10.15288/jsad.2016.77.51>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine, 6*(7). <https://doi.org/10.1371/journal.pmed.1000097>
- Nasui, B. A., Popa, M., & Popescu, C. A. (2015). Drinking patterns and behavioral consequences: a cross-sectional study among romanian university students. *Zdravstveno Varstvo, 55*(1), 59–66. <https://doi.org/10.1515/sjph-2016-0009>
- O’Connell, V. A. (2014). The healthy college student: The impact of daily routines on illness burden. *SAGE Open, 4*(3). <https://doi.org/10.1177/2158244014547181>
- Odaci, H. (2013). Risk-taking behavior and academic self-efficacy as variables accounting for problematic internet use in adolescent university students. *Children and Youth Services Review, 35*(1), 183-187
- Oswalt, S. B., Cameron, K. A., & Koob, J. J. (2005). Sexual regret in college students. *Archives of sexual behavior, 34*(6), 663-669.



- Oyekcin, D. G., Sahin, E. M., & Aldemir, E. (2017). Mental health, suicidality and hopelessness among university students in Turkey. *Asian Journal of Psychiatry*, *29*, 185–189. <https://doi.org/10.1016/j.ajp.2017.06.007>
- Pan, K. Y., Kok, A., Eikelenboom, M., Horsfall, M., Jörg, F., Luteijn, R. A., Rhebergen, D., Oppen, P. V., Giltay, E. J., & Penninx, B. (2021). The mental health impact of the COVID-19 pandemic on people with and without depressive, anxiety, or obsessive-compulsive disorders: a longitudinal study of three Dutch case-control cohorts. *The Lancet Psychiatry*, *8*(2), 121–129. [https://doi.org/10.1016/S2215-0366\(20\)30491-0](https://doi.org/10.1016/S2215-0366(20)30491-0)
- Peltz, J. S., & Rogge, R. D. (2016). The indirect effects of sleep hygiene and environmental factors on depressive symptoms in college students. *Sleep Health*, *2*(2), 159–166. <https://doi.org/10.1016/j.sleh.2016.01.007>
- Pidgeon, A., Rowe, N., Magyar, H., Stapleton, P., & Lo, B. (2014). Examining characteristics of resilience among university students: an international study. *Journal of the Social Sciences*, *2*, 14–22. <https://doi.org/10.4236/jss.2014.211003>
- Pozos-Radillo, B. E., Preciado-Serrano, M. D. L., Acosta-Fernández, M., Aguilera-Velasco, M. D. L. A., & Delgado-García, D. D. (2014). Academic stress as a predictor of chronic stress in university students. *Psicología Educativa*, *20*(1), 47–52. <https://doi.org/10.1016/j.pse.2014.05.006>
- Quinn, P. D., & Fromme, K. (2012). Personal and contextual factors in the escalation of driving after drinking across the college years. *Psychology of Addictive Behaviors: Journal of the Society of Psychologists in Addictive Behaviors*, *26*(4), 714–723. <https://doi.org/10.1037/a0026819>
- Ran, M.-S., Mendez, A. J., Leng, L.-L., Bansil, B., Reyes, N., Cordero, G., Carreon, C., Fausto, M., Maminta, L., & Tang, M. (2016). Predictors of mental health among college students in guam:

implications for counseling. *Journal of Counseling & Development*, 94(3), 344–355.  
<https://doi.org/10.1002/jcad.12091>

Roemer, A., & Walsh, Z. (2014). Where you live matters: the roles of living arrangement and self-esteem on college students' hazardous drinking behaviors. *Addiction Research and Theory*, 22(6), 474–480.  
<https://doi.org/10.3109/16066359.2013.877454>

Roese, N. J., Epstude, K., Fessel, F., Morrison, M., Smallman, R., Summerville, A., Galinsky, A. D., & Segerstrom, S. (2009). Repetitive Regret, Depression, and Anxiety: Findings from a Nationally Representative Survey. *Journal of Social and Clinical Psychology*, 28(6), 671–688.  
<https://doi.org/10.1521/jscp.2009.28.6.671>

Rogowska, A. M. (2018). The relationship between demographic variables and substance use in undergraduates. *International Journal of Mental Health and Addiction*.  
<https://doi.org/10.1007/s11469-018-9931-7>

Sa, J., Seo, D. C., Nelson, T. F., & Lohrmann, D. K. (2013). Cigarette smoking among Korean international college students in the United States. *Journal of American College Health*, 61(8), 454–467. <https://doi.org/10.1080/07448481.2013.832253>

Sahu, P. (2020). Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. *Cureus*, 12(4), e7541.  
<https://doi.org/10.7759/cureus.7541>

