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# Factors Associated with Binge Drinking during the Transition into Adulthood: Exploring Associations Within Two Distinct Young Adult Age Ranges

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## ABSTRACT

**BACKGROUND:** Binge drinking among young adults aged 18-21 years has declined over the past decade, but binge drinking rates among people 22-25 years old have remained largely the same. This steady trend in later years represents a departure from the traditional course of maturing out of risky alcohol use, perhaps because young adults are delaying the transition into adulthood.

**AIMS:** This paper explores the relationship between binge drinking and aspects of the transition into adulthood that could inform interventions targeting these two distinct groups of young adults.

**METHODS:** We use survey data on 1,081 young adults aged 18-25 living in 10 Indiana counties. Our dataset is unique because it contains both college-attending and non-college attending young adults. We ran weighted logistic regressions to determine the association between college enrollment, living situation, roles common in adulthood, and stressors common during the transition to adulthood (e.g., relationships, economic conditions, job stability) and binge drinking.

**RESULTS:** Our data indicate that different factors are associated with binge drinking based on whether subjects who are in the earlier (18-21 years old) or later (22-25 years old) years of young adulthood. For example, within the 18-21 years old group, college enrollment is associated with higher rates of binge drinking, but it is not associated with increased binge drinking in the older age group. The type of stress related to binge drinking also varies by age group.

**CONCLUSION:** Our results emphasize the need to disaggregate “young adulthood” into two separate periods when defining target populations and settings for binge drinking interventions.

**KEYWORDS:** binge drinking, young adult, problem behavior, alcohol drinking in college

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## Introduction

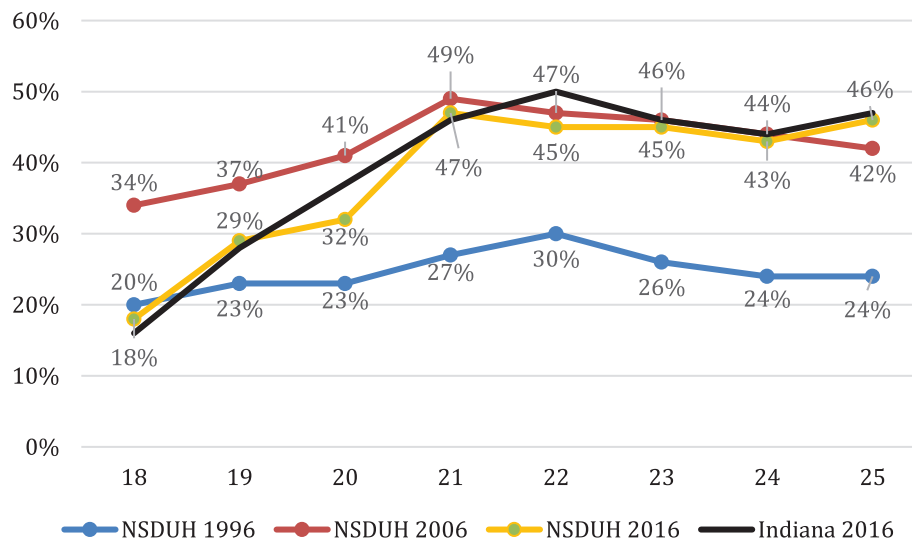
Binge drinking during young adulthood is a significant public health issue. A multitude of studies have established that binge drinking (consuming five or more alcoholic drinks for men or four or more alcoholic drinks for women on the same occasion) is directly related to some of the most prevalent causes of morbidity and mortality during this stage of life, including injury, accidents, and risky sexual behavior.<sup>1,2</sup> Due to these considerable risks, public health practitioners have put a lot of resources into research, awareness, and prevention of binge drinking among young adults, especially on high school and college campuses.<sup>3</sup> Over the past two decades, we have seen a decrease in binge drinking among young adults aged 18-21,<sup>4</sup> but rates of binge drinking remain stubbornly high among individuals aged 22-25.<sup>5</sup>

We investigate the issue of binge drinking in young adulthood while treating these two age groups (ages 18-21 and 22-25) as distinct periods of young adulthood. Distinguishing these two age groups continues a broader trend of thinking

more critically about the distinction between late adolescence and early adulthood in scholarship, policy, and public discussion. Scholars have questioned whether adolescence now extends beyond the second decade of life due to broad societal changes that have occurred in recent decades.<sup>6</sup> For instance, federal policy has allowed parental health insurance coverage to extend to children aged 26,<sup>7</sup> and books with titles such as *Adulting*<sup>8</sup> and *How to Really Love Your Adult Child*<sup>9</sup> are best-sellers due to the reality that a growing number of individuals are continuing to live with their parents into their late 20s.<sup>10,11</sup>

