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The Role of Protective Behavioral Strategies, Social Environment, and Housing Type on Heavy Drinking among College Students

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Abstract

Background: Though research has examined heavy drinking by housing type, the link between type of college student housing and protective behavioral strategies (PBS) has rarely been examined comparing different college campuses. *Objectives:* The purpose of this study is to examine the role of housing type, perceptions of peer drinking, and PBS with respondent heavy drinking among undergraduate college students from one Southeastern and one Midwestern university in the United States. *Methods:* 1,448 college students enrolled in undergraduate courses at two public universities completed a paper and pencil survey of attitudes and experiences about dating, sexuality, and substance use. Data were analyzed using multiple group path analysis. *Results:* Students living in Greek housing perceived their close friends as engaging in more risky drinking and had higher rates of heavy drinking compared to those living in other housing types. The effect of perceptions of peer drinking on PBS was significantly different between campuses, as were several other indirect pathways to heavy drinking. *Conclusion/Importance:* Understanding more about the differing roles of college residential environments can help inform effective drinking interventions and reduce heavy drinking among college students.

Keywords: Alcohol use, college students, housing type, protective behavioral strategies

Introduction

Among college students, 35% report binge drinking, and 40% of females and 46% of males report having gotten drunk in the past 30 days (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015). While national rates of heavy drinking among college students are high, regional variations in the United States exist: rates of college student alcohol use are higher on campuses in the Northeast and North Central regions compared to the Midwest and the West (Wechsler & Nelson, 2008). Though numerous risk factors for heavy drinking among college students have previously been examined (e.g., *the college environment*, Ip et al., 2015; *perceptions of peers' drinking*, Tyler, Schmitz, & Adams, 2017; and *Greek affiliation*, Hummer, LaBrie, Lac, Sessoms, & Cail, 2012), little is known about whether these risks operate similarly between college campuses, especially when rates of heavy drinking have been found to vary by campus location. Further explorations of regional nuances in college student alcohol use are necessary to proactively address young people's distinctive exposure to risk factors and the potential adverse consequences of drinking.

Despite these risk factors, the use of protective behavioral strategies (PBS) have been found to reduce the effect of college student drinking on negative outcomes (Borden et al., 2011; Martens, Pederson, LaBrie, Ferrier, & Cimini, 2007b). PBS are specific behaviors (e.g., avoid drinking games) that individuals engage in when drinking to lower their risk for unfavorable consequences (Martens et al., 2007b; Pearson, 2013). Though PBS are important for reducing alcohol use (Martens, Ferrier, & Cimini, 2007a), there is a paucity of research on *who* is most likely to use these protective strategies, and researchers have called for the examination of antecedents of PBS (Pearson, 2013). Specifically, there is a dearth of research that has examined how various housing types among college students (e.g., dorm vs. Greek housing) influence the use of PBS. This is significant given that effective use of PBS can lower the risk for negative outcomes (Martens et al., 2007b). Moreover, little is known about whether risk factors operate similarly between different college campuses. To address these shortcomings, we use multiple group path analysis to examine the role of housing type, perceptions of peer drinking, and PBS with respondent heavy drinking among undergraduate college students from one Southeastern and one Midwestern university in the United States. Understanding more about the differing roles of college residential environments can help inform effective drinking interventions by considering the unique influences of social context (Larimer & Crouce, 2007).

Research consistently finds that Greek affiliation is associated with higher drinking levels (Borsari, Hustad, & Capone, 2009; Ragsdale et al., 2012) and both fraternity and sorority members engage in more drinking compared to students living in residence halls or apartments (Page & O'Hegarty, 2006). Those living in campus residence halls report more heavy drinking compared to students who live off campus with their parents (Wall, Bailey Shea, & McIntosh, 2012), whereas students living in Greek housing and those living off campus had the highest drinking levels (Wechsler & Nelson, 2008). Zamboanga et al. (2009) found riskier drinking among students living on campus in traditional dormitory housing compared to those residing in large dorm-like houses on campus, whereas other researchers have found no difference in drinking behavior between those living on campus vs. those living off campus (Tanumihardjo, Shoff, Koenings, Zhang, & Lai, 2015). Finally, Velazquez

and colleagues (2011) examined several living arrangements but found that living situation was not significantly associated with drinking behavior among college students.