Schofield, M. J., O'Halloran, P., McLean, S., Forrester-Knauss, C., & Paxton, S. J. (2016). Depressive Symptoms Among Australian University Students: Who Is at Risk?. *Australian Psychologist*, 51(2), 135–144. <https://doi.org/10.1111/ap.12129>

- Scholly, K., Katz, A. R., Gascoigne, J., & Holck, P. S. (2005). Using social norms theory to explain perceptions and sexual health behaviors of undergraduate college students: an exploratory study. *Journal of American College Health*, 53(4), 159–166. <https://doi.org/10.3200/JACH.53.4.159-166>
- Schulenberg, J. E., & Maggs, J. L. (2002). A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol, Supplement*, s14, 54–70. <https://doi.org/10.15288/jsas.2002.s14.54>
- Seelman K. L. (2016). 'Transgender Adults' Access to College Bathrooms and Housing and the Relationship to Suicidality. *Journal of Homosexuality*, 63(10), 1378–1399. <https://doi.org/10.1080/00918369.2016.1157998>
- Serafini, G., Parmigiani, B., Amerio, A., Aguglia, A., Sher, L., & Amore, M. (2020). The psychological impact of COVID-19 on the mental health in the general population. *QJM: monthly journal of the Association of Physicians*, 113(8), 531–537. Advance online publication. <https://doi.org/10.1093/qjmed/hcaa201>
- Shamsuddin, K., Fadzil, F., Ismail, W. S. W., Shah, S. A., Omar, K., Muhammad, N. A., Jaffar, A., Ismail, A., & Mahadevan, R. (2013). Correlates of depression, anxiety and stress among Malaysian university students. *Asian Journal of Psychiatry*, 6(4), 318–323. <https://doi.org/10.1016/j.ajp.2013.01.014>
- Sokratous, S., Merkouris, A., Middleton, N., & Karanikola, M. (2014). The prevalence and socio-demographic correlates of depressive symptoms among Cypriot university students: A cross-sectional descriptive co-relational study. *BMC Psychiatry*, 14(1), 235. <https://doi.org/10.1186/s12888-014-0235-6>

- Sotgiu, I., Galati, D., Manzano, M., & Rognoni, E. (2010). Happiness components and their attainment in old age: A cross-cultural comparison between Italy and Cuba. *Journal of Happiness Studies*, 12(3), 353–371. <https://doi.org/10.1007/s10902-010-9198-6>
- Stroebe, M., Schut, H., & Nauta, M. (2015). Homesickness: A systematic review of the scientific literature. *Review of General Psychology*, 19(2), 157-171. <https://doi.org/10.1037%2Fgpr0000037>
- Sutton, H. (2021). Study finds student drinking habits changed due to COVID-19. *Campus Security Report*, 17(10), 9-9.
- Tao, Z., Wu, G., Wang, Z. (2016). The relationship between high residential density in student dormitories and anxiety, binge eating and Internet addiction: a study of Chinese college students. *SpringerPlus*, 5(1). <https://doi.org/10.1186/s40064-016-3246-6>
- Thurber, C. A., & Walton, E. A. (2012). Homesickness and adjustment in university students. *Journal of American College Health*, 60(5), 415–419. <https://doi.org/10.1080/07448481.2012.673520>
- Tran, A., Tran, L., Geghre, N., Darmon, D., Rampal, M., Brandone, D., Gozzo, J.-M., Haas, H., Rebouillat-Savy, K., Caci, H., & Avillach, P. (2017). Health assessment of French university students and risk factors associated with mental health disorders. *PLOS ONE*, 12(11), e0188187. <https://doi.org/10.1371/journal.pone.0188187>
- Tyler, K. A., Schmitz, R. M., Ray, C. M., Adams, S. A., & Simons, L. G. (2018). The role of protective behavioral strategies, social environment, and housing type on heavy drinking among college students. *Substance Use & Misuse*, 53(5), 724–733. <https://doi.org/10.1080/10826084.2017.1363235>
- Tull, M. T., Edmonds, K. A., Scamaldo, K. M., Richmond, J. R., Rose, J. P., & Gratz, K. L. (2020). Psychological outcomes associated with stay-at-home orders and the perceived impact of

COVID-19 on daily life. *Psychiatry research*, 289, 113098.  
<https://doi.org/10.1016/j.psychres.2020.113098>

UNESCO. *COVID-19 educational disruption and response*. (2020). UNESCO.  
<https://en.unesco.org/themes/education-emergencies/coronavirus-school-closures>

Vaez, M., & Laflamme, L. (2002). First-year university students' health status and socio-demographic determinants of their self-rated health. *Work*, 19, 71-80.

