

Permissive Norms and Young Adults' Alcohol and Marijuana Use: The Role of Online Communities

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ABSTRACT. Objective: Young adults are increasingly interacting with their peer groups online through social networking sites. These online interactions may reinforce or escalate alcohol and other drug (AOD) use as a result of more frequent and continuous exposure to AOD promotional norms; however, the influence of young adults' virtual networks on AOD use remains untested. The purpose of this study was to examine the association between the presence of AOD use content in online social networking, perceived norms (online norms regarding AOD use and anticipated regret with AOD use postings), and alcohol and marijuana use in a sample of 18- to 24-year-olds. **Method:** Using an adapted web version of respondent-driven sampling (webRDS), we recruited a sample of 18- to 24-year-olds ($N = 3,448$) in the United States. Using

multivariate regression, we explored the relationship between past-30-day alcohol and marijuana use, online norms regarding AOD use, peer substance use, and online and offline peer support. **Results:** Alcohol use was associated with more alcohol content online. Anticipated regret and online peer support were associated with less alcohol use. Anticipated regret was negatively associated with marijuana use. Peer AOD use was positively associated with both alcohol and marijuana use. **Conclusions:** Peers play an important role in young adult alcohol and marijuana use, whether online or in person. Our findings highlight the importance of promoting online network-based AOD prevention programs for young adults in the United States. (*J. Stud. Alcohol Drugs*, 73, 968–975, 2012)

ALCOHOL AND MARIJUANA are two of the most common substances used by young adults (Substance Abuse and Mental Health Services Administration [SAMHSA], 2010). In 2009, 50% of 18- to 20-year-olds and 70% of 21- to 25-year-olds in the United States reported current alcohol use (SAMHSA, 2010). Approximately 18% of 18- to 25-year-olds reported ever using marijuana (SAMHSA, 2010). For young adults, peer substance use is one of the strongest predictors of alcohol and other drug (AOD) use (Brenner et al., 2011; Elkington et al., 2011; Hawkins et al., 1992). Youth and young adults who interact in peer networks with higher concentrations of AOD use are more likely to use drugs than those with less AOD use in their social networks (Reifman and Watson, 2003; Valente et al., 2004). This clustering of AOD use may be attributable to both young adults selecting friends with similar drinking habits and individuals exerting influence on the alcohol consumption of others in a peer group (Reifman et al., 2006; Rosenquist et al., 2010). AOD socialization is consistent

with social learning (or social cognitive) theory, which posits that young adults influence each other through observational learning and modeling behaviors (Bandura, 1986). Selection and peer modeling are important factors for explaining AOD use; however, social norms are also a key element of the relationship between networks and AOD use (Valente et al., 2004).

Perceived norms have a significant effect on young adult alcohol and marijuana use (Borsari and Carey, 2001). Beliefs about others' behavior as well as others' acceptance of a behavior create a set of perceived norms (Ajzen, 1991; Fishbein, 1967). Both perceptions of peer use and perceptions of peer attitudes toward drinking are factors in college student drinking (Borsari and Carey, 2001). Student drinking levels are associated with perceived norms about other students' drinking behavior (Baer, 2002; Lewis and Neighbors, 2004; Neighbors et al., 2007), and perceptions of close friends' alcohol and marijuana use are associated with consumption (Baer et al., 1991; Lee et al., 2007; Mallett et al., 2009; Mooney and Corcoran, 1991; Thombs et al., 1997). Additionally, researchers have found that anticipated regret (i.e., an individual's ability to foresee the negative consequences of a behavior) is an important factor in behavioral decision making (Sandberg and Conner, 2008) and a strong predictor of intentions to use alcohol and marijuana (Cooke et al., 2007; Richard et al., 1996). Although researchers have identified links between perceived norms and AOD use, most researchers have focused on small samples of college students, limiting generalizability to more general populations of young adults (Baer

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et al., 1991; Cho, 2006; Cox and Bates, 2011; Lee et al., 2007; Mallett et al., 2009; Neighbors et al., 2008; Richard et al., 1996). In addition, most of this research has focused on face-to-face interaction and influences, limiting our understanding of how norms may be promoted through social networking technology.