Though numerous studies have examined the relationship between housing type and heavy drinking with mixed results, only one study specifically looked at residential status as a correlate of PBS and found that college students who lived with their parents had lower scores on serious harm reduction behaviors (e.g., using a designated driver), compared to students in other living arrangements (Walters, Roudsari, Vader, & Harris, 2007). Walters et al. (2007) concluded that total PBS scores did not significantly vary by residential status. Though we could only find two studies that compared PBS for Greek and non-Greek members, one study found that fraternity/sorority members reported using more PBS compared to their non-Greek counterparts (Soule, Barnett, & Moorhouse, 2015), while Barry, Madson, Moorer, and Christman (2016) found the opposite.

Other factors that influence PBS use while drinking include respondent's sex, amount of alcohol consumed, and perceptions of peers' drinking behavior. Much research finds that women are more likely to use PBS compared to men (LaBrie, Lac, Kenney, & Mirza, 2011; Walters et al., 2007), though one study revealed that males used more types of PBS compared to females (Zografos, Krenz, Yarmo, & Alcala, 2015). Students who drink less alcohol engage in more protective strategies (Patrick, Lee, & Larimer, 2011), whereas heavy drinkers are much less likely to utilize any type of PBS when consuming alcohol (Armstrong, Watling, & Buckley, 2014).

Perceptions of peer drinking behavior also are significantly related to one's own alcohol consumption (Borsari & Carey, 2003; Lewis & Neighbors, 2004; Perkins, 2002a; Reid, Carey, Merrill, & Carey, 2015), and undergraduate students overestimate peer drinking amounts and frequency (Lewis & Neighbors, 2004). However, confusion surrounding peer norms regarding drinking is mitigated when using proximal reference groups (i.e., close friends) compared to average college students (Larimer et al., 2011). Students exposed to alcohol-laden environments are at greater risk for heavy drinking (Ip et al., 2015), and there is a positive relationship between college roommate binge drinking and individual alcohol consumption (Eisenberg, Golberstein, & Whitlock, 2014). Therefore, college students' peers are key in understanding their risk for heavy drinking. College students perceive their peers as using fewer PBS than they themselves do, and these perceptions predict their own PBS usage (Benton, Downey, Glider, & Benton, 2008). Additionally, if one perceives their peers as drinking heavily, students themselves are likely to drink more (Borsari & Carey, 2003), and heavy drinking is associated with using fewer PBS (Armstrong et al., 2014). Students also tend to underestimate the scope and magnitude of adverse outcomes stemming from drinking alcohol (Logan, Henry, Vaughn, Luk, & King, 2012), which could influence their lower PBS usage if students do not perceive drinking as risky. In sum, students overestimate peer drinking among average college students (Lewis & Neighbors, 2004), underestimate peers' use of PBS (Benton et al., 2008), and students living on campus exhibit riskier drinking patterns (Zamboanga et al., 2009).

Theoretical framework

The theory of planned behavior holds that the single most important determinant of a person's actual behavior is their intent or plan to use a specific behavior (Ajzen, 1991). For

example, attitudes and subjective norms (Cooke, Dahdah, Norman, & French, 2016), such as those surrounding drinking on college campuses, may motivate students to behave in certain ways. That is, if there are elevated expectations for heavy drinking on campus and among close friends, students will be encouraged to drink heavily. Additionally, if the subjective norms within a specific housing type are such that everyone uses PBS when partying, then we would expect these students to plan ahead and to use more types of PBS. From this perspective, PBS is a type of planned behavior. Moreover, planned behavior is likely to vary by social demographics such as housing type and respondent's sex, especially if the individual strongly identifies with that particular social group (Johnston & White, 2003).

Hypotheses

Based on this literature, we hypothesized that: (1) those living in Greek housing would have a perception of more close friends who engage in risky drinking, greater PBS usage, and higher rates of heavy drinking compared to all other housing types (i.e., living off campus with a roommate, living off campus with a romantic partner, living off campus with parents, and living in a dorm); (2) perceptions of peer drinking would be negatively associated with PBS use but positively associated with respondent heavy drinking; (3) PBS would be negatively associated with heavy drinking; and (4) because the Southeast campus had higher mean scores on all the risk behaviors, we hypothesized that the pathways to heavy drinking would be significantly stronger for these college students compared to those at the Midwest campus. The models control for respondents' sex as these relationships are expected to vary for females and males.

