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## Examining Residence Status as a Risk Factor for Health Risk Behaviors Among College Students

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### Abstract

**Objective:** The current study aimed to evaluate college student residence as a unique risk factor for a range of negative health behaviors.

**Participants:** We examined data from 63,555 students (66% female) from 157 campuses who completed the National College Health Assessment Survey in Spring 2011.

**Methods:** Participants answered questions about the frequency of recent use of alcohol, tobacco, marijuana, and illicit drugs as well as sexual risk behavior in the last 30 days. Sexual risk behaviors were operationalized as having unprotected vaginal sex (yes-no) and the number of sexual partners.

**Results:** Logistic regression analyses revealed that living off-campus is a unique predictor of alcohol, tobacco, marijuana, and illicit drug use as well as engaging in unprotected sex and a greater number of sexual partners (all  $p < .01$ ).

**Conclusions:** Those living off-campus exhibit more substance use and sexual risk behaviors than students living on-campus, independent of gender, age, or race.

### Keywords

young adults; alcohol; tobacco; marijuana; sexual behavior

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Although more than half of students attending college in the United States are under the minimum legal drinking age of 21<sup>1</sup>, 78% report lifetime alcohol use, 60% report having been drunk in the past year, and 40% report having been drunk in the past 30 days<sup>2</sup>. Moreover, 36% of students report engaging in heavy episodic drinking (i.e., five or more drinks) at least once in the previous two weeks<sup>3</sup>. Heavy episodic drinking is associated with

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a host of negative consequences such as engaging in sexual risk behavior as well as other substance use<sup>3</sup>.

Many students begin college by living in dormitories or residence halls, and then move off-campus<sup>1</sup>. Off-campus residency is typically associated with living independently or with other college-age peers.<sup>4</sup> While these are positive aspects of living off-campus, living off-campus has also been associated with lower campus engagement. Specifically, commuting students are less likely than residential students to engage in co-curricular activities, to feel that their school wants them to thrive, to identify with the school, or to report a 'sense of belonging to or of feeling wanted by the institution'<sup>5,6,7</sup>. Living off-campus may also facilitate easier access to alcohol<sup>8,9,10</sup>. Preliminary research suggests that off-campus living is associated with greater odds of risky drinking<sup>9,10,11</sup>. Benz et al. (2017) found that students at two Northeastern universities who lived off-campus reported more frequent alcohol consumption, larger drinking quantities, more frequent heavy drinking, and a greater number of alcohol-related consequences than students living on-campus (ps <.05). These relationships held when controlling for potential confounding variables, such as age and year in school. Thus, living off-campus (without parents) appears to be a risk factor not only for low campus engagement but also for heavy drinking and consequences.

The present study aimed to replicate the findings of Benz and colleagues (2017) in a larger national sample and to identify additional risk behaviors that may be associated with residing off-campus independently or with peers. Specifically, while we know that off-campus living is associated with alcohol use, and alcohol use is associated with drug use<sup>12,13</sup>, whether drug use and off-campus living are linked has been understudied. Suerken et al. (2014)<sup>14</sup> found that living on-campus was associated with a higher likelihood of initiating marijuana use during the first year of college; however, because 94% of these students lived on-campus, off-campus living was non-normative in this sample and the relationship of residence and drug use may have been confounded. On the other hand, Bavarian and colleagues (2013)<sup>15</sup> found that off-campus residence was correlated with illicit use of prescription stimulants. However, this study did not examine the association between other drugs that are more commonly used by college students (e.g., 34% annual prevalence of marijuana use among college students<sup>2</sup>).

Sexual risk is another behavior that is often linked to alcohol use among college students<sup>16</sup>, however whether risky sex is related to residence is unclear. That is, alcohol has been a consistent predictor of sexual behaviors, conferring risk for sexually transmitted infections and/or unwanted pregnancy, namely sex without a condom and/or multiple sexual partners<sup>16</sup>. More recently, Mair and colleagues (2016)<sup>17</sup> found that more frequent and heavier drinking is associated with a greater number of sex partners and unprotected sex events in the past 28 days. Similar to other drug use, the association between these sexual risk behaviors and residence is unclear. Hittner and Kryzanowski (2010)<sup>18</sup> found that male students living on-campus engage in more frequent casual sex when drunk or high when compared to males living off-campus; however, it is not clear if "off-campus" residence in this study included those living with parents. However, more frequent drinking both in dorms and at off-campus parties has been associated with a greater number of unprotected sex events, and heavier

drinking at off-campus parties has been associated with a greater number of unplanned and unprotected sex events for males<sup>17</sup>.