Increasingly, young adults interact with their peer groups online through social networking sites. In 2010, 82% of 18- to 29-year-olds had used social network sites, and 54% reported use in the past day (Smith, 2010). Displays of AOD use and norms online may have an effect on young adult substance use. In a content analysis of MySpace profiles, 37% were found to display alcohol references and 10% contained drug use (Moreno et al., 2009). In another study, 75% of youth reported that they had seen a picture posted by a friend of another friend drinking alcohol, 30% had a friend post a picture of them drinking, and 26% had self-posted a drinking photo (Morgan et al., 2010). Recently, Moreno and colleagues (2012) observed that college students had higher odds of meeting problem-drinking criteria if they displayed greater alcohol use in their Facebook profiles. Although these associations may reflect the composition of young adults' social networks because young adults may select friends who have similar substance use norms, it is possible that online AOD modeling and promotive norms could reinforce or escalate AOD use. On the other hand, young adults may have increased anticipated regret about posting pictures of their alcohol use online, particularly given the increasing awareness that potential employers may examine online profiles as part of the hiring process, and thereby decrease their postings on alcohol use as a precaution. Consequently, we examined whether young adults' alcohol use was associated with both online risk (e.g., online alcohol prevalence, promotive AOD norms online) and promotive (e.g., anticipated regret) norms.

Although posting alcohol-related photos is a common behavior, posts about marijuana may be less prevalent and not as widely accepted (Morgan et al., 2010). In a sample of college students, 78% said they disapproved of posting photos of smoking the drug (Morgan et al., 2010). At present, however, few researchers have examined whether online norms are associated with marijuana use among young adults; therefore, using the same theoretical framework, we sought to extend our current understanding of the relationship between marijuana use and online norms.

The purpose of this study was to examine the association between AOD content in online social networking and alcohol and marijuana use, respectively. Using data from the Virtual Networks Study, we examined the association between perceived norms (online norms regarding AOD use and anticipated regret with AOD postings), the presence of online AOD content, and alcohol and marijuana use in a sample of 18- to 24-year-olds.

Method

Virtual Networks Study

Data for the current study were collected as part of the Virtual Networks Study, a cross-sectional observational study examining young adults' interpersonal relationships online. To be eligible for participation, young adults had to be between the ages of 18 and 24 years, live in the United States, and have access to the Internet. We used an adapted web version of respondent-driven sampling (webRDS) to recruit participants (Bauermeister et al., 2012b). The first wave of participants (i.e., seeds) were recruited through an online Facebook advertisement and selected based on race/ethnicity and region of the United States to ensure that initial network seeds were diverse and that we would not concentrate recruitment in a single region in the United States. We recruited 22 racially diverse seeds from across the United States (5 Black/African American, 8 Latino/Hispanic, 9 White/European American; 7 from the Northeast, 6 from the South, 4 from the West, and 5 from the Midwest). The remainder of the sample ($n = 3,426$) was recruited through referral chains from the original 22 seeds.

Data collection

Each prospective participant logged into the survey portal using his or her unique identifying (UID) number and subsequently created an account using a personal e-mail address. Participants completed a short eligibility screener asking their sex, age, current state of residence, and race/ethnicity. Eligible participants read and consented to the study and completed the survey, which assessed their socio-demographic characteristics, Internet use, lifetime and recent AOD use, lifetime and recent sexual behaviors, and other AOD correlates (e.g., mental health, peer and parental AOD use). Participants received a monetary incentive for their participation (\$20 on a VISA e-gift card) and were offered an additional \$10 for every other young adult (up to five, for a total of \$50) whom they referred to the study and who completed the questionnaire. On completion of the survey, participants were provided with a UID link to invite other friends to participate. Participants could copy and paste their UID link into instant messages, text messages, and/or social network sites (e.g., Facebook) to recruit their friends. Each UID could be used to access the questionnaire up to 10 times. If more than five referrals completed the survey, we allowed the first five who completed the survey to refer their peers. The last five were thanked and compensated for completing the survey. Survey data were screened for duplicate and fraudulent cases ($n = 675$; 16% of all completed entries received) in an effort to preserve data quality (Bauermeister et al., 2012a). All study procedures were reviewed and approved by the University of Michigan Institutional