There is a disconnect between this shift towards an ecologically valid (i.e., a conceptualization that better reflects the current, lived experience in the United States) life course perspective and the available research on age and binge drinking. The current body of evidence on binge drinking focuses on adolescents in high school and adults in college. Instead, in this paper, we separate young adults into two groups: 18-21-year-olds and 22-25-year-olds, given that these groups correspond to the two distinct recent trends in binge drinking in the United States. We





**Figure 1.** National prevalence of binge drinking during young adulthood by age and in our 10 counties

Source: United States Department of Health and Human Services. Substance Abuse and Mental Health Services Administration. Office of Applied Studies. National Survey on Drug Use and Health, 2006. ICPSR21240-v6. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2013-06-21. <http://doi.org/10.3886/ICPSR21240.v6>

then investigate the factors correlated with binge drinking behavior during these two separate phases of young adulthood. A better understanding of differences in binge drinking motivations and behaviors between these groups could help public health practitioners determine how to shape intervention efforts to more successfully target young adults of all ages. Specifically, it might inform us whether college campuses are the appropriate setting for interventions into binge drinking behavior among young adults and whether the correlates of binge drinking remain the same throughout young adulthood. This information could be useful in public health efforts to move the consistently high rates of binge drinking among 22-25-year-old young adults in the United States.

## Background

Traditionally, young adulthood – a period between the ages 18 and 25 – was a time when individuals experienced changes like attending and then graduating from college, entering the workforce, moving out of their parents' home, and settling into committed relationships. Shifting from a protected stage of adolescent self-discovery involving experimentation with high-risk behaviors into a period of increased responsibility and stability in adulthood is considered a “life course transition.”<sup>12</sup> Partly because of this life course transition, the shift from adolescence to young adulthood has traditionally been accompanied by process of “aging out” of risky health behaviors. Because the legal age of drinking in the United States is 21, the aging out of problematic drinking was characterized by an increased uptake during late teens years, a peak at age 21, followed by an aging out phase as young adults graduate from college and begin to assume career and family-oriented roles between the ages of 22 through 25.<sup>13</sup> However, data from recent years suggest that far fewer young adults begin aging out of heavy drinking around age 22 and

the process of maturing out of many forms of problem drinking is delayed until after age 25.<sup>14</sup>

Figure 1 displays the shifts in national patterns, as reported by the U.S. Department of Health and Human Services. In 1996, 20% of 18-year-olds participated in binge drinking, and the behavior peaked at age 22, with 30% of young adults engaging in the practice. After that, the prevalence of binge drinking declined by 20% by age 25. In 2006, a much larger percentage of all young adults engaged in binge drinking, peaking at age 21 (49%), with only a 14% decline by age 25. Fast forward another decade, and the aging out phase no longer exists. Data for 2016 indicate lower rates of binge behaviors until age 21, but the rate holds relatively steady, ending at 46% among 25-year-olds (indicating no aging out). Our data on binge drinking patterns in Indiana mirror this 2016 trend.

Delays in normative transitions into adulthood may help to explain some of the shifts in age-based patterns of heavy drinking witnessed over the past few decades. Unemployment stemming from economic recessions, technological advancements requiring job specialization, and the rise in dual-income dependent households have resulted in a larger number of non-traditional age young Americans (i.e., aged 23 and older) enrolled in post-secondary education.<sup>15</sup> Data from 2014, analyzed by the Center for Law and Social Policy indicates that 40% of all undergraduates in the United States are non-traditional students – above the age of 23, enrolled part-time, working part-/full-time, financially independent, living off-campus, etc.<sup>16</sup> Furthermore, even if students graduate from college at a normative age, they are more likely than in times past to become boomerang children: young adults who maintain independence while in college but opt to move back in with their parent(s) and build financial security following graduation or a disruptive life event. Approximately 33% of parents have reported that their living situations have changed in recent

times due to the return of an adult child.<sup>17</sup> These changes among college-attending adults contribute to a delay in securing employment, marriage, childbearing and maintaining financial independence. In sum, it has delayed the normative transition into adulthood.<sup>18</sup>

The recent large-scale shifts in the timing of transitions into adulthood may have influenced the binge drinking trend among young adults. The fact that fewer adults aged 22-25 are taking on the traditional tasks and roles associated with adulthood—living situation, marital status, employment, childbearing<sup>19</sup>—means health behaviors among these age groups are no longer likely to be indirectly affected by these transitions. The traditional population health benefit of aging into adulthood may be delayed and no longer present among these young adults.