This study aimed to replicate and extend previous research by examining associations between residence status and risky health behaviors. We utilized a large scale survey of college student beliefs and behaviors in order to inform future research and prevention strategies for college students. Because off-campus residence has been associated with easier access to substances and decreased supervision, we expected that drinking, other drug use, and sexual risk would vary by residence<sup>9</sup>. Specifically, we hypothesized that students living off-campus (without parents) would be more likely to report past 30 day use of alcohol, tobacco, marijuana, and other illicit drugs than those living in on-campus housing. Furthermore, we expected students living off-campus to be more likely to engage in unprotected vaginal sex in the past month and to have more sexual partners in the past year relative to students living on-campus.

## Methods

### Participants and Procedures

Permission was obtained from the American College Health Association (ACHA) to use the National College Health Assessment II (NCHA) Spring 2011 survey data in order to conduct the proposed analyses. The NCHA II survey included multiple-choice demographic and health-related questions and was distributed to 157 colleges in the United States during the spring 2011 semester. For the purpose of these analyses, we used data from 129 institutions which either surveyed all students or used random sampling techniques. The Spring 2011 sample consisted of 105,781 students. We removed those with missing data in the categories of gender and residence because we controlled for these demographics in analyses, as well those indicating that they were transgender ( $n = 226$ ) due to limited power to detect meaningful differences among these participants. We also removed those who indicated living in a “fraternity or sorority house,” “parent/guardian’s house,” or “other” ( $n = 18,226$ ). We chose to eliminate those living with their parents given recent research<sup>11</sup> which suggests living off-campus with one’s parents is associated with lower drinking related risk behavior. Additionally, we chose to exclude individuals who lived in fraternity/sorority housing because fraternity/sorority housing is on-campus at some institutions and would therefore involve an RA or some type of University presence, whereas fraternity/sorority housing is completely off-campus at other institutions. Given this potential variability (which was not captured by the measures) we chose to examine only students living independently on-campus or off-campus. Finally, we removed individuals endorsing class year above 4<sup>th</sup> year ( $n = 23,774$ ) because they may not be representative of the typical college student. The final sample included 63,555 undergraduate students (66% female, 75% White) with a mean age of 20.62 years ( $SD = 3.49$ ).

### Measures

**Demographics.**—Participants reported gender, age, race, and year in college.

**Residence.**—Participants were asked to describe their current place of residence as (1) campus residence hall; (2) fraternity or sorority house; (3) other college/university housing; (4) parent/guardian's home; (5) other off-campus housing; or (6) other. Response options 1 and 3 were combined to represent on-campus residence while option 5 represented off-campus housing.

**Drinking Status.**—Participants indicated how many days in the past 30 days they had used alcohol (beer, wine, liquor). Response options included (1) never used; (2) have used, but not in last 30 days; (3) 1–2 days; (4) 3–5 days; (5) 6–9 days; (6) 10–19 days; (7) 20–29 days; or (8) used daily. A dichotomous variable was created, such that individuals endorsing alcohol use at least one day in the past 30 days (response option 3) were categorized as drinkers as opposed to non-drinkers (response option 2).

**Tobacco Use.**—Participants indicated how many days in the past 30 days they had used (1) cigarettes; (2) tobacco from a water pipe (hookah); (3) cigars, little cigars, clove cigars; or (4) smokeless tobacco. Response options included (1) never used; (2) have used, but not in last 30 days; (3) 1–2 days; (4) 3–5 days; (5) 6–9 days; (6) 10–19 days; (7) 20–29 days; or (8) used daily. A dichotomous variable was created, such that individuals endorsing at least one tobacco option for at least one day in the past 30 days (response option 3) were categorized as tobacco users.

**Marijuana Use.**—Participants indicated how many days in the past 30 days they had used marijuana (pot, weed, hashish, hash oil). Response options included (1) never used; (2) have used, but not in last 30 days; (3) 1–2 days; (4) 3–5 days; (5) 6–9 days; (6) 10–19 days; (7) 20–29 days; or (8) used daily. A dichotomous variable was created, such that individuals endorsing at least one marijuana option for at least one day (response option 3) were assigned past 30-day marijuana use.

