American Journal of
Preventive Medicine

RESEARCH ARTICLE

Patterns of Alcohol, Tobacco, and Substance Use Among Young Adult Peer Crowds

Meghan Bridgid Moran, PhD,[1] Andrea C. Villanti, PhD, MPH,[1,2,3] Amanda Johnson, MHS,[3] Jessica Rath, PhD, MPH[3]

Introduction: The association between peer crowd identification and substance use is well documented among adolescents, but less is known about substance use among young adult peer crowds.

Methods: This study leverages data from the Truth Initiative Young Adult Cohort Study (Wave 8, June–July 2015), a nationally representative cohort sample of young adults aged 18–34 years. The current cross-sectional analyses (conducted in 2018) focused on 1,341 individuals aged 18–24 years in this sample. Participants reported their peer crowd identification and current use of alcohol, marijuana, other drugs, and tobacco (cigarettes, little cigars/cigarillos, e-cigarettes, hookah, smokeless tobacco). Adjusted logistic regression models assessed associations between peer crowd identification and substance use.

Results: In general, young adults who identified as homebody, young professional, or religious had lower odds of substance use than their counterparts. Young adults who identified as social/partier were more likely to be current users of alcohol, marijuana, any tobacco, cigarettes, and e-cigarettes than those who did not identify as social/partier. Those who identified as alternative were more likely to be current users of marijuana and other drugs than those not identified as alternative. Those who identified as country were more likely than those not identified as country to be current users of cigarettes and smokeless tobacco. Those who identified as hip hop were more likely to be current users of marijuana and e-cigarettes.

Conclusions: Peer crowd identification is associated with substance use among young adults. These findings can help identify target populations for prevention and cessation interventions and inform intervention design and delivery.

Am J Prev Med 2019;56(6):e185–e193.

INTRODUCTION

Peer crowd identity is self-perception as a member of or alignment with a social type or subculture.[1,2] More than just relationships between a group of friends, peer crowds are a macro-level phenomenon representing shared norms, values, behaviors, styles, and preferences among young people who span diverse geographic regions.[2,3] As such, peer crowd identification is "more cognitive than behavioral, more symbolic than concrete and interactional."[4] Research has consistently found several overarching domains of peer crowds among adolescents,[2,5] each with relatively consistent profiles of risk behavior.[6] Crowds include mainstream, social, alternative, hip hop, and country.[2,3,6]

Table 1 presents descriptions of common adolescent crowds and associated substance use behaviors. Peer crowds are relevant to health education and communication efforts, as they provide an optimal way to segment

From the [1]Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland; [2]Vermont Center on Behavior and Health, Department of Psychiatry, University of Vermont Larner College of Medicine, Burlington, Vermont; and [3]Schroeder Institute at Truth Initiative, Washington, District of Columbia

Address correspondence to: Meghan Bridgid Moran, PhD, Department of Health, Behavior and Society, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway, Room 729, Baltimore MD 21205. E-mail: mmoran22@jhu.edu.

0749-3797/$36.00
https://doi.org/10.1016/j.amepre.2019.02.010

Table 1. Peer Crowds Commonly Found Among Adolescents

Peer crowd	Description	Association with substance use behavior
Mainstream (adolescents)	This crowd includes Academics/Brains, who typically excel at school or are heavily involved in school-sanctioned pursuits, and Average/Regular, indicating those who may not have a strong identification with any particular crowd and typically do not seek to stand out[2,6,7]	Lower risk for tobacco use, alcohol use, marijuana use, and other drug use compared to those who do not identify with this crowd[2,6,8]
Social	Sometimes grouped into separate Jock and Popular crowds; typically well-liked and known among their peers[2,9,10]	Elevated risk for alcohol use, particularly compared to those who identify as Academic[2,9–11]
Alternative	Historically has been characterized using the terms Deviant[2] and Non-conformists[10]; typically rebels against social and cultural norms[6,7]	Elevated risk for smoking, alcohol, marijuana, and other drug use compared to those who do not identify with this crowd[2,6,8]
Hip hop	Individuals who identify with hip hop culture (e.g., prefer hip hop music and style of dress) and hold associated values such as authenticity, respect, and confidence[6–8]	Elevated risk for tobacco use, alcohol use, marijuana use and other drug use compared to those who do not identify with this crowd[6,8,13]
Country	Individuals who typically have a preference for country music; engage in outdoorsy activities; and value tradition, hard work, patriotism, community, and family[6]	Higher rates of smokeless tobacco use[6]

and design and deliver messages for a target population. Specifically, peer crowds vary on media and cultural preferences, norms, and values, which allows practitioners to design and deliver highly targeted messages.[7] Effective audience segmentation is critical to the success of public health campaigns.[14,15] As such, peer crowd targeting has been used in recent health communication campaigns to target substance use behaviors in adolescents and young adults, particularly tobacco use.[8,12,16] Although connections between peer crowd identification and substance use have been well explored among adolescents, less is known about this phenomenon among young adults. The current study seeks to examine and describe patterns of substance use across different young adult peer crowds in a nationally representative sample of young adults.

Young adulthood is a developmental period marked by an increased susceptibility to developing one or more addictions.[17,18] The risks evident in young adulthood play out in the higher prevalence of past 30-day tobacco use,[19] binge drinking, and illicit drug use, including marijuana use, in those aged 18–25 years compared with adolescents or adults aged 26 years or older.[20] Recent data highlight greater initiation of tobacco products in young adults compared with adolescents,[21,22] in contrast to prior decades of research.[23] Because identity formation processes continue through young adulthood,[24] it is possible that peer crowd identification influences these behaviors beyond adolescence. Research has found that identification with peer crowds is common among young adults[25] and continues to have significant associations with risk behaviors and indicators of emotional well-being.[26,27] Much work in this area has been done among college students.[5,25,28,29] Kuh and colleagues[30] describe typologies of college students based on factors, such as involvement in academics, sports/recreation, arts/music, and social activities. Hopmeyer et al.[26,31] extended this line of work by developing the College Peer Crowd Questionnaire and identified four broad crowds: social; counterculture (akin to alternative); scholastic (akin to academics); and athletic (akin to jocks).