We are especially interested in binge drinking among this subset of young adults—those aged 22-25. The prevalence estimates indicate that public health efforts to reduce binge drinking among 18-21-year-olds over the past two decades have been somewhat successful. Yet, we have not seen improvements during emerging adulthood, and we no longer see the negative slope observed in past decades. We pose the following descriptive questions to determine if public health professionals should disentangle “young adulthood” and treat these two age groupings as separate target populations when developing binge drinking interventions.

1. Is college attendance associated with binge drinking across all ages in young adulthood?
2. Are normative life transitions such as becoming a parent associated with binge drinking across all ages in young adulthood?
3. Are living conditions (specifically living with parents or a spouse) associated with binge drinking across all ages in young adulthood?
4. Are stressors common during the transition into adulthood associated with binge drinking across all ages in young adulthood?

## Methods

We collected data through a survey of young adults in 10 Indiana counties that have high rates of underage drinking or prescription drug misuse. The Eagleton Center for Public Interest Polling at Rutgers University administered the survey. All study procedures received full approval by the Rutgers University Institutional Review Board, and a Certificate of Confidentiality was obtained from the National Institutes of Health to protect participants' confidentiality further. De-identified data were provided to the authors for analysis.

### Procedures

A stratified sampling strategy was employed, in which respondents were sampled relative to American Community Survey (ACS) five-year estimates of the proportion of young adults in each county. The sampling frame included young adults aged

18 to 25 listed in a cellular phone database with targetable geographic and demographic variables or a listed sample of registered voters with similar variables. Participants with a current cell phone number were recruited via text messaging and provided with the survey link, as well as an option to opt-out of the message. The link navigated to a landing page where the system assessed eligibility by asking potential participants to confirm their age and county of residence. Eligible participants were required to provide consent before continuing to the survey page and were informed of a small incentive (\$10 gift card to Amazon) for completing the survey. Contact information for processing incentives was collected separately to prevent data from ever being linked to participant identities.

We obtained 1,122 completed surveys. This total represents a 21.9% response rate and a 39.3% cooperation rate. The response rate is slightly higher than the average 15% response rate of web-based surveys conducted between 2005 and 2016.<sup>20</sup> Web-based surveys, in general, experience lower response rates than alternative survey collection modes. According to Daikeler and colleagues' metanalysis<sup>20</sup>, our higher response rate may be due to our multiple contact attempts and younger target population. Our web-based survey likely reduced response bias on individual, sensitive questions, but the low response rate also likely introduced some nonresponse bias.

Sample weights were designed based on a two-stage process. The first-stage weight adjustment was made to account for the disproportionate sampling of respondents from the registered voters sample frame. In the second stage, the sample was weighted using a raking algorithm to several ACS parameters for Indiana: sex, age, education, race, Hispanic, and county. Weights were truncated at the 3rd and 97th percentile to ensure a reasonable portion of survey respondents represented specific subpopulations. The final weighted sample had an estimated sampling error of +/- 3.4% points at a 95% confidence interval.

### Measures

*Covariates.* Covariates included gender (man, woman), race (White, Black, Other), and an indication of economic status in terms of how often they can cover their expenses (always, sometimes, never). Existing literature has consistently established a strong relationship between these covariates and binge drinking across the life course.<sup>21</sup>

*Living situation.* Respondents were asked about their current living situation in terms of with whom they are currently living. We converted responses into a categorical variable indicating that the respondent was living with a spouse, a romantic partner (cohabiting), parents or other family members (with parents), roommates, or alone.

*College enrollment status.* College enrollment status was a dummy variable determined by responses to one question on the survey: “Are you currently enrolled in a post-secondary

school (including vocational, college, or graduate school)? ” There were 132 missing values, and we imputed the values based on 12 imputations for ten iterations.