**Illicit Drug Use.**—Participants indicated how many days in the past 30 days they had used (1) cocaine (crack, rock, freebase); (2) methamphetamine (crystal meth, ice, crank); (3) other amphetamines (diet pills, bennies); (4) sedatives (downers, ludes); (5) hallucinogens (LSD, PCP); (6) anabolic steroids (testosterone); (7) opiates (heroin, smack); (8) inhalants (glue, solvents, gas); (9) MDMA (ecstasy); (10) other club drugs (GHB, ketamine, rohypnol); or (11) other illegal drugs. Response options included (1) never used; (2) have used, but not in last 30 days; (3) 1–2 days; (4) 3–5 days; (5) 6–9 days; (6) 10–19 days; (7) 20–29 days; or (8) used daily. Again, a dichotomous variable was created, such that individuals endorsing at least one illegal drug use option for at least one day (response option 3) were assigned past 30-day illicit drug use.

**Sexual Risk.**—Sexual risk behavior was measured using two variables. First, participants indicated how many days in the past 30 days they or their partner(s) had used a condom or other protective barrier (e.g., male condom, female condom, dam, glove) during vaginal intercourse. Response options included (1) never did this sexual activity, (2) have not done this sexual activity during the last 30 days, (3) never, (4) rarely, (5) sometimes, (6) most of the time, or (7) always. Respondents endorsing 1 and 2 were excluded, leaving a reduced sample of students who had engaged in vaginal intercourse in the past month. A

dichotomous variable was created, such that individuals endorsing any failure to use protection (response option 6) were categorized as having engaged in unprotected sex in the past 30 days. Second, participants indicated with how many partners they had had oral sex, vaginal intercourse, or anal intercourse in the past 12 months.

### Data Analysis Plan

Data analyses were conducted using SAS Version 9.4. One dummy-coded variable was created to reflect differences between living on-campus vs. off-campus. First, bivariate correlations were used to examine the associations among predictor and criterion variables. Next, we used five logistic regressions to test the association between residential status and past month alcohol, tobacco, marijuana, and illicit drug use, and unprotected sex, respectively. We used negative binomial regression<sup>19,20</sup> to test the predictive model for number of partners (a count variable), which is comparable to linear regression with the exception that the outcome follows a negative binomial distribution. Gender, age, and race (coded as White/nonwhite), were included as covariates in all regression models to control for their influence on the various risk behaviors and associations with the residential status predictors.

### Results

The sample comprised 63,555 undergraduate students. Overall, 44,807 (71%) students used some type of substance (alcohol, tobacco, marijuana, or illicit drugs) while 18,748 (29%) did not report using any substances. The highest rates of past 30-day substance use were reported for alcohol (67% of students), followed by tobacco (23%), marijuana (17%), and illicit drugs (6%). Furthermore, 75% of those who endorsed having vaginal intercourse in the last 30 days reported doing so without always using protection. Participants reported an average of 3 sexual partners (oral, anal, or vaginal) in the past year.

#### Alcohol

As hypothesized, those living off-campus were more likely (50%) to drink than those living on-campus (OR=1.49, 95% CI=1.43, 1.55,  $p<.001$ ). This effect was observed above and beyond all covariates, each of which also discriminated between past-month drinkers and non-drinkers. Specifically, women were 8% more likely than men to use alcohol (OR=1.08, 95% CI=1.04, 1.12,  $p<.001$ ), a one-unit increase in age was associated with nearly 20% increased likelihood of drinking (OR=1.18, 95% CI=1.16, 1.20,  $p<.001$ ), and those who were White were 78% more likely to report alcohol use in the past 30 days (OR=1.78, 95% CI=1.71, 1.85,  $p<.001$ ).

#### Tobacco

Consistent with our hypothesis, those living off-campus were more likely (37%) to use tobacco products than those living on-campus (OR=1.37, 95% CI=1.31, 1.44,  $p<.001$ ). This effect was observed above and beyond all covariates, each of which also discriminated between past-month tobacco users and non-tobacco users. Specifically, women were 46% less likely than men to use tobacco products (OR=.54, 95% CI=.52, .56,  $p<.001$ ), a one-unit increase in age was associated with 4% lower likelihood of using tobacco products (OR=.96,

95% CI=.95, .98,  $p<.001$ ), and those who were White were 37% more likely to use tobacco products (OR=1.37, 95% CI=1.31, 1.44,  $p<.001$ ).