Van Praag, B. M., Frijters, P., & Ferrer-i-Carbonell, A. (2003). The anatomy of subjective well-being. *Journal of Economic Behavior & Organization*, 51(1), 29-49.  
[https://doi.org/10.1016/S0167-2681\(02\)00140-3](https://doi.org/10.1016/S0167-2681(02)00140-3)

Vasilenko, E. A., Vorozheykina, A. V., Gnatyshina, E. V., Zhabakova, T. V., & Salavatulina, L. R. (2020). Psychological factors influencing social adaptation of first-year students to the conditions of university. *Journal of Environmental Treatment Techniques*, 8(1), 241-247.

Verschuur, M. J., Eurelings-Bontekoe, E. H., & Spinhoven, P. (2004). Associations among homesickness, anger, anxiety, and depression. *Psychological Reports*, 94(3 Pt 2), 1155–1170.  
<https://doi.org/10.2466/pr0.94.3c.1155-1170>

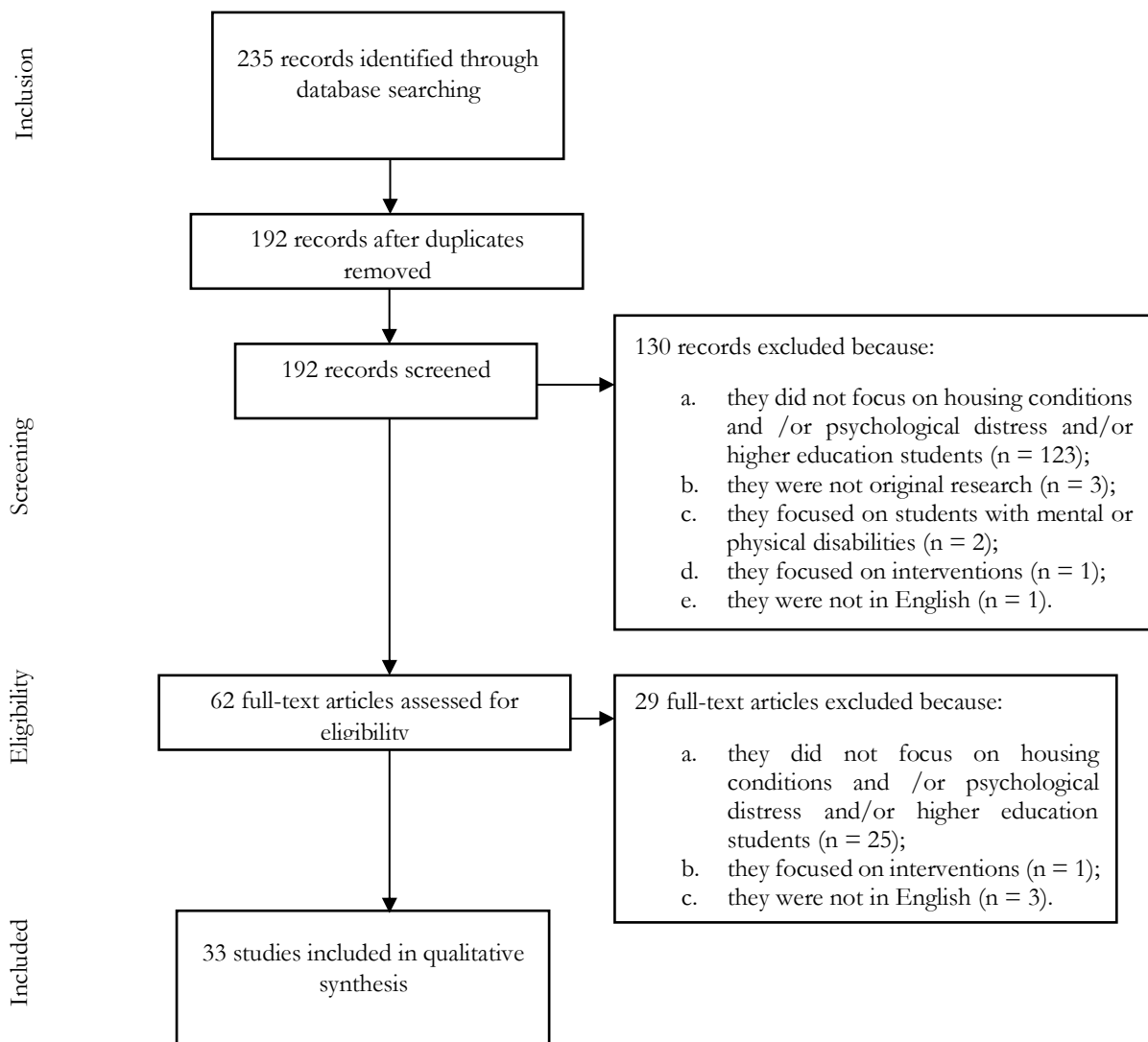
Wege, N., Muth, T., Li, J., & Angerer, P. (2016). Mental health among currently enrolled medical students in Germany. *Public Health*, 132, 92–100. <https://doi.org/10.1016/j.puhe.2015.12.014>