Methods

Study site and sample size

Data were gathered in the 2013–2014 academic year at two large public universities in the United States, one in the Midwest and one in the Southeast. Both universities are public land-grant institutions with undergraduate enrollment ranging from 20,000 to 25,000 students. Racial composition at both locations during data collection was approximately 80% White. The combined sample consisted of 1,448 undergraduate college students.

Procedure

Undergraduate students enrolled in social science courses completed a paper and pencil survey of attitudes and experiences about dating, sexuality, and substance use. Every student was eligible to participate. Students were informed that their participation was voluntary and their responses were anonymous. They had the option of filling out the survey for course credit. If they did not wish to complete the survey, they were given another option. Students were told that if they chose not to fill out the survey or do the alternative extra credit assignment, it would not affect their course grade. Approximately 98% of all students in attendance across both institutions completed the survey, while the remaining students opted for the alternative assignment. The Institutional Review Board at both institutions approved this study for their respective location.

Measures

Independent variables

Protective behavioral strategies. The PBS scale was adapted from the protective behavioral strategies survey (Martens et al., 2005). This scale included 10 items, which asked how often in the past 12 months they engaged in the following activities when they “partied/socialized” (1 = never to 5 = almost always or always). For example, “Use a designated driver,” “Determine not to exceed a set amount of drinks,” and “Avoid drinking games.” A mean scale was created such that a higher score indicated more frequent use of PBS. Cronbach’s α is 0.85 for the current sample.

Perceptions of peer drinking included three items which asked, how many of your close friends “drink,” “get drunk,” and “drink primarily to get drunk” (0 = none to 5 = nearly all/all of my friends). A mean scale was created: higher scores indicate the perception of a greater number of close friends who engage in risky drinking behavior ($\alpha = 0.91$ for the current sample).

Place of residence was measured by asking students where they were living in the current semester. Five dummy coded variables were created for the different housing options whereby respondents were assigned a value of “1” if they were in the housing group and a value of “0” if they were not in that group. The categories included: (1) residence hall/dorm/student housing; (2) fraternity/sorority house; (3) off campus alone or with a friend/nonromantic roommate; (4) off campus with a romantic partner/spouse; and (5) at home with parents.

Demographic variables

Sex was coded as 0 = male and 1 = female.

Dependent variable

Heavy drinking included two items (Testa, Livingston, & Leonard, 2003) which asked, during the past 12 months, “how many times have you gotten drunk on alcohol” and “how many times have you consumed five or more (if you’re a man)/four or more (if you’re a woman) drinks in a single sitting” (0 = never to 5 = five or more days per week). The two items were averaged (Testa et al., 2003), so a higher score indicated more frequent heavy episodic drinking. The correlation between the two items was 0.85. Since our focus was on PBS, we homed in on more hazardous drinking behaviors to analyze the impact of protective strategies on the most risk-laden types of alcohol use. Similar analytic strategies have been effectively implemented in previous well-regarded studies (Velazquez et al., 2011; Wall et al., 2012).

Statistical analyses

Comparisons between the two institutions were done using t-tests and chi square tests. Next, a fully recursive multiple group path model was estimated using the maximum likelihood estimator in Mplus 7.4 (Muthén & Muthén, 1998–2015) to simultaneously compare

pathways between the two institutions. Standardized beta coefficients (β) are reported in all figures. Thirty-four cases (2.3%) were dropped because of missing data on the predictors. Thus, the sample size for our final analyses included 1448 cases.

Results

Sample characteristics

Approximately one-half of the sample was female ($N = 755$; 51.2%). The majority of respondents were White (80%), followed by Black/African American (7.3%), Asian (6.6%), or Hispanic or Latino (3.6%), and 2.4% identified their race as "other." In terms of living situation, 26% of respondents lived in a residence hall/dorm/student housing, 8% lived in a fraternity or sorority house, 56% lived off campus either alone or with a nonromantic roommate, 5% lived off campus with a romantic partner, and 5% lived at home with parents. Finally, 53% of the sample ($N = 771$) was from the Southeast campus and 47% ($N = 677$) was from the Midwest campus.