TABLE 1. Sample descriptors ($N = 3,448$)

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	%
Demographics				
Race/ethnicity				
African American			167	4.9
Asian/Pacific Islander			398	11.7
Hispanic/Latino			288	8.5
White			2,387	70.3
Native American			29	0.9
Other			47	1.4
Multiracial			79	2.3
Age, in years	20.78	1.76		
Sex				
Female			1,642	48.4
Male			1,745	51.6
Average hours of Internet use per day, (range: 1–8 hours)	3.84	1.32		
Level of education				
Eighth grade or less			5	0.1
Some high school			127	3.7
Graduated high school			781	23.1
Technical school, associate's degree, or some college			1,826	53.8
College			489	14.4
Some graduate school			129	3.8
Graduate school			36	1.1

Review Board, and data are protected by a Certificate of Confidentiality.

Study sample

The demographic characteristics for the study sample ($N = 3,448$) are displayed in Table 1.

Measures

Alcohol and marijuana use. Participants were asked to indicate what substances they had ever used in their lifetime (Johnston et al., 2011). Substances included alcohol, cigarettes, marijuana, cocaine, Ecstasy (3,4-methylenedioxymethamphetamine [MDMA]), hallucinogens, and nonprescription drugs. If alcohol was selected, we then assessed participants' frequency of alcohol use in the past 30 days (0 = *never*, 1 = *once a month or less*, 2 = *2–3 times a month*, 3 = *about once a week*, 4 = *2–6 times a week*, 5 = *about once a day*, 6 = *more than once a day*). For participants who selected marijuana, we then assessed their frequency of marijuana use in the past 30 days (same response options as for alcohol use). Participants who had never used alcohol or marijuana were coded as *never* in the past 30 days. Because of relatively low rates of marijuana use (skew), the variable was recoded into four categories for analysis (0 = *never*, 1 = *3 or fewer times a month*, 2 = *1–6 times a week*, 3 = *daily use*).

Anticipated regret. Anticipated regret was assessed with a four-item scale that examined young adults' perceptions that AOD use online (through posting pictures, etc.) could

have negative consequences in their social lives. Two items reflected parental attitudes, and two items reflected peer attitudes, respectively (i.e., My [parents/peers] would be upset if they found online pictures of me drinking and My [parents/friends] would be upset if they found online pictures of me using drugs). Response options ranged from 0 (*strongly disagree*) to 4 (*strongly agree*). We computed a mean composite score across the four items ($\alpha = .75$). Higher scores indicated higher anticipated regret norms.

Alcohol and other drug use online norms. Online promotive norms regarding AOD use (i.e., participants' attitudes about posting pictures of AOD use on social networking sites) was assessed with a five-item scale (e.g., Everybody posts pictures where they are drinking or My friends think it's cool to post pictures of themselves using drugs in their profiles). Response options ranged from 0 (*strongly disagree*) to 4 (*strongly agree*). We computed a mean composite score across the five items ($\alpha = .82$). Higher scores indicated higher online promotive norms.

Online alcohol prevalence. How many alcohol-related pictures and posts respondents and their friends put on social networking sites was assessed with five items (e.g., How many of the pictures in your social networking profile show you consuming alcohol? How many of your friends have posted a message on your wall regarding getting drunk?). Response options ranged from 0 (*none*) to 4 (*almost all*). We computed a mean composite score across the five items ($\alpha = .86$). Higher scores indicated a higher prevalence of alcohol content on social networking sites.