Weigold, I. K., Weigold, A., Ling, S., & Jang, M. (2020). College as a growth opportunity: Assessing personal growth initiative and self-determination theory. *Journal of Happiness Studies*, 1-21.

Wölfel, F., Gusy, B., Lohmann, K., Töpitz, K., & Kleiber, D. (2016). Mental health problems among university students and the impact of structural conditions. *Journal of Public Health*, 24(2), 125-133.

Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., & McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders*, 277, 55–64. <https://doi.org/10.1016/j.jad.2020.08.001>

Figure 1. Flow of information through the different phases of the systematic review



## Supplementary material

Table 1. Results of the systematic review on housing conditions and psychological distress in higher education students

Year	Authors	Title	Source	Characteristics of the sample	Outcome measures	Results	Country
2020	Hong, P. & Cui, M.	Helicopter Parenting and College Students' Psychological Maladjustment: The Role of Self-control and Living Arrangement	Journal of Child and Family Studies	The study sample consisted in 432 students from two universities in the southern United States aged 18 to 29. Most of the students are female (89.6%)	<ul style="list-style-type: none"> <li>- Five-item over-parenting scale</li> <li>- Brief Self-Control Scale</li> <li>- Ten-item version of the Center for Epidemiological Studies</li> <li>- Depression Scale</li> <li>- Ten-item version of the Beck Anxiety Inventory</li> <li>- Five-item satisfaction with life scale</li> </ul>	For college students living at home, helicopter parenting was connected to psychological maladjustment ( $r = .12, p < .05$ )	USA



2020	Vasilenko, E.A., Vorozheykina, A.V., Gnatyshina, E.V., Zhabakova, T.V., & Salavatulina, L.R.	Psychological factors influencing social adaptation of first-year students to the conditions of university	Journal of Environmental Treatment Techniques	of The study sample consisted in 142 students, 90.1% females and 9.9% and males	- Self-assessment of adaptation - Self-assessment of emotional states - Self-evaluation and expert assessment of the development of training skills - Self-evaluation of relationships with teachers - Temperament questionnaire - Diagnostic questionnaire for identifying character accentuations - Sixteen Personality Factor Questionnaire - Intelligence Structure Test–2000 R	For college students living at home, USA helicopter parenting was connected to psychological maladjustment ( $r =$ $.12, p < .05$ )
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2018	Bhat, U. S., Amaresha, A. C., Kodancha, P., John, S., Kumar, S., Aiman, A., ... Cherian, A.V.	Psychological distress among college students of coastal district of Karnataka: A community-based cross-sectional survey	Asian Journal of Psychiatry	The study sample consisted in 4,839 students, 1,958 males and 2,881 females, with an average age of $19.23 \pm 1.54$	- 20-item Self-Reporting Questionnaire (SRQ-20)	Students who lived with their families showed higher levels of psychological distress than students who did not live with parents ( $U = 2,687,648.5$ ; $p = .004$ )	India
2018	Cleveland, M. J., Turrisi, R., Reavy, R., Ackerman, S., & Buxton, O. M.	Examining parent and peer influences of alcohol use: A comparison of first-year community college and baccalaureate students	Journal of Alcohol and Drug Education	The study sample consisted in 295 participant, 56% females and 44% males. The average age was 18.42 years	- Young Adult Alcohol Problems Screening Test (YAAPST) - Drinking Norms Rating Form (DNRF)	First-year baccalaureate students residing on-campus show higher alcohol consumption rates than peers living with their families ( $p < .001$ ). Factors related to the university environment, such as proximity to peers, seemed to foster risky drinking behavior	USA
2018	Cleveland, M. J., Mallett, K. A., Turrisi, R., Sell, N. M., Reavy, R., & Trager, B.	Using latent transition analysis to compare effects of residency status on alcohol-related consequences during the first two years of college	Addictive Behaviors	The study sample consisted in 1,706 students, 57.2% females, with an average age of 18.18	- Young Adult Alcohol Consequences Questionnaire (YAACQ) - Daily Drinking Questionnaire (DDQ)	Students living on-campus were at a lower risk of engaging in risky drinking-related behaviors than those who lived in fraternities ( $p < .001$ ) or off-campus ( $p < .001$ )	USA