Chi square test results (see top half of Table 1), revealed that there were significantly more females at the Midwest campus (55.5%) than the Southeast campus (44.5%). Significantly more students at the Midwest location lived off campus with parents, in a dorm, or in a fraternity or sorority house compared to students at the Southeast campus. Finally, just over 75% of students at the Southeast campus lived off campus with a roommate compared to only 24% at the Midwest campus. T-test results (see bottom of Table 1) comparing campuses revealed that the *mean* for perceptions of peers drinking and respondent heavy drinking were significantly higher for students at the Southeast campus compared to the Midwest campus.

Table 1. Mean and group comparison between campuses

	N/Total	Total %	Southeast		Midwest		Chi Square
			N	%	N	%	
Female	755/1475	51.2%	336	44.5%	419	55.5%	39.41**
OC with roommate	827/1481	55.8%	627	75.8%	200	24.2%	409.48**
OC with romantic partner	69/1481	4.7%	38	55.1%	31	44.9%	.197
OC with parents	80/1481	5.4%	17	21.3%	63	78.8%	33.04**
Dorm	391/1481	26.4%	50	12.8%	341	87.2%	335.35**
Fraternity/Sorority	114/1481	7.7%	45	39.5%	69	60.5%	8.36**
		t-test	Southeast Mean		Midwest Mean		
Perceptions of peer drinking		6.576**	4.065		3.646		
PBS		-1.689	2.682		2.757		
Heavy drinking		7.008**	1.427		1.059		

Note: OC = off campus, PBS = protective behavioral strategies. ** $p < 0.01$, * $p < 0.05$

Multivariate direct effect results

Southeast campus

Path analysis results for the Southeast campus (only significant paths given) shown in Figure 1 revealed that females ($\beta = -0.125$) perceived significantly fewer close friends who engaged in risky drinking compared to males while those living off campus with a roommate ($\beta = -0.199$), romantic partner ($\beta = -0.237$), or with parents ($\beta = -0.246$) and those living on campus in a dorm ($\beta = -0.250$) all perceived significantly fewer friends who engaged in risky drinking compared to those living in Greek housing, which is consistent with hypothesis 1. Females engaged in more PBS use compared to males ($\beta = 0.216$) whereas those who perceived more close friends who engaged in risky drinking used significantly fewer PBS ($\beta = -0.223$). Finally, females reported engaging in less heavy drinking compared to males ($\beta = -0.156$), while those living with parents ($\beta = -0.087$) or in a dorm ($\beta = -0.160$) engaged in significantly less heavy drinking than those living in Greek housing, which is supportive of hypothesis 1. Perceiving more close friends who participate in risky drinking ($\beta = 0.493$) is positively associated with heavy drinking, which is consistent with hypothesis 2. PBS was negatively associated with heavy drinking ($\beta = -0.166$), which is consistent with hypothesis 3. The model explained 43% of the variance in heavy drinking among college students at the Southeast campus.

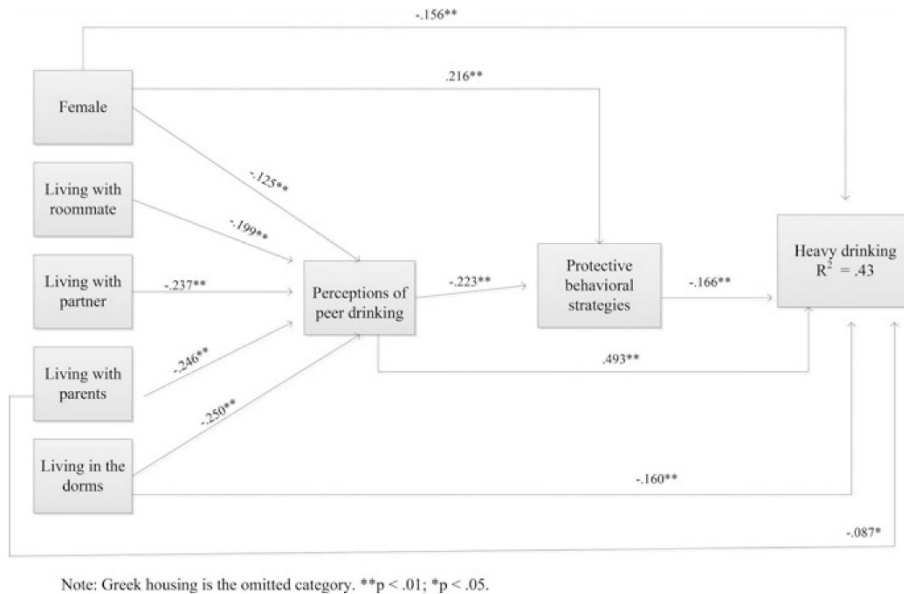


Figure 1. Correlates of heavy drinking for Southeast campus (only significant paths shown).