Regional studies have found that associations between peer crowd identification and risk behavior among young adults largely mirror those found among adolescents.[3,26,27,31] Lisha and colleagues[3] surveyed young adult bar patrons in California and found that identifying as hip hop was associated with an increased likelihood of cigarette, e-cigarette, and cigar use, whereas identification with the young professional crowd (akin to the academic crowd in adolescents) was associated with a decreased likelihood of tobacco use.[3] Akin to the academic crowd in adolescents, those identifying with the young professional crowd prioritize their careers and are less trend sensitive than the social/partier crowd.[3] This work also found that the homebody crowd, similar to the mainstream crowd among adolescents, exhibited lower rates of tobacco product use compared with crowds such as hip hop.[3] Hopmeyer et al.[31] have used surveys to examine peer crowd identification among college students in the Western U.S. and found that counterculture young adults were at increased risk for risky drug and alcohol use, whereas scholastic and athletic were less likely to frequently engage in these behaviors.

Given the relevance of peer crowds to this age group, and the increasing shift in substance use initiation from adolescence to young adulthood,[21,22] it is important to understand these patterns. Such data can help practitioners identify young adult segments with high rates of substance use, and better target and deliver interventions. Yet, no national studies have examined substance

use among young adult peer crowds. To address this gap in knowledge, the current study describes patterns of tobacco, alcohol, marijuana, and other drug use across different peer crowds among a nationally representative sample of individuals aged 18–24 years. It is expected that substance use varies across crowds, as others have found in adolescents and smaller studies of young adults, and the authors seek to extend this work by focusing on a nationally representative sample of young adults.

METHODS

Study Sample

The current study leverages data from Wave 8 of the Truth Initiative Young Adult Cohort Study (June–July 2015), a large contemporary cohort of U.S. young adults that includes information on trajectories of smoking behavior, social, and contextual influences on smoking behavior among young adults. The detailed methods of this study are described elsewhere.[32] The cohort includes a nationally representative sample of young adults aged 18–34 years drawn from GfK's KnowledgePanel,® which is recruited via address-based sampling to provide a statistically valid representation of the U.S. population, including cell phone–only households. The survey was administered online in English and Spanish. Address-based sampling has been described by others previously,[33,34] and it has been used broadly in the peer-reviewed medical literature.[35–38] The cohort was refreshed at each wave to retain the initial sample size.

The panel recruitment rate[39] was 13.5% for Wave 8, and in 64.4% of the identified households, one member completed a core profile survey in which key demographic information was collected (profile rate). At each wave, only one panel member per household was selected at random to be part of the study sample, and no members outside the panel were recruited. The completion rate was 63.1%, and thus, the cumulative response rate (a product of these three rates) was 5.5%.[40] This study was approved by the Chesapeake IRB, Inc. (Protocol #20036020). Online consent was collected from participants before survey self-administration. The present analysis focused on a subset of participants aged 18–24 years at Wave 8 (n=1,341) who provided responses to the peer crowd identity item.

Measures

Sociodemographic correlates included gender; race/ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic other, Hispanic); and highest level of education (categorized as less than a high school education, high school diploma, some college/associate's degree, bachelor's degree or more education).

Participants were provided with a list of 15 crowds and asked: *People often identify with different groups and types of people. Which group would you say you most identify with?* This measure was adapted from existing measures of peer crowd identification.[10,41,42] The list of crowds was identified through a review of existing literature and prior work,[2,16,41,43,44] and consultation with experts. There were 15 resulting peer crowd response options: *activist*, *artsy*, *country*, *emo/scene*, *goth*, *hip hop*, *hippies*, *hipsters*, *homebody*, *people who are into live/independent music*, *preppy*, *religious*, *skaters*, *social/partier*, and *young professional*. From others' work,[3,6] to account for small sample sizes and conceptual similarity between crowds, the authors collapsed activist, artsy, emo/scene, goth, skaters, hippies, hipsters, and people who are into live/independent music into one crowd called alternative and collapsed preppy and young professional into one crowd called young professional. The resulting crowds mirror others' work,[3,6] with the addition of the religious peer crowd. This crowd is primarily characterized by the importance of faith in their lives.

Ever (lifetime) and past 30-day (current) tobacco, alcohol, and marijuana use were assessed as in other national studies.[19,20] Past 30-day alcohol use was determined by two items. The first asked about frequency of alcohol use in the past year (never, monthly or less, two to four times per month, two to three times per week, four or more times per week). Those who reported any use of alcohol were queried about frequency of use in the past 30 days, with respondents using ≥1 days defined as current users. Those who refused to respond, or who reported never, or 0 days used in the past 30 days were categorized as current non-users.

Respondents were asked how often they currently use marijuana, and other drugs (cocaine, heroin, ecstasy, meth), with response options of *not at all*, *some days*, and *every day*. Respondents who responded some days or every day were asked how frequently in the past 30 days they used each substance. Past 30-day use of each of these substances was categorized as current use. Those who refused to respond, reported not at all, or 0 days used in the past 30 days were categorized as current non-users.