2018	Dazkir, S. S.	Place Meaning, Sense of Belonging, and Personalization Among University Students in Turkey	Family & Consumer Sciences Research Journal	The study sample consisted of 33 students, 18 males and 15 females, aged between 18 and 27 years	- Semi-structured interviews	80% of women and 72% of men experienced homesickness when they first entered college. Being away from their families and homes, living in a new and unfamiliar environment, feeling lonely and not having many interpersonal relationships were the reasons most frequently associated to homesickness. Moreover, students declared that creating new relationships with their peers and personalizing their new rooms helped them overcome their homesickness.	Turkey
2018	Henry, B., Cormier, C., Hebert, E. P., Naquin, M. R., & Wood, R.	Health and health care issues among upper-level college students and relationships to age, race, gender, and living arrangements.	College Student Journal	The study included 397 students, 41.8% males and 57.7% females. Age ranged from 19 to 69 years	- Ad hoc survey instrument including questions regarding age, gender, race, college classification, full- or part-time status, number of hours employed per week, residency/living arrangement, general physical and mental health,	Students who lived on campus reported lower levels of overall health than those living off campus ( $\chi^2(4) = 10.38, p < .05$ )	USA

					specific health-related behaviors, perceptions of health-related factors affecting academic success, and health care access and use		
2018	Kolar, K., Erickson, P., Hathaway, A., & Osborne, G.	Differentiating the Drug Normalization Framework: A Quantitative Assessment of Cannabis Use Patterns, Accessibility, and Acceptability Attitudes among University Undergraduates	Substance Use and Misuse	The total sample of the study consisted in 1,757 students	- Self-administered web-based drug use and attitude survey	Living conditions exposing to cannabis users predicted cannabis acceptability (OR=1.16; SE= .23; 95% CI [.78,1.71]; z = .72)	Canada
2018	McIntyre, J. C., Worsley, J., Corcoran, R., Woods, P. H., & Bentall, R. P.	Academic and non-academic predictors of student psychological distress: the role of social identity and loneliness	Journal of Mental Health	The total sample consisted in 1,135 students, with an average age of 20.78 years	- Academic Stress Scale - Academic Expectations Stress Inventory - UCLA Loneliness Scale (ULS-8) - English Housing Survey - Debt Worry Scale	Results highlighted that both financial stress ( $\beta = .25$ , $p < .001$ ) and poor living conditions ( $\beta = -.09$ , $p = .012$ ) were linked to high levels of depression and anxiety. In the sample examined, 11.3% met criteria for severe depression and 20.9% met criteria for severe anxiety	UK

					<ul style="list-style-type: none"> <li>- Generalized Anxiety Disorder-7 (GAD-7)</li> <li>- Perceived Inequality in Childhood Scale</li> <li>- ACEs scale</li> <li>- Patient Health Questionnaire (PHQ-9)</li> </ul>		
2018	Rogowska, A. M.	The Relationship Between Demographic Variables and Substance Use in Undergraduates	International Journal of Mental Health and Addiction	The study sample consisted in 983, 303 females and 680 males, aged between 21 and 36 years	<ul style="list-style-type: none"> <li>- Self-administered questionnaire “Students 2004”</li> </ul>	Results suggested a link between students living in a dorm or apartment and the use of binge drinking behaviors (OR=1.65; p = .0002). Living conditions were also associated with the use of illicit substances (OR=1.36; p = .08)	Poland
2018	Tyler, K. A., Schmitz, R. M., Ray, C. M., Adams, S. A., & Simons, L. G.	The Role of Protective Behavioral Strategies, Social Environment, and Housing Type on Heavy Drinking among College Students	Substance Use and Misuse	The study sample consisted in 1448 students, 755 females and 693 males	<ul style="list-style-type: none"> <li>- Protective behavioral strategies scale</li> </ul>	Students living off-campus with parents ( $\beta = -.349$ ), roommates ( $\beta = -.111$ ), romantic partner ( $\beta = -.131$ ), or in dorms ( $\beta = -.348$ ) perceived fewer close friends engaged in risky drinking compared to students living in Greek housing	USA