Midwest campus

Results for the Midwest campus shown in Figure 2 revealed that students living off campus with a roommate ($\beta = -0.111$), with a romantic partner ($\beta = -0.131$), with parents ($\beta = -0.349$),

or in the dorms ($\beta = -0.348$) perceived significantly fewer close friends who engaged in risky drinking compared to those living in Greek housing, which is consistent with hypothesis 1. Females engaged in more PBS use compared to males ($\beta = 0.211$). Those living with a roommate ($\beta = -0.100$) and dorm dwellers ($\beta = -0.148$) used significantly fewer PBS compared to those living in Greek housing which is consistent with hypothesis 1. Females engaged in less heavy drinking compared to males ($\beta = -0.138$), while those living with a romantic partner ($\beta = -0.110$), with parents ($\beta = -0.104$), or in a dorm ($\beta = -0.175$) engaged in significantly less heavy drinking compared to those living in Greek housing, which is consistent with hypothesis 1. Perceiving more close friends who participate in risky drinking ($\beta = 0.518$) was positively associated with heavy drinking, which is consistent with hypothesis 2. Additionally, PBS was negatively associated with heavy drinking ($\beta = -0.116$), supporting hypothesis 3. The model explained 37% of the variance in heavy drinking among college students at the Midwest campus.

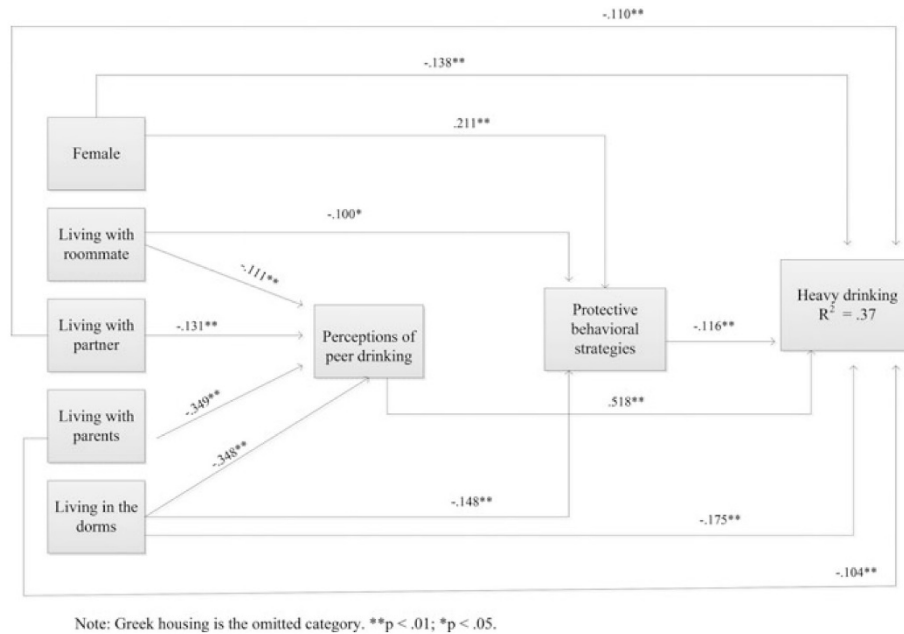


Figure 2. Correlates of heavy drinking for Midwest campus (only significant paths shown).

Direct path comparisons

In order to examine hypothesis 4, we did a comparison of all direct path coefficients (results not shown). Results revealed one significant difference between campuses. The relationship between perceptions of peers’ risky drinking and PBS was significantly different at the Southeast campus ($b = -0.154$; $p < 0.05$) (i.e., the perception that the more peers who engaged in risky drinking, the lower the use of PBS by respondent) compared to the Midwest campus ($b = 0.036$; $p > 0.05$), which is consistent with hypothesis 4.