Participants were asked, *Which, if any, of the following tobacco or nicotine products have you ever used or tried? (For cigarettes, cigars, cigarillos, and e-cigarettes, even 1 puff). Please select all that apply.* Response options were in a list of ten tobacco and nicotine products, including *cigarettes*, *cigars*, *pipe*, *little cigars/cigarillos*, *electronic cigarettes (e-cigarettes)*, *chewing tobacco*, *dip/snuff*, *snus*, *dissolvable tobacco products*, and *hookah/shisha* or *none of these*. Ever tobacco users were asked, *Which of the following products have you used in the past 30 days? (Select all that apply.)* Response options were in a list of ten tobacco and nicotine products including *cigarettes*, *cigars*, *pipe*, *little cigars/cigarillos*, *e-cigarettes*, *chewing tobacco*, *dip/snuff*, *snus*, *dissolvable tobacco products*, and *hookah/shisha*. Participants who reported using cigarettes, little cigars/cigarillos, e-cigarettes, or hookah in the past 30 days were classified as current users of each respective product. Participants who reported using chewing tobacco or dip/snuff in the past 30 days were identified as current smokeless tobacco users. Participants who reported using any tobacco product in the past 30 days were classified as current users of any tobacco. Participants who did not select any tobacco product ever used or used in the past 30 days were classified as current non-users.[8]

Statistical Analysis

Cross-sectional analyses of the Young Adult Cohort Wave 8 data were conducted in 2018 with Stata, version 15, using survey weights to account for nonresponse. Weighted prevalence estimates were calculated for gender, race/ethnicity, and education level for the entire sample and within each peer crowd. Design-based F tests were used, which accounted for survey weighting, to test for differences in these sociodemographic factors across crowds. Weighted prevalence estimates were then calculated for current use of alcohol, marijuana, other drug use as well as cigarette, little cigars/cigarillos, e-cigarettes, hookah, smokeless

tobacco, and any tobacco use by peer crowd. Multivariable logistic regression was used to assess the odds of current use (compared with current non-use) depending on whether an individual identified with each crowd, controlling for gender, race/ethnicity, and education level. Separate models were conducted for each crowd, and listwise deletion was used for missing data.

RESULTS

Table 2 displays sample characteristics. Just more than one quarter (27%) of the sample identified most with the young professional crowd; 20% identified most with the homebody crowd; 23% with the alternative crowd; 10% with the religious crowd; 7% with the country crowd; 7% with the hip hop crowd; and 7% with the social/partier crowd.

As illustrated in Table 2, just under half (49%) of participants were current alcohol users; 13% were current marijuana users; and 3% were current other drug users. Few participants (16%) were current users of any tobacco, and 12% were current cigarette users, 2% were current little cigar users, 4% were current e-cigarette users, 2% were current hookah users, and 2% were current smokeless tobacco users.

Table 3 displays the prevalence of substance use by crowd and AORs examining associations between identification with each crowd and substance use, controlling for gender, race/ethnicity, and education level. Individuals who identified as young professional were less likely to be current users of marijuana, other drugs, any tobacco, and cigarettes than those who did not identify with the crowd. Those who identified as religious were less likely to be current users of alcohol and any tobacco. Those who identified as social/partier were more likely to be current users of alcohol, marijuana, any tobacco, cigarettes, and e-cigarettes. Those who identified as alternative were more likely to be current users of marijuana and other drugs. Those who identified as country were more likely to be current users of cigarettes and smokeless tobacco. Those who identified as hip hop were more likely to be current users of marijuana and e-cigarettes.

DISCUSSION

Using a national sample of U.S. young adults aged 18–24 years, the current study highlights that more than half (57%) of young adults self-identify as homebody, young professional, or religious—all of which generally have a lower prevalence of substance use than their counterparts. The remaining 43% of young adults identify with crowds with higher odds of substance use: social/partier, alternative, country, and hip hop. These findings are consistent with previous studies in adolescent samples,[2,6,8] demonstrating that peer crowd identification remains an important phenomenon as adolescents transition into young adulthood.

There are several potential explanations for these findings. First, literature on peer crowd identification indicates that a crowd's social norms, often influenced by media and marketing, may play an important role in driving substance use.[7] This study's findings align with how alcohol, tobacco, and marijuana use has been portrayed through marketing and in the media. For example, the tobacco industry has previously targeted consumers based on their identities. Cigarette and cigar manufacturers have used hip hop culture to market their products,[45–48] whereas smokeless tobacco brands typically feature outdoorsy activities and values (e.g., tradition) common to the country crowd.[49] Camel cigarettes has previously associated their product with indie rock to appeal to hipsters typical of the alternative crowd.[50] General media portrayals may also help to establish crowd norms around substance use. For instance, recent work has found that hip hop music videos commonly feature tobacco and marijuana use.[51] Alcohol use is common in media, and alcohol users in the media are often portrayed as higher status.[52–54] However, although there are similarities between peer crowds at risk for use of different substances and media depictions of typical users of each substance, no work has empirically connected media portrayals to variations in substance use by peer crowd. Another explanation is that individuals may self-select into crowds based on their pre-existing traits and background factors. In this scenario, young adults who are already pre-disposed to use certain substances may identify with crowds for which use is normative. Finally, there may be other risk or protective factors associated with a particular peer crowd. For example, in this study, young adults who identified with the religious crowd were consistently at lower risk for substance use. Earlier work has found that religious affiliation is a well-documented protective factor against substance use[55] (though this may vary by sexuality in young adults[56]). As such, increased religiosity among this crowd could operate as a protective factor against substance use.