*Stressors common in young adulthood.* Five stressors related to the transition into adulthood were assessed as part of the study design: money, work, family, relationships, and job stability. Participants were asked to rate the extent to which each stressor was a significant source of stress on a 4-point Likert scale (very significant, somewhat significant, not very significant, not at all significant). We re-coded items dichotomously to indicate either a very/somewhat significant source of stress (1) or a not very/not at all significant source of stress (0).

*Roles common in adulthood.* Two dichotomous variables indicate whether respondents had taken on roles conventional in adulthood. One variable indicates whether or not the respondent is a parent and the other indicates whether they are financially supporting someone else.

*Binge drinking (dependent variable).* Binge drinking was defined consistent with the National Institute on Alcohol Abuse and Alcoholism definition.<sup>22</sup> When asked about this behavior during the survey, interviewers defined binge drinking as consuming 5 or more drinks on the same occasion. Participants reported on the number of days in which they engaged in binge drinking in the most recent 30-day period. We re-coded responses into a binary variable indicating whether the respondent had engaged in binge drinking in the past month.

### *Analytic strategy*

*Descriptive analyses.* We conducted descriptive statistics on study variables to assess the extent of missing values and assumptions of normality. There was a small proportion of missing data across study variables (2.2%), excluding the previously mentioned college enrollment variable. Small portions of missing data (i.e., <5%) are unlikely to systematically bias statistical findings, particularly in large samples.<sup>23</sup> As such, we employed listwise deletion before all analyses, resulting in a working sample size of 1,097 participants.

*Multivariable analyses.* We conducted a series of weighted logistic regression analyses in STATA 15 to test for associations between binge drinking and the previously listed measures associated with the transition into adulthood. All analyses were done separately for the younger group (aged 18-21, n=410) and the older group (aged 22-25, n=687), and all models adjust for age, gender, race, and educational status. Due to the exploratory nature of this study and because VIF (variance inflation factor) analyses raised concerns about multicollinearity, each model adds one independent variable of interest to a model that includes covariates. Therefore, all of our models are multivariate models. We determined statistical significance at

the  $p < .05$  level. The pseudo R-squared values for the models also provide an estimate of the variance explained by the independent variables.

## **Results**

### *Descriptive results*

Table 1 provides descriptive statistics for our participants. Of the 1097 study participants, about 62% identified themselves as female, with an equal distribution of these women represented in both age groups of interest to this research: 18-21-year-olds and 22-25-year-olds. There was a larger percentage of people attending college in the 18-21 age group, but 185 college attendees were in the 22-25 age group. The sample was predominantly White (70%), with Black respondents representing 19% and other minority racial groups representing 12% of the sample. As an indicator of economic status, approximately 50% of participants stated they are always able to meet their financial needs.

### *Analytic results*

*Living situation and binge drinking.* Young adults' living situation is associated with binge drinking in both of the age groups examined, but the relationships vary by group. For example, living with parents or a spouse represents protective living situations for both groups (see Table 2), but living with parents has a more substantial effect and is statistically significant in the younger age group (it reduces the likelihood of binge drinking from 43% to 28% of 18-21-year-olds). Within the older age group, living with a spouse has a stronger protective relationship with binge drinking than living with a parent. Distinct from living with a spouse, the relationship between cohabiting and binge drinking in this older group is notably weak and is not statistically significant.

Living with roommates represents the riskiest living situation for both age groups. Regardless of age, young adults living with roommates were significantly more likely than their peers to engage in binge drinking (142% more likely and 229% more likely in the younger and older groups, respectively). Living alone also posed a risk, but was only statistically significant in the older group because a more sizeable percentage of respondents between the ages of 22 and 25 were living alone. Overall, according to the pseudo  $r$ -squared values in Table 2, the models that include covariates and living situation explain more of the variance in binge drinking among 18-21-year-olds than among 22-25-year-olds.