Peer support. Support from friends was assessed with a five-item social support scale adapted from the Perceived Social Support from Friends Scale (e.g., I rely on my friends for emotional support) (Bryant and Zimmerman, 2002; Procidano and Heller, 1983). Response options ranged from 1 (*not true*) to 5 (*very true*). We computed a mean composite score across the five items ($\alpha = .92$). Higher scores indicated more peer support.

Online peer support. Online peer support was measured with the same five-item social support scale but reworded to assess their relationships with primarily online friends (e.g., I rely on my online friends for emotional support) (Bryant and Zimmerman, 2002; Procidano and Heller, 1983). Participants were instructed to answer online social support items for peers they had only met online, not their face-to-face peers. Response options ranged from 1 (*not true*) to 5 (*very true*). We computed a mean composite score across the five items ($\alpha = .96$). Higher scores indicated more support from their online peers/friends.

Peer substance (alcohol or other drug) use. Peer substance use during the past 12 months was assessed with four items (i.e., How many of your friends [a] drank beer or wine at least once a month, [b] drank distilled spirits at least once a month, [c] had a drug problem, and [d] smoked marijuana at least once a month?) (Elkington et al., 2011). Response

TABLE 2. Descriptive statistics for study variables ($n = 3,395$)

Variable	<i>M</i>	<i>SD</i>	Range
Independent variables			
Prevalence of alcohol content online ^a	1.22	0.76	0–4
Promotive alcohol or other drugs norms online ^b	1.27	0.82	0–4
Anticipated regret ^b	2.55	0.92	0–4
Peer support ^c	3.60	0.98	1–5
Online peer support ^c	2.03	1.12	1–5
Peer substance use ^d	2.83	0.89	1–5
Dependent variables			
Past-30-day alcohol use ^e	1.67	1.55	0–5
Past-30-day marijuana use ^f	0.36	0.75	0–3

^aMeasured on 5-point scale where 0 = none, 1 = a few, 2 = some, 3 = most, 4 = almost all; ^bmeasured on 5-point scale where 0 = strongly disagree, 1 = disagree, 2 = neither agree or disagree, 3 = agree, 4 = strongly agree; ^cmeasured on 5-point scale where 1 = not true, 2 = a little true, 3 = somewhat true, 4 = pretty true, 5 = very true; ^dmeasured on 5-point scale where 1 = none, 2 = a few, 3 = some, 4 = most, 5 = I don't know; ^emeasured on 5-point scale where 0 = never, 1 = once a month or less, 2 = 2–3 times a month, 3 = about once a week, 4 = 2–6 times a week, 5 = one or more times a day; ^fmeasured on a 4-point scale where 0 = never, 1 = 3 or fewer times a month, 2 = 1–6 times a week, 3 = daily use.

options ranged from 1 (none) to 4 (most). We computed a mean composite score across the four items ($\alpha = .80$). Higher scores indicated more peer substance use.

Demographic characteristics. Participants were asked to report their biological sex (1 = male, 2 = female) and level of education (1 = eighth grade or less, 2 = some high school, 3 = graduated high school, 4 = technical school, 5 = associate degree, 6 = some college, 7 = college, 8 = some graduate school, 9 = graduate school). For analysis, technical school, associate degree, and some college were

combined into a single category. Participants were asked to indicate whether they were Hispanic or Latino (1 = yes, 2 = no) and to report their race/ethnicity. Based on the responses to the two items, a race/ethnicity variable was created (1 = African American/Black, 2 = Asian/Pacific Islander, 3 = White/European American, 4 = Native American, 5 = other, 6 = multiracial, 7 = unknown, 8 = Hispanic/Latino). For analysis, we created a dichotomous variable (1 = White; 0 = all other racial/ethnic groups). We also asked participants to estimate the amount of time they spend online in an average week (i.e., On average, how many hours per day do you spend on the Internet [i.e., online] outside of your school or work responsibilities?) Response options ranged from 1 (no hours) to 8 (16 hours or more). Participants were asked to report their date of birth. For analysis, we created a dichotomous variable (1 = age 21 years or greater, 0 = age 20 years or less) to account for legal drinking age.