Because peer crowds vary in risk behavior, they can be useful for targeting public health campaigns. Ling and colleagues[57] note that because tobacco use is concentrated within specific peer crowds, peer crowd targeting allows practitioners to reach priority populations in a more efficient, cost-effective way. Moreover, Ling and others have noted that, in addition to facilitating more precise campaign reach, peer crowds may enhance campaign effectiveness by offering specific crowd-relevant cues (e.g., hip hop music or styles of dress used in hip

Table 2. Sample Characteristics

Characteristics	Total, N (weighted %)	Religious, *n* (weighted %)	Home-body, *n* (weighted %)	Young professional, *n* (weighted %)	Social/Partier, *n* (weighted %)	Alternative, *n* (weighted %)	Country, *n* (weighted %)	Hip hop, *n* (weighted %)	χ^2, *p*-value
Overall	1,341 (100)	129 (9.8)	276 (20.1)	382 (26.9)	92 (6.8)	301 (22.5)	94 (6.9)	67 (6.9)	
Sex									Design-based *F*(5.92, 11488.08)=1.638, *p*=0.133
Male	460 (50.2)	46 (52.0)	77 (44.5)	150 (55.6)	35 (55.0)	90 (45.7)	32 (44.8)	30 (57.8)	
Female	881 (49.8)	83 (48.0)	199 (55.5)	232 (44.4)	57 (45.0)	211 (54.3)	62 (55.2)	37 (42.2)	
Race									Design-based *F*(16.52, 32050.55)=4.229, ***p*<0.001**
Non-Hispanic white	777 (52.4)	75 (51.4)	146 (50.7)	229 (52.7)	49 (52.1)	180 (53.5)	80 (85.7)	18 (20.5)	
Non-Hispanic black	115 (12.8)	11 (13.2)	36 (19.5)	27 (10.0)	5 (8.3)	18 (8.6)	0 (0.0)	18 (34.9)	
Non-Hispanic other	120 (10.5)	13 (9.7)	27 (8.4)	33 (13.4)	8 (7.2)	23 (9.5)	6 (7.4)	10 (16.2)	
Hispanic	329 (24.3)	30 (25.7)	67 (21.3)	93 (23.8)	30 (32.4)	80 (28.4)	8 (6.9)	21 (28.3)	
Education									Design-based *F*(15.19, 29476.41)=3.477, ***p*<0.001**
Less than high school	119 (16.9)	13 (20.3)	22 (15.3)	17 (9.5)	7 (17.4)	39 (24.2)	10 (17.6)	11 (20.9)	
High school degree	319 (28.9)	37 (32.1)	73 (31.9)	52 (19.5)	21 (23.3)	79 (30.7)	29 (36.7)	28 (44.0)	
Some college/associate's degree	666 (43.6)	57 (38.5)	144 (44.5)	197 (51.9)	54 (52.1)	144 (38.4)	45 (40.2)	25 (28.2)	
Bachelor's or graduate degree	237 (10.6)	22 (9.1)	37 (8.4)	116 (19.1)	10 (7.2)	39 (6.8)	10 (5.6)	3 (6.9)	

Note: Reported Ns are unweighted. Survey weights were calculated to provide representative estimates based on sex, age, race/ethnicity, education, U.S. Census region, metropolitan area, Internet access, and language spoken at home (English/Spanish). Boldface indicates statistical significance ($p<0.05$).

Table 3. Substance Use Behavior by Peer Crowd

Current use	Young professional (*n*=382, 27%)	Homebody (*n*=276, 20%)	Alternative (*n*=301, 23%)	Religious (*n*=129, 10%)	Country (*n*=94, 7%)	Hip hop (*n*=67, 7%)	Social/Partier (*n*=92, 7%)	Total
Alcohol								
Unweighted *n*	225	129	165	35	61	35	76	726