Multivariate indirect effect results*Southeast campus*

The full indirect effect results for the Southeast campus (top half of Table 2) revealed that all variables were significantly indirectly associated with respondent heavy drinking. Males engaged in more heavy drinking and this link was associated with perceiving having more close friends who engaged in risky drinking and using fewer PBS. Those living in Greek housing engaged in more heavy drinking which was associated with perceiving having more close friends who engaged in risky drinking compared to those living in all other housing types. Finally, perceptions of greater peer drinking was associated with respondent heavy drinking and lower PBS use for those at the Southeast campus.

Midwest campus

Results for the Midwest campus (middle portion of Table 2) revealed that three variables including living with romantic partner, with parents, or living in a dorm were significantly and indirectly associated with heavy drinking. Those living in Greek housing engaged in more heavy drinking, as it was associated with perceiving having more close friends who engaged in risky drinking compared to those living with a romantic partner, with parents, or in the dorms for students at the Midwest campus.

Indirect path comparisons

Statistically significant ($p < 0.05$) indirect effect results for heavy drinking for both campuses are presented in the lower portion of Table 2. Here we tested the equality of the indirect effect coefficients by calculating the difference in each unstandardized indirect effect coefficient between the Southeast and Midwest campuses. Of the possible 21 indirect effects we tested, six were significantly different between campuses. The coefficient for "Female \rightarrow Perception of Peers \rightarrow PBS" for the Southeast campus ($b = -0.010$) is significant at $p < 0.05$, meaning that part of the relationship between gender and heavy drinking is associated negatively with perceptions of peer drinking and PBS usage. Thus, perceptions of peers and PBS are important factors for the relationship between gender and heavy drinking for the Southeast campus but not the Midwest campus. Housing type (i.e., living with roommate, romantic partner, parents, and in dorms compared to living in Greek housing) was associated with heavy drinking as well as perceptions of peer drinking and PBS, which were all significant for the Southeast campus but not the Midwest campus, indicating that the relationship between housing type and heavy drinking operates differently by campus location. Finally, we find a significant association between perceptions of peer drinking and respondent heavy drinking and its association with PBS for the Southeast campus but not the Midwest campus. These results indicate that the relationship between perceptions of peer drinking and PBS function differently by campus.

Table 2. Full model results for heavy drinking and indirect effects comparisons for SE and MW campuses

Variables	Direct effect estimate	S.E.	Total indirect effect estimate	S.E.	Total effect estimate	S.E.
Southeast campus						
Female	-0.156***	.028	-0.102***	.020	-0.258***	.029
OC with roommate	-0.067	.056	-0.103***	.022	-0.170	.056
OC with romantic partner	-0.072	.037	-0.128***	.029	-0.200***	.041
OC with parents	-0.087*	.035	-0.124***	.032	-0.211***	.037
Dorm	-0.160**	.046	-0.128***	.025	-0.288***	.046
Perceptions of peer drinking	.493***	.027	.037**	.011	.530***	.024
PBS	-0.166***	.033	—	—	—	—
Midwest campus						
Female	-0.138***	.035	-0.041	.057	-0.179***	.039
OC with roommate	-0.085	.045	-0.045	.024	-0.130*	.056
OC with romantic partner	-0.110**	.042	-0.064*	.025	-0.174***	.048
OC with parents	-0.104***	.022	-0.183***	.019	-0.288***	.030
Dorm	-0.175***	.028	-0.161***	.016	-0.336***	.035
Perceptions of peer drinking	.518***	.033	-0.006	.006	.512***	.033
PBS	-0.116***	.033	—	—	—	—
Indirect pathway to heavy drinking		Southeast campus	Midwest campus		b SE – b MW ^a	
		b	b			
Female → Perception of peers → PBS		-0.010*	.000		-0.010*	
OC w/roommate → Perception of peers → PBS		-0.019**	.001		-0.021**	
OC with partner → Perception of peers → PBS		-0.042**	.004		-0.046**	
OC with parents → Perception of peers → PBS		-0.066**	.007		-0.073**	
Dorm → Perception of peers → PBS		-0.039**	.004		-0.043**	
Perception of peers → PBS		.034	-0.004		.038**	

Note: OC = off campus, PBS = protective behavioral strategies, Southeast (SE), Midwest (MW).