### Marijuana

As hypothesized, those living off-campus were more likely (50%) to use marijuana than those living on-campus (OR=1.49, 95% CI=1.43, 1.57,  $p<.001$ ). This effect was observed above and beyond all covariates, each of which also discriminated between past-month marijuana users and non-users. Specifically, women were 30% less likely than men to use marijuana (OR=.70, 95% CI=.66, .73,  $p<.001$ ), a one-unit increase in age was associated with 10% lower likelihood of using marijuana (OR=.90, 95% CI=.89, .91,  $p<.001$ ), and those who were White were 37% more likely to use marijuana (OR=1.37, 95% CI=1.30, 1.44,  $p<.001$ ).

### Illicit Drugs

Consistent with our hypothesis, those living off-campus were more likely (60%) to use illicit drugs than those living on-campus (OR=1.60, 95% CI=1.48, 1.72,  $p<.001$ ). This effect was observed above and beyond all covariates. Gender and race discriminated between past-month users and non-users of illicit drugs. Specifically, women were 25% less likely than men to use illicit drugs (OR=.75, 95% CI=.71, .81,  $p<.001$ ) and those who were White were 39% more likely to use illicit drugs (OR=1.39, 95% CI=1.28, 1.51,  $p<.001$ ). Age was not significant (OR=.98, 95% CI=.93, 1.04,  $p=.70$ ).

### Sexual Risk

**Unprotected vaginal sex.**—In the reduced sample of individuals who reported any vaginal sex events in the last month, each predictor variable discriminated between individuals who always used protection and those who did not. Consistent with our hypothesis, those living off-campus were nearly 39% more likely to have unprotected vaginal sex than those living on-campus (OR=1.39, 95% CI=1.31, 1.47,  $p<.001$ ). Further, women were 17% more likely than men to have unprotected vaginal sex (OR=1.17, 95% CI=1.11, 1.24,  $p<.001$ ), a one-unit increase in age was associated with 8% increased likelihood of engaging in unprotected vaginal sex (OR=1.08, 95% CI=1.06, 1.10,  $p<.001$ ), and those who were White were 7% more likely to have unprotected vaginal sex (OR=1.07, 95% CI=1.01, 1.13,  $p<.05$ ).

**Number of partners.**—With respect to the number of sexual partners had in the last year (including oral, anal, or vaginal sex), gender, race, and residence status all significantly predicted number of sexual partners. Raw parameter estimates are log-based. Exponentiated parameter estimates can be interpreted as rate ratios. Thus, the exponentiated parameter estimate for gender of .77 (95% CI=.76, .79,  $p<.001$ ) indicates that women, on average, had 23% fewer sexual partners than men. Furthermore, those who were White had 13% more sexual partners than non-White individuals (95% CI=1.11, 1.16,  $p<.001$ ), and those living off-campus had 18% more partners compared to those living on-campus (95% CI=1.15, 1.21,  $p<.001$ ).



## Exploratory Analyses

In light of observed associations between residence and substance use, and known associations between substance use and sexual risk behavior<sup>21,22</sup>, we conducted exploratory analyses to determine whether the effects of living in off-campus housing (without parents) would be reduced or eliminated when controlling for substance use. We again regressed unprotected vaginal sex and number of sexual partners on age, gender, race, and campus housing while simultaneously adding alcohol use, tobacco use, marijuana use, and illicit drug use. After controlling for each substance use variable, living in off-campus housing was still a significant predictor of having unprotected vaginal sex (OR=1.35, 95% CI=1.28, 1.43,  $p<.001$ ) and an increased number of sexual partners (OR=1.07, 95% CI=1.05, 1.09,  $p<.001$ ). Furthermore, all other substances (alcohol, tobacco, and marijuana use) were significant ( $p<.05$ ) with the exception of illicit substance use ( $p = .22$ ).

## Comment

This research sought to replicate and extend previous work by evaluating off-campus residence as a risk factor for alcohol use among a nationally representative sample as well as evaluating the association between living off-campus (without parents) and other health risk behaviors. The current findings were consistent with previous work showing that students living off-campus without parents were more likely to report current drinking<sup>11</sup>. Similar trends emerged with respect to the other health risk behaviors. Specifically, those living off-campus were more likely to report recent tobacco, marijuana, and illicit drug use and had higher odds of engaging in unprotected vaginal sex and having a greater number of sexual partners. These associations were not explained by age, race, or gender, which are common correlates of both risky health behaviors and residential status in college. It is also noteworthy that associations between sexual risk behaviors and off-campus housing were found even when controlling for other substance use. This suggests that campus housing status is an independent and important risk factor that should be considered in sexual risk reduction programs.