Weighted %	51.2	41.4	52.0	22.9	58.5	46.4	82.8	49.0
OR (95% CI)	1.13 (0.85, 1.5)	0.68 (0.5, 0.94)	1.17 (0.86, 1.6)	**0.28 (0.17, 0.44)**	1.51 (0.9, 2.53)	0.9 (0.51, 1.58)	**5.52 (2.98, 10.21)**	
AOR (95% CI)	0.83 (0.72, 1.23)	0.72 (0.51, 1.00)	1.32 (0.95, 1.85)	**0.27 (0.17, 0.43)**	1.57 (0.96, 2.58)	1.33 (0.75, 2.39)	**5.85 (2.96, 11.57**)	
Marijuana								
Unweighted *n*	15	24	63	5	10	17	23	157
Weighted %	4.3	10.6	22.2	4.9	11.1	23.9	29.3	13.2
OR (95% CI)	**0.23 (0.13, 0.41)**	0.74 (0.41, 1.32)	**2.42 (1.59, 3.69)**	**0.32 (0.12, 0.85)**	0.82 (0.38, 1.77)	**2.23 (1.13, 4.38)**	**3.03 (1.67, 5.51)**	
AOR (95% CI)	**0.23 (0.13, 0.42)**	0.74 (0.42, 1.31)	**2.39 (1.57, 3.62)**	0.77 (0.52, 1.15)	0.72 (0.33, 1.59)	**2.41 (1.15, 5.05)**	**3.11 (1.72, 5.61)**	
Other drug use								
Unweighted *n*	3	3	13	0	3	2	5	29
Weighted %	0.9	1.0	6.5	0.0	2.7	4.8	6.3	2.9
OR (95% CI)	**0.25 (0.07, 0.89)**	0.28 (0.06, 1.3)	**3.82 (1.51, 9.68)**	—[a]	0.95 (0.27, 3.38)	1.81 (0.32, 10.14)	2.54 (0.86, 7.51)	
AOR (95% CI)	**0.25 (0.07, 0.95)**	0.32 (0.07, 1.44)	**3.27 (1.42, 7.52)**	—[a]	1.11 (0.31, 4.04)	2.07 (0.36, 11.82)	2.58 (0.75, 8.92)	
Any tobacco use								
Unweighted *n*	30	46	50	5	21	15	30	197
Weighted %	8.1	18.0	17.2	6.0	23.2	22.0	33.4	15.7
OR (95% CI)	**0.39 (0.24, 0.64)**	1.23 (0.79, 1.93)	1.16 (0.76, 1.77)	**0.32 (0.12, 0.84)**	1.7 (0.95, 3.03)	1.58 (0.78, 3.19)	**2.99 (1.76, 5.1)**	
AOR (95% CI)	**0.41 (0.25, 0.67)**	1.25 (0.80, 1.96)	1.11 (0.72, 1.71)	**0.31 (0.11, 0.82)**	1.42 (0.79, 2.54)	1.67 (0.79, 3.55)	**3.23 (1.87, 5.56)**	
Cigarettes								
Unweighted *n*	19	32	34	4	20	11	25	145
Weighted %	5.2	13.3	11.7	5.3	22.7	15.0	27.0	11.7
OR (95% CI)	**0.34 (0.18, 0.63)**	1.21 (0.71, 2.06)	1.01 (0.61, 1.65)	0.4 (0.14, 1.14)	**2.41 (1.32, 4.38)**	1.37 (0.64, 2.95)	**3.12 (1.78, 5.46)**	
AOR (95% CI)	**0.35 (0.19, 0.66)**	1.21 (0.71, 2.07)	0.96 (0.58, 1.60)	0.38 (0.13, 1.12)	**2.00 (1.10, 3.62)**	1.47 (0.65, 3.33)	**3.34 (1.90, 5.89)**	
Little cigars/cigarillos								
Unweighted *n*	5	6	6	1	1	3	3	25
Weighted %	1.4	1.9	2.4	1.8	1.5	6.6	4.5	2.3
OR (95% CI)	0.53 (0.18, 1.54)	0.75 (0.26, 2.19)	1.02 (0.34, 3.05)	0.73 (0.1, 5.53)	0.62 (0.08, 4.76)	3.43 (0.83, 14.12)	2.13 (0.57, 7.89)	
AOR (95% CI)	0.44 (0.13, 1.45)	0.80 (0.28, 2.26)	1.18 (0.41, 3.44)	0.71 (0.09, 5.42)	0.96 (0.13, 7.22)	2.45 (0.60, 10.07)	2.34 (0.63, 8.71)	
E-cigarettes								
Unweighted *n*	7	9	16	2	5	5	8	52
Weighted %	2.2	2.8	5.0	1.7	4.2	10.0	10.0	4.1
OR (95% CI)	0.44 (0.18, 1.06)	0.63 (0.27, 1.47)	1.3 (0.67, 2.55)	0.37 (0.09, 1.6)	1.04 (0.37, 2.92)	2.92 (0.98, 8.68)	**2.92 (1.17, 7.3)**	
AOR (95% CI)	0.40 (0.15, 1.06)	0.68 (0.29, 1.61)	1.27 (0.65, 2.48)	0.36 (0.08, 1.61)	0.72 (0.25, 2.07)	**5.30 (1.73, 16.19)**	**3.07 (1.22, 7.73)**	