Data analytic strategy

Pearson's correlations were used to examine bivariate relationships between study variables. Multivariate regression analyses examined whether independent variables were associated with alcohol and marijuana use, respectively. All analysis were completed in SPSS 19.0 (SPSS Inc., Chicago, IL). Sampling weights were applied to correct for intraclass correlations that resulted from the webRDS referral procedures (Volz and Heckathorn, 2008). The sampling weights were computed based on the participants' social network characteristics and are described in

TABLE 3. Bivariate correlations between study variables

	Prevalence of alcohol content online	Promotive AOD norms online	Anticipated regret	Peer support	Online peer support	Peer substance use	Past-30-day alcohol use	Past-30-day marijuana use	White	Sex	Internet use	Education	Age 21 years and older
Prevalence of alcohol content online	1.00												
Promotive AOD norms online	.53**	1.00											
Anticipated regret	-.28**	-.10**	1.00										
Peer support	.12**	-.04	.16**	1.00									
Online peer support	.02	.04	-.003	.12**	1.00								
Peer substance use	.54**	.32**	-.17**	.20**	-.03	1.00							
Past-30-day alcohol use	.51**	.20**	-.27**	.16**	-.07	.55**	1.00						
Past-30-day marijuana use	.24**	.11**	-.22**	.04	-.03	.36**	.40**	1.00					
White	.08*	-.01	.02	.10**	-.05	.18**	.15**	.06	1.00				
Sex	.04	-.003	.14**	.29**	-.003	.05	-.01	-.10**	.01	1.00			
Internet use	.03	.03	-.03	.04	.22**	-.001	.01	-.03	-.12**	-.05	1.00		
Education	.14**	-.01	-.07*	.04	.03	.10*	.19**	-.03	.03	.07*	.02	1.00	
Age 21 years and older	.10**	-.01	-.11**	-.01	.07	.04	.16**	-.05	-.03	.04	.16**	.46**	1.00

Note: AOD = alcohol or other drugs.

*Significant at the .05 level (two-tailed test); **significant at .01 level (two-tailed test)

TABLE 4. Multivariate regression models for alcohol and marijuana use ($n = 817$)

Variable	Alcohol use		Marijuana use	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Constant	-0.45	0.35	0.26	0.19
Prevalence of alcohol content online	0.56**	0.09	—	—
Anticipated regret	-0.23**	0.06	-0.12**	0.03
Promotive AOD norms online	-0.12	0.07	-0.02	0.04
Online peer support	-0.09*	0.04	-0.003	0.03
Peer support	0.10	0.05	0.02	0.03
Peer substance use	0.61**	0.06	0.28**	0.03
Sex	-0.16	0.10	-0.15**	0.06
Education	0.14**	0.06	-0.05	0.03
Age 21 years or older	0.20	0.11	-0.06	0.06
Internet use	-0.01	0.04	-0.02	0.02
White	0.16	0.11	0.01	0.06
R^2	.43		.17	

Note: AOD = alcohol or other drugs.

* $p < .05$; ** $p < .01$.

more detail in Bauermeister and colleagues (2012b). Descriptive statistics are reported for the unweighted sample. Multivariate regression models were completed using the weighted sample ($n = 817$).

Results

Table 2 provides descriptive data for the focal independent variables (AOD online norms, peer substance use, and peer support variables) and the dependent variables (30-day alcohol and marijuana use). Table 3 provides correlations between the independent variables, the demographic covariates, and peer AOD use variables.