*Factors related to binge drinking among young adults aged 18-21.* Both college enrollment and experiencing financial stress are associated with binge drinking, but only in the younger age group. Table 3 indicates that 18-21-year-olds who were enrolled in college were more likely to engage in binge drinking during the past 30 days, but college enrollment is not linked to an increased likelihood of binge drinking among 22-25-year-olds. Similarly, experiencing financial stress is only



**Table 1.** General characteristics and binge drinking behavior of sample population (n = 1,097).

	TOTAL	18-21 YEAR OLDS	22-25 YEAR OLDS
Women	62.3%	62.0%	62.4%
Enrolled in college	45.1%	62.7%	34.7%
Race			
White	69.6%	65.1%	72.3%
Black	18.5%	21.5%	16.8%
Other	11.9%	13.4%	11.0%
Ability to Cover Expenses			
Always	51.1%	48.0%	52.9%
Sometimes	43.1%	43.3%	43.0%
Never	5.8%	8.7%	4.1%
Living Situation			
With Spouse	22.3%	6.9%	31.5%
Cohabiting	15.7%	9.3%	19.5%
With Parents	29.7%	52.7%	15.9%
With Roommates	18.2%	23.6%	14.9%
Alone	11.7%	4.5%	16.0%
Stressors			
Money	82.2%	84.0%	81.2%
Work	71.1%	66.6%	73.8%
Family	66.3%	66.7%	66.1%
Relationships	67.3%	69.2%	66.2%
Housing	42.2%	44.1%	41.1%
Job Stability	40.7%	39.1%	41.5%
Roles			
Is a Parent	23.5%	13.0%	29.7%
Financially Supports Someone	27.7%	16.3%	34.5%
Binge Drinking	41.6%	33.4%	46.5%

positively associated with binge drinking among participants aged 21 and younger. Those participants under 21 who experienced financial stress were 113% more likely to binge drink than their peers.

*Factors Unique to Binge Drinking among Young Adults Aged 22-25.* Whereas financial stress is related to binge drinking in the younger sample, stress from relationships and the workplace are associated with binge drinking in the older sample (see Table 4). Work stress and relationship stress both have moderately strong, direct relationships with binge drinking in this age group. Stress related to job stability also showed a positive relationship with binge drinking but was not statistically significant ( $p = .07$ ).

Young adults aged 22-25 are less likely to report binge drinking if they are financially supporting someone or are the parent/caregiver for a child. Not only are these older young adults more likely than the younger age group to be in these situations, but there is also a much stronger protective relationship associated with serving in these roles within the older cohort compared to the younger cohort.

## Discussion

Our results indicate that policies and practitioners targeting binge drinking may want to disaggregate “young adulthood” into two specific periods: one between the years of 18 and 21 and the other between the ages of 22 and 25. Historically, these age groups have been thought of as one singular

**Table 2.** Odds ratios from logistic regression of living situation on binge drinking.

	AMONG 18-21 YEAR OLDS (N = 410)				
	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Women					
White	***	***	**	*	***
Always Covers Expenses					
<i>Living Situation</i>					
With Spouse (7%)	.74				
Cohabiting (9%)		.57			
With Parents (53%)			.43***		
With Roommates (24%)				3.29***	
Alone (5%)					2.54
Pseudo $R^2$	0.02	0.03	0.05	0.07	0.03
	AMONG 22-25 YEAR OLDS (N = 687)				
	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
Women			*		*
White	***	***	**	***	***
Always Covers Expenses					
<i>Living Situation</i>					
With Spouse (31%)	.59**				
Cohabiting (19%)		.91			
With Parents (16%)			.70		
With Roommates (15%)				2.42***	
Alone (16%)					1.66*
Pseudo $R^2$	0.02	0.02	0.02	0.04	0.02

Note: Shaded variables are covariates that were mentioned in the methods section. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

**Table 3.** Factors associated with binge drinking at younger ages during young adulthood.

	MODEL 1		MODEL 2	
	18-21 Y	22-25 Y	18-21 Y	22-25 Y
Enrolled in College	1.98** (.46)	0.89 (.15)		
Stress about Money			2.13* (.71)	1.03 (.21)
Baseline Odds	0.19	0.68	0.14	0.63
Pseudo $R^2$	0.04	0.02	0.03	0.02

Note: All models control for the covariates mentioned in the methods section, and the models with only those factors had pseudo  $R^2 = .02$ . Odds ratios are reported, and standard errors are in parentheses. \* $p < .05$ , \*\* $p < .01$ .

period, whether in the traditional sense of young adulthood or the more recent movement toward researching emerging adulthood as a life stage.<sup>24,25</sup> Our data indicate that, based on the factors related to binge drinking, it may be useful to

treat the younger group as being in a period of “extended adolescence” and the older group as being in a different stage of young adulthood when developing binge drinking interventions.