(*continued on next page*)

Table 3. Substance Use Behavior by Peer Crowd (*continued*)

Current use	Young professional (*n*=382, 27%)	Homebody (*n*=276, 20%)	Alternative (*n*=301, 23%)	Religious (*n*=129, 10%)	Country (*n*=94, 7%)	Hip hop (*n*=67, 7%)	Social/Partier (*n*=92, 7%)	Total
Hookah								
Unweighted *n*	6	6	9	0	0	3	3	27
Weighted %	0.9	2.3	2.7	0.0	0.0	2.3	3.6	1.7
OR (95% CI)	0.44 (0.17, 1.15)	1.49 (0.56, 3.96)	1.9 (0.76, 4.76)	—[a]	—[a]	1.36 (0.37, 5.01)	2.33 (0.63, 8.55)	
AOR (95% CI)	0.52 (0.21, 1.25)	1.35 (0.51, 3.58)	1.80 (0.71, 4.59)	—[a]	—[a]	1.43 (0.33, 6.19)	2.39 (0.66, 8.60)	
Smokeless tobacco								
Unweighted *n*	2	3	4	1	9	2	1	22
Weighted %	0.7	1.3	2.6	0.7	11.9	5.7	1.0	2.4
OR (95% CI)	0.23 (0.05, 1.06)	0.49 (0.13, 1.9)	1.11 (0.3, 4.12)	0.26 (0.03, 1.96)	**7.95 (3, 21.09)**	2.74 (0.56, 13.41)	0.39 (0.05, 3.01)	
AOR (95% CI)	0.22 (0.04, 1.15)	0.57 (0.14, 2.30)	1.00 (0.31, 3.27)	0.23 (0.03, 1.91)	**9.72 (3.65, 25.85)**	3.03 (0.62, 14.75)	0.36 (0.05, 2.89)	

Note: Separate models were run for each crowd, comparing participants who most identified with the crowd to all other participants in the sample. AORs significant at $p<0.05$ are bolded.
[a]Models were not run for peer crowds that did not include both current and current non-users.

hop crowd–targeted campaigns) that can increase attention to and liking and perceived relevance of campaigns,[7,8,57] thus increasing the likelihood of campaign effectiveness. Currently, several media campaigns to reduce tobacco use among adolescents use peer crowds to identify and target materials to target audiences. Most notably, the U.S. Food and Drug Administration's national Fresh Empire campaign targets tobacco education messages to the hip hop crowd by linking a tobacco-free lifestyle to the styles, values, and norms that are important to this crowd.[8,11] This study found hip hop young adults were more likely to use marijuana as well as e-cigarettes, making this a potential target audience for marijuana prevention and education campaigns as well as for the existing tobacco prevention and education efforts. Several regional campaigns have also adopted a peer crowd–targeted approach, some in young adults.[12,13,16,43] The current study provides national estimates to inform the development, implementation, and targeting of substance use prevention and treatment campaigns for young adults. For example, this study found that the hip hop and social/partier crowds were more likely to be current e-cigarette users. Practitioners could develop two uniquely targeted campaigns, one for each crowd, by incorporating preferences and values from each crowd into campaign messages and delivering the campaigns through channels heavily used by each crowd.