Multivariate models

Results for each model (alcohol use and marijuana use) are shown in Table 4. Greater alcohol content online ($b = 0.56$, $p < .01$) and peer AOD use ($b = 0.61$, $p < .01$) were associated with higher levels of alcohol use. Conversely, higher levels of anticipated regret ($b = -0.23$, $p < .01$) and more online peer support ($b = -0.09$, $p < .05$) were associated with less alcohol use. Young adults with greater educational attainment were more likely to report more alcohol use ($b = 0.14$, $p < .01$). We found no relationship between alcohol use and offline peer support, Internet use, promotive AOD online norms, sex, age, or race/ethnicity.

Peer AOD use was positively associated with marijuana use ($b = 0.28$, $p < .01$), whereas perceptions that acknowledging drug use online could have damaging effects was negatively related to marijuana use ($b = -0.12$, $p < .01$). Women were less likely than men to report marijuana use ($b = -0.15$, $p < .01$). We found no association between marijuana use and promotive AOD norms online, online or offline peer support, education, age, Internet use, or race/ethnicity.

Discussion

Online interactions may facilitate opportunities to promote or deter substance use among young adults. Consistent with prior findings that suggest AOD content on social networking websites might increase alcohol use among college students (Moreno et al., 2012; Ridout et al., 2012), we found that young adults who reported a greater prevalence of alcohol content (e.g., pictures, wall posts) in their online profiles were also more likely to report greater alcohol use frequency in the past 30 days. Curiously, once the prevalence of alcohol content was accounted for, we found no relationship between promotive AOD norms online and alcohol use. One plausible explanation for these discrepant findings may be attributed to how peer substance use is being presented. Young adults may be more likely to engage in substance use if they see (visualize) more images of their peers drinking alcohol rather than just making attributions about their peers' beliefs about their alcohol use. This is consistent with theory and findings that observational learning and peer modeling influence behavior (Bandura, 1986; Borsari and Carey, 2001, 2006; Schunk, 1987). For example, Wood and colleagues (2001) examined social influences (i.e., social modeling, perceived norms) on college student drinking and found that social modeling had the strongest association with alcohol use and problematic alcohol use. Posting images on social networking sites provides a new and additional venue for observing peer drinking behavior. Conversely, consistent with prior research focused on anticipated regret (Cooke et al., 2007; Sandberg and Conner, 2008), young adults who were able to think about the repercussions of their online AOD posts and conversations reported less alcohol use. Taken together, our findings suggest that online campaigns seeking to reduce alcohol consumption among young adults may benefit from persuasive visual content (e.g., images, pictures) that discourage the promotion of alcohol content in their social networks as well as opportunities for young adults to consider the negative consequences of their behavior.

We found no support for the relationship between promotive online norms and marijuana use. One plausible explanation for the lack of findings is the increased stigma surrounding marijuana use. In support of this interpretation, we found that young adults who reported greater anticipated regret about AOD use reported fewer occasions of marijuana use in the past 30 days. Young adults may be more careful about posting any messages or pictures that may be interpreted as promoting an illegal substance or that suggest that they use marijuana, particularly given the increasing awareness that potential employers may examine online profiles as part of the hiring process. Furthermore, it may be possible that young adults access websites other than social networking sites to discuss marijuana and other drugs, where posting pictures or comments is less common. However, our current study did not assess factors related to the prevalence

of marijuana content online. Future research that examines how young adults use the Internet to find information about and/or discuss their illicit drug use may be warranted.