2017	Tran, A., Tran, L., Geghre, N., Darmon, D., Rampal, M., Brandone, D., ... Avillach, P.	Health assessment of French university students and risk factors associated with mental health disorders	Plos ONE	The sample consisted in 4184 students, 42.57% males and 57.43% females, aged 18 to 20 years	- Data were collected prospectively by medical doctors and nurses using a computer-assisted medical examination software program called CALCIUM	Results indicated that students with depressive symptoms were more likely to be dissatisfied with their living conditions (OR = 2.36, CI95 = [1.63; 3.39]). Being a woman and living alone were associated with anxiety (OR = 2.28, CI95 = [1.67; 3.11])	France
2016	Bähler, C., Foster, S., Estévez, N., Dey, M., Gmel, G., & Mohler-Kuo, M.	Changes in living arrangement, daily smoking, and risky drinking initiation among young Swiss men: a longitudinal cohort study	Public Health	The total sample of the study consisted of 4,662 male students with an average age of 21.1 years	- Ad-hoc questionnaire	Results showed a link between moving out from parental home and both daily smoking (OR = 1.67; p= .007) and risky drinking behavior (OR monthly risky single-occasion drinking = 1.42; p= .012)	Switzerland
2016	Deb, S., Banu, P.R., Thomas, S., Vardhan, R.V., Rao, P.T., & Khawaja, N.	Depression among Indian university students and its association with perceived university academic environment, living arrangements and personal issues	Asian Journal of Psychiatry	The sample consisted of 717 students, 402 males and 315 females. Age ranged from 21 to 26 years	- Ad-hoc questionnaire; - University Student Depression Inventory, - Students' academic performance was measured through the Choice-Based Credit System	Positively experiencing living arrangements led to lower levels of depression (p < 0.01). Dissatisfaction with housing conditions was a significant stressor for students	India

2016	Miller, M. B., Merrill, J. E., Yurasek, A. M., Mastroleo, N. R., & Borsari, B.	Summer versus school-year alcohol use among mandated college students	Journal of Studies on Alcohol and Drugs	The study sample consisted in 305 students, 67% male, with a mean age of 18.68 years	- Online questionnaire	Alcohol consumption during summer months is lowered by living with a parent (B = -1.42, SE = .50; 95% CI [-2.43, -.46])	USA
2016	Peltz, J. S., & Rogge, R. D.	The indirect effects of sleep hygiene and environmental factors on depressive symptoms in college students	Sleep Health	The study sample consisted in 335 college students, 77% females and 23% males, with an average age of 19.9 years	- Patient Health Questionnaire - Pittsburgh Sleep Quality Index (PSQI) - Adolescent Sleep Hygiene Scale (ASHS)	Environmental factors related to living conditions induced sleep disturbances, with an impact on depressive symptoms (B= .27, SE = .07)	USA
2016	Ran, M. S., Mendez, A. J., Leng, L. L., Bansil, B., Reyes, N., Cordero, G., ... Tang, M.	Predictors of Mental Health Among College Students in Guam: Implications for Counseling	Journal of Counseling and Development	The study sample consisted in 308 students, 205 females and 103 males	- Ad-hoc sociodemographic questionnaire - 42-item Depression Anxiety Stress Scales (DASS)	Students who lived alone and those who shared housing with friends were more likely to have severe depressive and anxiety symptoms than students who lived with their family. Living alone ( $\beta = .34, sr^2 = .03$ ), $t(134) = 3.29, p < .05$ ; Living with friends ( $\beta = .22, sr^2 = .02$ ), $t(134) = 2.51, p < .05$	Guam

2016	Seelman K. L.	Transgender Adults' Access to College Bathrooms and Housing and the Relationship to Suicidality	Journal of Homosexuality	The study sample consisted in 2,325 transgender students, with an average age of 27 years	- National Transgender Discrimination Survey	Negative experiences related to housing conditions negatively impacted on psychological well-being, increasing suicide attempts ( $p < .01$ -.50; OR=.61)	USA
2016	Tao, Z., Wu, G., Wang, Z.	The relationship between high residential density in student dormitories and anxiety, binge eating and Internet addiction: a study of Chinese college students	Springer Plus	The study sample consisted of 1,048 students, 540 males with a mean age of 20.6 years, and 508 females with a mean age of 20.8	- Zung's Self-Rating Anxiety Scale - Internet Addiction Test - Self-Control Scale	High binge eating and internet addiction seemed connected to anxiety caused by high-density living conditions (Binge eating, $p = .008$ ; internet addiction, $p = .000$ ).	China
2015	Kono, K., Eskandarieh, S., Obayashi, Y., Arai, A., & Tamashiro, H	Mental Health and Its Associated Variables Among International Students at a Japanese University: With Special Reference to Their Financial Status	Journal of Immigrant and Minority Health	The study sample consisted in 276 students.	- Ad-hoc questionnaire assessing demographic information; educational background including Japanese language skills; lifestyle-related practices, such as, exercise, alcohol consumption, and quality of sleep; mental health; and	Poor housing conditions had an impact on depressive symptoms (OR 2.98; CI 1.69–5.26)	Japan