Limitations

Study findings should be interpreted in light of several limitations. First, only the crowd that participants most identified with was examined. The authors opted for this measure to reduce participant burden and to be mindful of time limitations in implementing the survey. Although individuals may identify with multiple crowds[58] with varying levels of strength, assessing the most identified with crowd is commonly used[42,59–61] and provides an efficient way to capture the primary crowd identification. Additionally, although self-report is the most commonly used way to assess peer crowd identification,[2] there is potential for social desirability bias. Even though this study controlled for gender, race/ethnicity, and educational level, there may be other factors that influence the relationship between peer crowd identification and substance use.

CONCLUSIONS

This study provides national prevalence estimates of substance use across different young adult peer crowds, adding to emerging evidence that peer crowd identification is associated with substance use among young

adults. These findings extend previous work related to peer crowds among young adults by documenting that peer crowd identification is still relevant for young adults, and that it is associated with substance use behavior. These findings can help practitioners identify young adults at risk for substance use and can be used to inform the design of highly targeted prevention and education messages. Interventions to prevent or reduce substance use in this population should consider peer crowds as a tool to identify and target at-risk young adults, as well as a framework for guiding the development of the brand, style, and delivery of the intervention content.

ACKNOWLEDGMENTS

Data collection for this study was supported by Truth Initiative. Dr. Moran's effort was supported by the National Institute on Drug Abuse and the Food and Drug Administration Center for Tobacco Products (K01DA037903, PI: Moran). Dr. Villanti's effort was supported by the Schroeder Institute at Truth Initiative and the National Institute of General Medical Sciences (P20GM103644). The content is solely the responsibility of the authors and does not necessarily represent the official views of NIH or the Food and Drug Administration.

Meghan Moran is serving as an expert witness for the prosecution on litigation in which a tobacco company is the defendant. No other financial disclosures were reported by the authors of this paper.

REFERENCES

1. Brown BB, Mory MS, Kinney D. Casting adolescent crowds in a relational perspective: caricature, channel, and context. In: Montemayor R, Adams GR, Gullotta TP, eds. *Advances in Adolescent Development*. Thousand Oaks, CA: Sage Publications, Inc., 1994:123–167.
2. Sussman S, Pokhrel P, Ashmore RD, Brown BB. Adolescent peer group identification and characteristics: a review of the literature. *Addict Behav.* 2007;32(8):1602–1627. https://doi.org/10.1016/j.addbeh.2006.11.018.
3. Lisha NE, Jordan JW, Ling PM. Peer crowd affiliation as a segmentation tool for young adult tobacco use. *Tob Control.* 2016;25(suppl 1):i83–i89. https://doi.org/10.1136/tobaccocontrol-2016-053086.
4. Brown BB. Adolescents' relationships with peers. In: Lerner R, Steinberg L, eds. *Handbook of Adolescent Psychology*. 2nd ed. Hoboken, NJ: Wiley, 2004:363–394. https://doi.org/10.1002/9780471726746.ch12.
5. Ashmore RD, Griffo R, Green R, Moreno AH. Dimensions and categories underlying thinking about college student types. *J Appl Soc Psychol.* 2007;37(12):2922–2950. https://doi.org/10.1111/j.1559-1816.2007.00288.x.
6. Jordan JW, Stalgaitis CA, Charles J, Madden PA, Radhakrishnan AG, Saggese D. Peer crowd identification and adolescent health behaviors: results from a statewide representative study. *Health Educ Behav.* 2019;46(1):40–52. https://doi.org/10.1177/1090198118759148.
7. Moran MB, Walker MW, Alexander TN, Jordan JW, Wagner DE. Why peer crowds matter: incorporating youth subcultures and values in health education campaigns. *Am J Public Health.* 2017;107(3):389–395. https://doi.org/10.2105/AJPH.2016.303595.
8. Walker MW, Navarro MA, Hoffman L, Wagner DE, Stalgaitis CA, Jordan JW. The hip hop peer crowd: an opportunity for intervention to reduce tobacco use among at-risk youth. *Addict Behav.* 2018;82:28–34. https://doi.org/10.1016/j.addbeh.2018.02.014.
9. Dolcini MM, Adler NE. Perceived competencies, peer group affiliation, and risk behavior among early adolescents. *Health Psychol.* 1994;13(6):496–506. https://doi.org/10.1037/0278-6133.13.6.496.
10. La Greca AM, Prinstein MJ, Fetter MD. Adolescent peer crowd affiliation: linkages with health-risk behaviors and close friendships. *J Pediatr Psychol.* 2001;26(3):131–143. https://doi.org/10.1093/jpepsy/26.3.131.
11. Barber BL, Eccles JS, Stone MR. Whatever happened to the jock, the brain, and the princess? Young adult pathways linked to adolescent activity involvement and social identity. *J Adolesc Res.* 2001;16(5):429–455. https://doi.org/10.1177/0743558401165002.
12. Fallin A, Neilands TB, Jordan JW, Ling PM. Social branding to decrease lesbian, gay, bisexual, and transgender young adult smoking. *Nicotine Tob Res.* 2015;17(8):983–989. https://doi.org/10.1093/ntr/ntu265.
13. Lee YO, Jordan JW, Djakaria M, Ling PM. Using peer crowds to segment black youth for smoking intervention. *Health Promot Pract.* 2014;15(4):530–537. https://doi.org/10.1177/1524839913484470.
14. Noar SM, Benac CN, Harris MS. Does tailoring matter? Meta-analytic review of tailored print health behavior change interventions. *Psychol Bull.* 2007;133(4):673–693. https://doi.org/10.1037/0033-2909.133.4.673.
15. Slater MD. Theory and method in health audience segmentation. *J Health Commun.* 1996;1(3):267–283. https://doi.org/10.1080/108107396128059.
16. Fallin A, Neilands TB, Jordan JW, Hong JS, Ling PM. Wreaking "havoc" on smoking: social branding to reach young adult "partiers" in Oklahoma. *Am J Prev Med.* 2015;48(1 suppl 1):S78–S85. https://doi.org/10.1016/j.amepre.2014.09.008.
17. Hammond D. Smoking behaviour among young adults: beyond youth prevention. *Tob Control.* 2005;14(3):181–185. https://doi.org/10.1136/tc.2004.009621.
18. Sussman S, Arnett JJ. Emerging adulthood: developmental period facilitative of the addictions. *Eval Health Prof.* 2014;37(2):147–155. https://doi.org/10.1177/0163278714521812.
19. Kasza KA, Ambrose BK, Conway KP, et al. Tobacco-product use by adults and youths in the United States in 2013 and 2014. *N Engl J Med.* 2017;376(4):342–353. https://doi.org/10.1056/NEJMsa1607538.
20. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, HHS, RTI International. Results from the 2017 National Survey on Drug Use and Health: Detailed Tables. www.samhsa.gov/data/report/2017-nsduh-detailed-tables. Published 2018. Accessed October 14, 2018.
21. Thompson AB, Mowery PD, Tebes JK, McKee SA. Time trends in smoking onset by sex and race/ethnicity among adolescents and young adults: findings from the 2006–2013 National Survey on Drug Use and Health. *Nicotine Tob Res.* 2018;20(3):312–320. https://doi.org/10.1093/ntr/ntx010.
22. Perry CL, Perez A, Bluestein M, et al. Youth or young adults: which group is at highest risk for tobacco use onset? *J Adolesc Health.* 2018;63(4):413–420. https://doi.org/10.1016/j.jadohealth.2018.04.011.
23. HHS. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General.* Atlanta, GA: HHS, CDC, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2012.
24. Schwartz SJ, Cote JE, Arnett JJ. Identity and agency in emerging adulthood: two developmental routes in the individualization process. *Youth Soc.* 2005;37(2):201–229. https://doi.org/10.1177/0044118X05275965.
25. Ashmore RD, Del Boca FK, Beebe M. "Alkie," "frat brother," and "jock": perceived types of college students and stereotypes about drinking. *J Appl Soc Psychol.* 2002;32(5):885–907. https://doi.org/10.1111/j.1559-1816.2002.tb00247.x.
26. Hopmeyer A, Medovoy T. Emerging adults' self-identified peer crowd affiliations, risk behavior, and social–emotional adjustment in college. *Emerg Adulthood.* 2017;5(2):143–148. https://doi.org/10.1177/2167696816665055.