One explanation for this pattern of findings is the difference in rules and regulations for those living on versus off-campus. Specifically, those living on-campus traditionally are subject to residential rules and regulation as well as oversight in the form of residence assistants relative to those living off-campus<sup>23</sup>. Thus, living off-campus may remove the barriers imposed by traditional campus housing rules, thereby increasing availability and access to alcohol and other substances. Previous research supports this explanation, as increased availability of alcohol is a well-known risk factor for consumption among emerging adults<sup>10</sup>. Because it would not be feasible on some campuses to require students to live on-campus, research examining alternative strategies for reducing health risk behaviors among college students is warranted.

The current findings can be used to inform both future research and prevention practice. First, these findings add support to existing literature<sup>9,11</sup> suggesting that off-campus living is an important correlate of college student substance use. Thus, future prevention interventions can be designed specifically to target students who either live off-campus (without parents) at the start of college or students who move from on- to off-campus

housing during their college experience. Many universities currently address alcohol and other drug use at high-risk times, such as freshman year. It is important that health promotion programs be available to all students and not just those who choose to live in on-campus dormitories. Also, based on current data, the transition from dormitory living to off-campus housing may be another opportune time for intervention<sup>24</sup>. Consistent with this hypothesis, a study by Carey et al. (2017) examining intervention efficacy among students who recently moved off-campus found that participants who received the College Drinkers Check-Up reported significantly fewer heavy drinking episodes at 1 month, lower peak drinking quantities at 3 months, and fewer alcohol-related consequences at 1 and 3 months when compared to those in the control group. Thus, moving off-campus may contribute to increased risk behavior, but recent work suggests that interventions designed to target these individuals are effective<sup>24</sup>.

### Limitations and Conclusions

This study contributes to the literature by replicating and extending research findings that off-campus housing is an important risk factor for health risk behaviors among young adults attending college in the U.S. However, these findings should be interpreted in light of several limitations. This study utilized cross-sectional data, so causal associations among these variables cannot be determined. Absent the ability to conduct a true randomized experiment to determine casual associations regarding campus housing arrangements and risk outcomes, a longitudinal design investigating risk behaviors at multiple time points both before and after moving off-campus would reveal whether the environment enables risky behaviors or if individuals prone to risky behaviors choose to live in a more permissive environment. We also relied on self-report with respect to all substance use and sexual behavior variables and were unable to examine outcomes related to misuse of prescription drugs. Finally, future work is needed to examine the extent to which findings may generalize to certain subgroups of students, including transgender students, men who have sex with men, and those who have recently graduated from college as well as other substances (i.e., prescription drug misuse). Considering the public health consequences of risky health behaviors among young adults, it is important to develop and implement interventions that prevent such negative behaviors. In order to change drinking and related behaviors among college students successfully, it is essential to understand the factors that influence them. Thus, it is important to recognize the impact of residence status on alcohol and other drug use. This study supports the idea that living off-campus – either independently or with peers – is an independent risk factor for alcohol, tobacco, marijuana, and illicit drug use as well as sexual risk behaviors. Therefore, students living off-campus may be appropriate targets for prevention programs. Future studies should investigate the efficacy of targeted interventions designed for this group in order to reduce the potential harms associated with moving off-campus.

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**Table 1.**

Logistic Regression analyses of all outcomes.

Predictor	Outcome											
	Alcohol Use		Tobacco Use		Marijuana Use		Illicit Drugs		Vaginal Sex			
	OR	p-value	OR	p-value	OR	p-value	OR	p-value	OR	p-value		
Gender	1.08	<.001	0.53	<.001	0.70	<.001	0.74	<.001	1.50	<.001		
Age	1.18	<.001	0.94	<.01	0.90	<.001	0.99	0.7	1.13	<.001		
Race	1.78	<.001	1.54	<.001	1.37	<.001	1.48	<.001	1.39	<.001		
Housing Status	1.49	<.001	1.38	<.001	1.50	<.001	1.26	<.01	1.23	<.01		