Whether online or offline, our findings underscore the importance of AOD use as a socializing behavior. We found strong associations between peer AOD use and participant alcohol and marijuana use, respectively. This link is consistent with previous studies that identify peer substance use as one of the strongest predictors of AOD use among young adults (Donato et al., 1994; Hawkins et al., 1992; Rai et al., 2003; Windle, 2000). Whether it is attributable to selection or socialization, peer substance use continues to play an influential role in young adult substance use. In addition, we found that young adults who had greater emotional support from online friends were also less likely to report recent alcohol use but no association between in-person peer support and alcohol use. These findings are surprising because prior research suggests a relationship between peer support and AOD use (Cho, 2006; Cox and Bates, 2011; Neighbors et al., 2008). Because it is atypical for young adults to drink alone (Christiansen et al., 2002), it may be that young people who spend more time with friends online have less social contact offline with peers who use alcohol and, therefore, are drinking less alcohol. This interpretation is consistent with prior research linking larger in-person social networks and greater amounts of social contact to alcohol use (Fondacaro and Heller, 1983). Nevertheless, our findings may need to be interpreted cautiously because our measures of online and in-person peer support were the same except for the modification of which friends they were asked about, and the distinction between online and face-to-face networks may be disappearing. We did, however, instruct participants to answer online social support items for peers they had only met online, not their face-to-face peers. In addition, although the dimensions of support may differ somewhat for online and face-to-face relationships, it is also likely that several aspects may be the same, especially with the advent of social networking sites and video calling capabilities. Moreover, we were interested in assessing how the same aspects of support may differ for both groups of peers. Although our current study examined differences in online and in-person peer support, it remains unclear who comprises these online networks, the characteristics of these relationships (e.g., duration, closeness, intimacy, trust), and how they may differ from relationships built and maintained offline. Future research examining these relationships may inform subsequent online network interventions.

To our knowledge, this is the first study to specifically examine the relationship between self-report online norms and AOD use among young adults. In addition, we were able to examine the association between online norms and AOD use in a large national sample of 18- to 24-year-olds. To date, most studies of norms and AOD use have focused on small samples of college students, limiting generalizability

to a broader population of young adults (Borsari and Carey, 2001).

Limitations

Despite the strengths of the current study, limitations should be noted. First, because the study was cross-sectional, we cannot assert that the associations reported are causal. Future studies should explore the effects of online technologies on young adult alcohol and marijuana use over time. Second, although we have a large national sample of young adults, the characteristics of our sample limits the generalizability of our findings. Our sample was predominantly college educated and White. African American, Latino, and other minority emerging adults were underrepresented in our sample, as were youth of lower socioeconomic status and/or those with lower levels of academic achievement. In addition, our sample was recruited through Facebook, and participants completed the survey online. This method of recruitment and data collection may have contributed to the characteristics of our sample and may reflect the large racial and ethnic disparities in when, where, and how long youth can stay online. In 2010, 56% of African Americans had broadband access compared with 67% of Whites. Blacks and Latinos were more likely than Whites to use the Internet and social networking sites on their cell phone (Smith, 2010). Public or mobile phone access may limit what can be done online, including taking the survey. Based on these characteristics, our findings may be less applicable for young adults in minority and lower socioeconomic status groups. Future research that explores these issues in other samples of young adults would be useful. Finally, it is possible that the differences we found between online and face-to-face support could be a function of the measure of support we used for both groups. If online support is qualitatively different from face-to-face support, then our findings may be a result of not assessing the appropriate dimensions of support for online. Yet, our measure assessed dimensions that are logically relevant for both online and face-to-face contacts. It remains an empirical question, however, whether and how online and face-to-face support may differ. Although this is beyond the scope of our study, it is a question that our study findings suggest would be a useful direction for future research.

Overall, our findings support the idea that online technologies are another mechanism whereby young adults socialize about substance use and point to the potential of AOD health promotion messages for young adults through online technologies. Our findings suggest that visualizing pictures of their peers' AOD use may be more influential than words. Thus, online intervention and prevention messages should consider incorporating images because pictures may help young adults grasp important AOD use information. Because concern about the consequence of posting AOD use online

was linked to less alcohol or marijuana use, interventions that focus on how substance use and online behaviors affect health and quality-of-life issues may be an avenue for health promotion and substance use prevention programming. Online technology may function as a mechanism for increasing awareness about the consequences of AOD use behavior.

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