27. Wax A, Hopmeyer A, Dulay PN, Medovoy T. Commuter college student adjustment: peer crowd affiliation as a driver of loneliness, belongingness, and risk behaviors. *Emerg Adulthood.* In press. Online June 11, 2018. https://doi.org/10.1177/2167696818781128.
28. Hu S, Katherine L, Kuh GD. *Student Typologies in Higher Education.* San Francisco, CA: Jossey-Bass; 2011:5–15. https://doi.org/10.1002/ir.413.
29. Sessa FM. Peer crowds in a commuter college sample: the relation between self-reported alcohol use and perceived peer crowd norms. *J Psychol.* 2007;141(3):293–306. https://doi.org/10.3200/JRLP.141.3.293-306.
30. Kuh GD, Hu S, Vesper N. "They shall be known by what they do": an activities-based typology of college students. *J Coll Stud Dev.* 2000;41(2):228–244.
31. Hopmeyer A, Troop-Gordon W, Medovoy T, Fischer J. Emerging adults' self-identified peer crowd affiliations and college adjustment. *Soc Psychol Educ.* 2017;20(3):643–667. https://doi.org/10.1007/s11218-017-9390-1.
32. Rath JM, Villanti AC, Abrams DB, Vallone DM. Patterns of tobacco use and dual use in U.S. young adults: the missing link between youth prevention and adult cessation. *J Environ Public Health.* 2012;2012:679134. https://doi.org/10.1155/2012/679134.
33. Chang L, Krosnick JA. National surveys via RDD telephone interviewing versus the internet comparing sample representativeness and response quality. *Public Opin Q.* 2009;73(4):641–678. https://doi.org/10.1093/poq/nfp075.
34. Yeager DS, Krosnick JA, Chang L, et al. Comparing the accuracy of RDD telephone surveys and Internet surveys conducted with probability and non-probability samples. *Public Opin Q.* 2011;75(4):709–747. https://doi.org/10.1093/poq/nfr020.
35. Rhodes DJ, Radecki Breitkopf C, Ziegenfuss JY, Jenkins SM, Vachon CM. Awareness of breast density and its impact on breast cancer detection and risk. *J Clin Oncol.* 2015;33(10):1143–1150. https://doi.org/10.1200/JCO.2014.57.0325.
36. Grande D, Mitra N, Shah A, Wan F, Asch DA. Public preferences about secondary uses of electronic health information. *JAMA Intern Med.* 2013;173(19):1798–1806. https://doi.org/10.1001/jamainternmed.2013.9166.
37. Kumar S, Quinn SC, Kim KH, Daniel LH, Freimuth VS. The impact of workplace policies and other social factors on self-reported influenza-like illness incidence during the 2009 H1N1 pandemic. *Am J Public Health.* 2012;102(1):134–140. https://doi.org/10.2105/AJPH.2011.300307.
38. Fowler FJ Jr., Gerstein BS, Barry MJ. How patient centered are medical decisions? Results of a national survey. *JAMA Intern Med.* 2013;173(13):1215–1221. https://doi.org/10.1001/jamainternmed.2013.6172.
39. The American Association for Public Opinion Research. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys.* 8th ed. Ann Arbor, MI: The American Association for Public Opinion Research; 2015.
40. Callegaro M, DiSogra C. Computing response metrics for online panels. *Public Opin Q.* 2008;72(5):1008–1032. https://doi.org/10.1093/poq/nfn065.
41. Moran MB, Sussman S. Translating the link between social identity and health behavior into effective health communication strategies: an experimental application using antismoking advertisements. *Health Commun.* 2014;29(10):1057–1066. https://doi.org/10.1080/10410236.2013.832830.
42. Sussman S, Unger JB, Dent CW. Peer group self-identification among alternative high school youth: a predictor of their psychosocial functioning five years later. *Int J Clin Health Psychol.* 2004;4(1):9–25.
43. Ling PM, Lee YO, Hong J, Neilands TB, Jordan JW, Glantz SA. Social branding to decrease smoking among young adults in bars. *Am J Public Health.* 2014;104(4):751–760. https://doi.org/10.2105/AJPH.2013.301666.
44. Moran MB, Zhao X. The effect of adolescent peer crowd identification on cigarette, alcohol and marijuana use: an updated approach for understanding adolescent risk behavior. Ponte Vedra Beach, FL: American Academy of Health Behavior; 2016.
45. Cruz TB, Wright LT, Crawford G. The menthol marketing mix: targeted promotions for focus communities in the United States. *Nicotine Tob Res.* 2010;12(suppl 2):S147–S153. https://doi.org/10.1093/ntr/ntq201.
46. Hafez N, Ling PM. Finding the Kool Mixx: how Brown & Williamson used music marketing to sell cigarettes. *Tob Control.* 2006;15(5):359–366. https://doi.org/10.1136/tc.2005.014258.
47. Richardson A, Ganz O, Vallone D. The cigar ambassador: how Snoop Dogg uses Instagram to promote tobacco use. *Tob Control.* 2014;23(1):79–80. https://doi.org/10.1136/tobaccocontrol-2013-051037.
48. Ganz O, Rose SW, Cantrell J. Swisher Sweets "Artist Project": using musical events to promote cigars. *Tob Control.* 2018;27(e1):e93–e95. https://doi.org/10.1136/tobaccocontrol-2017-054047.
49. National Cancer Institute. The Role of the Media in Promoting and Reducing Tobacco Use. Tobacco Control Monograph No. 19. Bethesda, MD: HHS, NIH, National Cancer Institute; 2008.
50. Hendlin Y, Anderson SJ, Glantz SA. "Acceptable rebellion": marketing hipster aesthetics to sell Camel cigarettes in the U.S. *Tob Control.* 2010;19(3):213–222. https://doi.org/10.1136/tc.2009.032599.
51. Knutzen KE, Moran MB, Soneji S. Use of combustible and electronic tobacco and marijuana products in hip hop music videos, 2013–2017. *JAMA Intern Med.* 2018;178(12):1608–1615. https://doi.org/10.1001/jamainternmed.2018.4488.
52. Cranwell J, Murray R, Lewis S, Leonardi-Bee J, Dockrell M, Britton J. Adolescents' exposure to tobacco and alcohol content in YouTube music videos. *Addiction.* 2015;110(4):703–711. https://doi.org/10.1111/add.12835.
53. Kollath-Cattano C, Abad-Vivero EN, Mejia R, Perez-Hernandez R, Sargent JD, Thrasher JF. Portrayals of character smoking and drinking in Argentine-, Mexican- and U.S.-produced films. *Prev Med.* 2016;90:143–147. https://doi.org/10.1016/j.ypmed.2016.07.005.
54. Primack BA, Colditz JB, Pang KC, Jackson KM. Portrayal of alcohol intoxication on YouTube. *Alcohol Clin Exp Res.* 2015;39(3):496–503. https://doi.org/10.1111/acer.12640.
55. Cotton S, Zebracki K, Rosenthal SL, Tsevat J, Drotar D. Religion/spirituality and adolescent health outcomes: a review. *J Adolesc Health.* 2006;38(4):472–480. https://doi.org/10.1016/j.jadohealth.2005.10.005.
56. Rostosky SS, Danner F, Riggle ED. Is religiosity a protective factor against substance use in young adulthood? Only if you're straight. *J Adolesc Health.* 2007;40(5):440–447. https://doi.org/10.1016/j.jadohealth.2006.11.144.
57. Ling PM, Holmes LM, Jordan JW, Lisha NE, Bibbins-Domingo K. Bars, nightclubs, and cancer prevention: new approaches to reduce young adult cigarette smoking. *Am J Prev Med.* 2017;53(3):S78–S85. https://doi.org/10.1016/j.amepre.2017.03.026.
58. Fuqua JL, Gallaher PE, Unger JB, et al. Multiple peer group self-identification and adolescent tobacco use. *Subst Use Misuse.* 2012;47(6):757–766. https://doi.org/10.3109/10826084.2011.608959.
59. Cross JR, Fletcher KL. The challenge of adolescent crowd research: defining the crowd. *J Youth Adolesc.* 2009;38(6):747–764. https://doi.org/10.1007/s10964-008-9307-6.
60. Pokhrel P, Sussman S, Black D, Sun P. Peer group self–identification as a predictor of relational and physical aggression among high school students. *J Sch Health.* 2010;80(5):249–258. https://doi.org/10.1111/j.1746-1561.2010.00498.x.
61. Sussman S, Dent CW, Stacy AW, et al. Peer-group association and adolescent tobacco use. *J Abnorm Psychol.* 1990;99(4):349–352. https://doi.org/10.1037/0021-843X.99.4.349.