Standardized coefficients shown in top portion of table.

a. Difference between unstandardized coefficients for SE and MW campuses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Discussion

This paper examined the role of housing type, perceptions of peer drinking, and PBS with respondent heavy drinking among undergraduate college students from one Southeastern and one Midwestern university, given the existence of regional variations in heavy drinking (Wechsler & Nelson, 2008). Overall, results indicate that housing type is uniquely associated with perceptions of peers' risky drinking and respondent heavy drinking. However, the various housing types had little association with the use of PBS. While the theory of planned behavior can help us understand how social context determinants (e.g., housing

type, perceptions of peer drinking) shape college students' risky alcohol use, it may be that residence type is less influential in determining how college students plan their PBS usage.

In terms of housing type, our findings are generally consistent with the one study (i.e., Walters et al., 2007) that examined residential status and PBS. That is, PBS scores did not significantly vary by residential status with two exceptions: students living in Greek housing at the Midwest campus use PBS more frequently compared to those living in the dorms and those living with a roommate. This finding is consistent with the work of Soule et al. (2015) who found that fraternity and sorority members use more types of PBS compared to their non-Greek counterparts. One possible explanation for this finding is that because Greek students generally have higher drinking levels (Borsari et al., 2009; Ragsdale et al., 2012) and engage in more drinking while partying compared to students living in residence halls or apartments (Page & O'Hegarty, 2006), Greek members at the Midwest campus overall may be more proactive when it comes to drinking and thus use more PBS to counteract potential negative outcomes. It is also plausible that many Greek members may plan to get drunk but do so responsibly. That is, they plan their behaviors ahead of time to account for heavy drinking (i.e., use a designated driver) rather than work to reduce their overall alcohol consumption. This finding and explanation is consistent with the theory of planned behavior, which holds that the single most important determinant of a person's actual behavior is their intent to use a specified behavior (Ajzen, 1991). Alternatively, one possible explanation as to why dorm-residing students and those living with a roommate at the Midwest campus have lower PBS usage is because these groups generally drink less than their Greek counterparts, and thus may feel they are at lower risk for negative outcomes associated with heavy drinking. The lower rate of drinking we found among students living in the dorms at both campuses is consistent with prior research (Page & O'Hegarty, 2006). Thus, dorm residents and those living with a roommate may utilize fewer PBS related to their intentions to consume less alcohol if they do not perceive themselves to be at risk.

We also find that females at both campuses utilize PBS more frequently when drinking compared to males, which is consistent with previous studies (LaBrie et al., 2011; Walters et al., 2007). It is possible that women ascribe more value to protective strategies in general, as they more strongly emphasize the importance of staying safe while drinking and caring for others who drink too much, while men are more hesitant to employ PBS for themselves and others (Howard, Griffin, Boekeloo, Lake, & Bellows, 2007). Thus, planning ahead of time to use PBS varies by respondent's sex, with females more likely to do so. This gender difference in PBS usage may also point to the pervasiveness of cultural double standards that more strongly emphasize college women's personal responsibility and planning while drinking to avoid adverse consequences, such as sexual victimization (Kimble, Neacsu, Flack, & Horner, 2008).

Consistent with hypothesis 2, the perception of how much one's peers drink is positively associated with respondent's own heavy drinking for students at both campuses. This coincides with prior research on proximal reference groups such that college students more accurately perceive what their close friends are doing compared to the average college student (Larimer et al., 2011). In addition, we found a negative correlation between perceptions of peer drinking and PBS usage among students at the Southeast campus. This

finding is consistent with the literature that finds that college students perceive their peers as using fewer PBS than they themselves do, and these perceptions predict their own PBS usage (Benton et al., 2008). Furthermore, if one perceives their peers as drinking heavily, students themselves are likely to drink more (Borsari & Carey, 2003), and heavy drinking is associated with using fewer PBS (Armstrong et al., 2014). It is also possible that campus culture is more conducive to heavy drinking and students at the Southeast campus expect to drink more and believe that their close friends also drink more, as they hold more accurate views of their close reference groups (Larimer et al., 2011).