**Table 4.** Factors associated with binge drinking at older ages during young adulthood (Odds Ratios).

	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	18-21Y	22-25Y	18-21Y	22-25Y	18-21Y	22-25Y	18-21Y	22-25Y
A Financial Provider	0.85 (.26)	0.52*** (.09)						
Stress about Relationship			1.34 (.23)	1.59** (.27)				
Stress about Job Stability					1.07 (.24)	1.37* (.21)		
Stress about Work							1.14 (.26)	1.66** (.30)
Baseline Odds	0.29	0.86	0.23	0.47	0.27	0.54	0.25	0.47
Pseudo $R^2$	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.03

Note: All models control for the covariates mentioned in the methods section, and the models with only those factors had pseudo  $R^2 = .02$ . Odds ratios are reported and standard errors are in parentheses. \* $p < .05$ , \*\* $p < .01$ .

One particularly noteworthy finding in this regard concerns college campuses as the setting for binge drinking interventions targeting young adults. Demographic changes taking place across universities (i.e., increasing “non-traditional” student enrollment) mean that these programs might be able to capture 22-25-year-olds. However, those captured may not represent a high-risk group because when these young adults are placed in the context of a college campus they do not engage in more binge drinking. Although they may be attending universities, college campuses do not seem to be an appropriate setting to address the fact that 22-25-year-olds are no longer maturing out of heavy drinking until later in adulthood.

Normative transitions into adulthood are associated with less binge drinking but not during extended adolescence. Among our 22-25-year-olds, being a spouse, parent, and financial provider all protect against binge drinking. Although some of our younger participants served in these roles, for them, the roles were not associated with less binge drinking. It seems that these transitions are most protective if they occur at the more normative transition point: later in young adulthood.

One risk factor was common across all ages in young adulthood: living with roommates. Living with a roommate during extended adolescence showed the strongest relationship to binge drinking and explained more variance than any other factor in our models. There are several reasons living with a roommate might increase drinking, regardless of age. Studies find that on college campuses and beyond, observational learning, peer pressure, and reciprocal relationships between roommates (e.g., “I’ve got this time, you get next time”) could increase the frequency of heavy drinking.<sup>25,26</sup>

Financial stress was also associated with binge drinking during extended adolescence. Although on its face financial stress might seem like an “adult” stressor, existing literature indicates

that financial burden is a common stressor among college students. For them, these stressors are not related to typical adult financial stress but instead refer to issues such as missing out on activities that their peers participate in and expectations about future student loan debt.<sup>27,28</sup>

### Limitations

Scholars and practitioners should be cautious when attempting to generalize our findings. This study focused on ten counties in Indiana. Our data comment directly on the situation in a largely rural (seven counties’ population density is  $< 500$  people/m<sup>2</sup>) non-Hispanic White (65%) population where about a quarter of adults have a college degree (26% Bachelor’s degree or higher), and 16% of people live in poverty. As is common in web surveys, we also had a low response rate, potentially introducing nonresponse bias. The requirement of internet service likely exacerbated the low response rate in a sample with a large rural representation. Future studies are needed that expand geographically and to more diverse populations.

Our study was also exploratory, utilized cross-sectional data, and produced minimally adjusted associations. Future studies would benefit from a longitudinal design, models including independent variables specific to each age group, and the ability to adjust for important factors such as employment status (which was not available in this wave of our database). While our findings cannot be extrapolated to other settings, they are important in highlighting the value of considering demographic shifts occurring in the broader society when deciding on target populations and settings for intervention programs.

### Implications

Overall, this study provides some guidance for practitioners who are concerned with the high rates of binge drinking among



older young adults, which no longer seem to decline “naturally” as young adults age. Our results indicate that college-based interventions into binge drinking or focusing on living situations may not be the best approaches for young adults aged 22 to 25. Even if these older young adults are enrolled in college, those who are enrolled are no more likely than other people their age to engage in binge drinking. Also, although their living situation matters, it does not influence binge drinking as much as it does during extended adolescence. We have an extensive amount of knowledge about factors embedded within college culture and structure that contribute to binge drinking; scholars should begin to look into structural and cultural factors that influence binge drinking among older young adults. Our results point more toward efforts to help these young adults obtain steady jobs, transition into the role of financial provider, and positively cope with the stress of these new responsibilities.

### Author Contribution

Each author made a substantial contribution to this manuscript. TGJL and DW contributed to the conception and data collection. TGJL and SJ conducted analyses and drafted the article. All authors participated in critical review and final approval of the final version.

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