2015	Nasui, B. A., Popa, M., & Popescu, C. A.	Drinking Patterns and Behavioral Consequences: A Cross-Sectional Study among Romanian University Students	Zdravstveno Varstvo	The study sample consisted in 468 students, 35.5% males, 64.5% females. The average age was $21.9 \pm 3.22$ years.	current housing conditions	- Patient Health Questionnaire (PHQ- 9) - Baseline Questionnaire	Regarding living arrangement, students living in rented apartments reported higher levels of alcohol consumption than students living with their families did. However, no statistically significant differences in alcohol consumption emerged considering livings condition ( $F = .742; p = .564$ )	Romania
2014	O'Connell, V. A.	The healthy college student: The impact of daily routines on illness burden	SAGE Open	The study sample consisted in 84 students		- Ad-hoc survey assessing stress, food choices, sleeping patterns, exercise, alcohol and cigarette use, and hygiene	Living conditions were significantly associated with disease burden: students living alone reported .42 days of acute illness versus 1.23 days for students living in double ( $p = .014$ )	USA
2014	Roemer, A., & Walsh, Z.	Where you live matters: The roles of living arrangement and self-esteem on college students' hazardous drinking behaviors	Addiction Research and Theory	The study sample consisted in 139 college students, 37% males, aged from 17 to 35 years		- Rosenberg Self-Esteem Scale - The Rutgers Alcohol Problem Index (RAPI)	The influence of self-esteem on drinking behaviors is moderated by living arrangement, $B = 1.32, t(60) = 2.03, p < 0.05$ .	Canada

2014	Sokratous, S., Merkouris, A., Middleton, N., & Karanikola.	The prevalence and socio-demographic correlates of depressive symptoms among Cypriot university students: A cross-sectional descriptive co-relational study	BMC Psychiatry	The study sample consisted in 1,500 students, 448 males and 1,052 females, with an average age of 20.3	- Ad-hoc questionnaire		Quality of living condition was associated with the occurrence of clinical depressive symptoms OR 2.73, 95% CI: 2.00 – 3.72. Students living alone showed a prevalence of clinically significant symptoms of depression compared to those who live together (31.5% vs. 26.9%, p = .030)	Greece
2013	Galambos, N. L., Lascano, D. I. V., Howard, & A., Maggs, J. L.	Who Sleeps Best? Longitudinal Patterns and Covariates of Change in Sleep Quantity, Quality, and Timing Across Four University Years	Behavioral Sleep Medicine	The study sample consisted in 186 first-year students, 112 females and 74 males	- Pittsburgh Sleep Quality Index (PSQI)		Students living on-campus reported a higher level of stress in the sleep indicators: quantity (B=.05; SE=.09) disturbances (B=.05; SE=.03), bedtime (B=.33; SE=.07), rise time (B=.46; .07)	Canada
2013	Hallett, J., Howat, P., McManus, A., Meng, R., Maycock, B., & Kypri, K.	Academic and personal problems among Australian university students who drink at hazardous levels: Web-based survey	Health promotion Journal of Australia	The sample consisted of 942 students, both 53.3% males and 46.7% females, aged 17 to 24	- Ad hoc questionnaire on alcohol consumption - Academic Role Expectations and Alcohol Scale (AREAS) - Alcohol Problems Scale (APS)		Results highlighted a link between alcohol-related problems and housing conditions. The 45% of students living in shared housing reported that alcohol intake negatively influenced the quality of their university career. Emotional outbursts were among the most frequently reported alcohol-related and non-academic related problems (30.5%)	Australia

2013	Lorant, V., Nicaise, P., Soto, V. E., & D'Hoore, W.	Alcohol drinking among college students: responsibility for personal troubles	BMC Public Health	The sample consisted of 7,015, 47.2% males, 57.3% females, with an average age of 21.5	<ul style="list-style-type: none"> <li>- Positive Drinking Consequences Questionnaire</li> <li>- European School Survey Project on Alcohol and Other Drugs (ESPAD) questionnaire</li> </ul>	Results showed how living on campus may lead to an increase in alcohol consumption (OR =1.12 95% CI: 1.06-1.18)	Belgium
2013	Odaci, H.	Risk-taking behavior and academic self-efficacy as variables accounting for problematic internet use in adolescent university students.	Children and Youth Services Review	The study sample consisted in 556 students, 58.1% females and 41.9% males, with an average age of 19.25 years	<ul style="list-style-type: none"> <li>- Ad-hoc questionnaire on personal information</li> <li>- Problematic Internet Use Scale</li> <li>- Adolescent Risk-Taking Scale</li> <li>- Academic Self-Efficacy Scale</li> </ul>	Problematic internet use did not vary according to housing conditions (t=-.13, p>.05)	Turkey
2013	Sa, J., Seo, D. C., Nelson, T. F., & Lohrmann, D. K.	Cigarette smoking among Korean international college students in the united states	Journal of American College Health	Participants were 1,201 South Korean students, aged 18 to 28 years	<ul style="list-style-type: none"> <li>- National College Health Risk Survey</li> <li>- Behavioral Risk Factor Surveillance System questionnaire</li> <li>- College Alcohol Study questionnaire</li> <li>- Acculturative Stress Scale for</li> </ul>	Results highlighted that factors like living place and living situation are strongly associated with smoking habits. Most students living off campus (62%) compared to those living on campus (25%) reported an increase in smoking	USA