The relationship between perceptions of peer drinking and PBS was not significant for students on the Midwest campus. Even though both campuses have high rates of heavy drinking, perhaps campus norms surrounding the general use of PBS are encouraged more on the Midwest campus. Future research may wish to examine current norms on different campuses and how they may vary with respect to the use of PBS, which could also be largely shaped by campus-specific alcohol awareness and prevention campaigns and their focus on student body drinking norms (Perkins, Haines, & Rice, 2005).

In terms of heavy drinking, we find that those living with parents, those living in the dorms, and those living with a partner (Midwest campus only) engage in less frequent heavy drinking compared to those living in Greek housing, regardless of campus location. One possible explanation for this finding is that students tend to associate with others who are similar to themselves (Wimmer & Lewis, 2010). Thus, because Greeks have elevated levels of drinking, it is plausible that the friends they associate with have similarly high rates. We also find that several paths from housing type to heavy drinking via perceptions of peer drinking and PBS are statistically different across campuses. Students living with a roommate, romantic partner, parents, and in the dorms engage in less heavy drinking compared to those students living in Greek housing via perceptions of peer drinking and PBS for those at the Southeast campus, indicating that the relationship between housing type and heavy drinking operates differently by campus location. One possible explanation is that the drinking expectations and formal and informal norms vary by campus (Perkins et al., 2005). Because students at the Southeast campus engage in riskier behaviors in general compared to their Midwest campus counterparts, the expectations for drinking and partying may be higher at the Southeast campus, which could be associated with the perception that more close friends engage in high-risk drinking. Studies have consistently found a positive relationship between social integration and heavy alcohol consumption (Perkins, 2002b).

Limitations

Some limitations should be noted. First, all data are self-reported. Despite this, all responses were anonymous so it is less likely that participants would bias their responses. Second, the retrospective nature of some measures may have resulted in some over- or underreporting if respondents misremembered their behavior. Third, this study was cross-sectional; therefore, we can only assume that the behaviors we examined are correlated and not causal. Fourth, this study cannot be generalized to the whole college population given that the sample was not randomly selected. Finally, though we compared two public

universities similar in size and race and ethnicity, there are other factors not examined here that may account for some of the across-campus differences that were found.

Conclusion

Our study adds to the limited research in this area by first examining and then demonstrating that some risk factors for heavy drinking can indeed operate differently across campus location. Additionally, our study reveals the unique ways that various types of student housing are associated with different high-risk behaviors, which is significant given that there is a paucity of research that has examined some of these relationships previously, such as housing type and PBS. Given the established importance of social contexts and norms impacting college students' drinking behaviors (Ip et al., 2015), we extend upon this knowledge by also examining geographical variations of college campuses and the nuances of varying social environments and interactions.

Future research should examine the multiple social aspects of the campus environment and how they may differ by campus location. Specifically, the link between housing type and PBS requires additional attention. It is interesting that differences for high-risk behaviors emerged by housing type (e.g., respondent heavy drinking), yet we found little variation in PBS use among housing subgroups. Additionally, further exploration of how peers perceive PBS is warranted and the ways this might influence an individual's willingness to enact PBS when drinking.

Implications

Our findings highlight a need for additional exploration into risk factors for heavy drinking by campus location. Specifically, further research on college populations is needed to see whether these campus differences with regard to housing type and heavy drinking can be replicated, and how they might differ across various geographical regions. Relatedly, housing type may be reflective of something broader than living situation itself. That is, a more nuanced understanding of campus norms surrounding drinking, as well as the use of protective strategies, may provide a more holistic understanding of drinking behaviors. Moreover, given that the relationship between perceptions of peer drinking and PBS was significant only for the Southeast campus, future research should work to expound upon this relationship and how it might be linked more directly to campus culture. If this finding is indeed specific to campus location, this suggests that campus-based interventions should be tailored for the specific location of public universities that highlight unique local and regional contexts surrounding college student beliefs about normative PBS usage. It is also important to develop alcohol-focused reduction interventions for both Greek and non-Greek heavy drinkers that can be implemented outside of traditional alcohol treatment. Widespread dissemination of alcohol-focused reduction efforts would also benefit the college student population more broadly because it may reduce the risk for negative drinking outcomes. However, given that many college students will continue to drink, regardless of the risks associated with it, a campus-wide focus that more generally encourages the consistent and frequent use of PBS when drinking may be more effective.

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