				International Students			
2013	Shamsuddin, K., Fadzil, F., Ismail, W. S., Shah, S. A., Omar, K., Muhammad, N. A., ... Mahadevan, R.	Correlates of depression, anxiety and stress among Malaysian university students	Asian Journal of Psychiatry	The study sample consisted in 506 students, aged 18 to 24 years, 44.7% males and 55.3% females	- Ad-hoc questionnaire - Depression Anxiety Stress Scale-21 (DASS-21)	Students born in rural areas had higher average scores for depression and anxiety, with significant differences for both types of mental distress compared to students born in urban areas ( $F(2,505) = 3.574, p = .029$ ; and $F(2,505) = 4.275, p = .014$ )	Malaysia
2012	Iwamoto, D., Takamatsu, S., & Castellanos, J.	Binge drinking and alcohol-related problems among U.S.-born Asian Americans.	Cultural Diversity and Ethnic Minority Psychology	The study sample consisted of 1,575 Asian American students, with an average age of 19.85 years. Participants were 71.9% females and 28.1% males	- Web-based assessment of demographic information - Multigroup Ethnic Identity Measure-Revised (MEIM-R) - Descriptive norms instrument, adapted from the Daily Drinking Questionnaire (DDQ) - Rutgers Alcohol Problems Index (RAPI)	Results showed that students living off-campus were more likely to consume higher quantity of alcohol ( $r = .07, p < .01$ ) and to show alcohol-related problems ( $r = .07, p < .01$ )	USA

2012	Quinn, P. D., & Fromme, K.	Personal and contextual factors in the escalation of driving after drinking across the college years	Psychology of Addictive Behaviors	The study sample consisted in 1833 students	- Web-based college survey	Students who lived on-campus were less likely to drive after drinking than students who lived off-campus ( $\Delta\chi^2(6) = 18.54, p = .005$ )	USA
2010	Boot, C. R. L., Rosiers, J. F. M., Meijman, F. J., & Van Hal, G. F. G.	Consumption of tobacco, alcohol and recreational drugs in university students in Belgium and the Netherlands: The role of living situation.	International Journal of Adolescent Medicine and Health	The sample of this study consisted of 8,258 students from a University in the Netherlands and 27,210 students from a University of Belgium, aged 17 to 27 years	- Ad-hoc questionnaire including questions about health status, problem solving, support, time pressure, study-related problems, study questions, including health status, substance use, participation in leisure activities, knowledge about substance use regarding counseling, treatment and drug issues	This study highlighted that the living situation is a determining factor with respect to the consumption of substances among students. Living with peers seemed to increase tobacco, alcohol and drugs use in both the countries investigated:  For what concerns Netherland, data were: consumption of tobacco (OR = 1.22; 95%CI [1.02; 1.46]), alcohol (OR = 2.02; 95%CI [1.49; 2.74]), recreational drugs (OR = 1.35; 95%CI [1.13; 1.62]).  For what concerns Belgium, data were: consumption of tobacco (OR= 1.22; 95%CI [1.02; 1.46]), alcohol (OR = 3.58; 95%CI [1.32; 9.71]), recreational drugs (OR= 1.94; 95%CI [1.32; 2.84])	Belgium, Netherlands

2010 Hittner, J. B., & Kryzanowski, J. Residential status moderates the association between gender and risky sexual behavior Journal of Health Psychology of The study sample consisted in 410 college students, 136 males and 258 females (16 did not report gender), aged from 18 to 26 years - CORE Alcohol and Drug Survey - AIDS-Risky Behavior Inventory Living on-campus increased risky sexual behavior compared to off-campus living in a drunk or high condition ( $\beta = -.149$ ,  $p = .019$ ,  $sr = -.123$ ,  $sr^2 = .015$ ) USA

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