Informing Alcohol Interventions for Student Service Members/ Veterans: Normative Perceptions and Coping Strategies

Mary Beth Miller[a,b], **Emma I. Brett**[b], **Eleanor L. Leavens**[b], **Ellen Meier**[b,c], **Brian Borsari**[a,d], and **Thad R. Leffingwell**[b]

[a]Department of Behavioral and Social Sciences, Center for Alcohol and Addiction Studies, Brown University, Box G-S121-4, Providence, RI 02912, USA

[b]Department of Psychology, Oklahoma State University, 116 North Murray, Stillwater, OK 74078, USA

[c]Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina, 67 President Street, Charleston, SC 29425, USA

[d]Mental Health and Behavioral Sciences Service, Department of Veterans Affairs Medical Center, 830 Chalkstone Avenue, Providence, RI 02908, USA

Abstract

Objective—The current study aimed to inform future interventions for heavy alcohol use and problems among college students by examining the utility of normative perceptions and coping strategies in predicting alcohol use among student service members/Veterans (SSM/Vs).

Methods—SSM/Vs and civilian students ($N = 319$) at a large university in the Southern Plains completed self-report measures of demographics, alcohol use and related behaviors, and coping strategies.

Results—Both SSM/Vs and civilian students significantly overestimated the typical weekly drinking quantities and frequencies of same-sex students on campus. Among SSM/Vs, normative perceptions of typical student (not military-specific) drinking and substance-related coping strategies significantly predicted drinks consumed per week, while substance-related coping predicted alcohol-related consequences.

Conclusions—Despite the theoretical importance of similarity to normative referents, military-specific norms did not significantly improve the prediction of SSM/Vs' personal drinking behavior. Moreover, neither typical student nor military-specific norms predicted alcohol-related consequences among SSM/Vs after accounting for substance-related coping strategies. Future

Correspondence concerning this article should be addressed to Mary Beth Miller, Department of Behavioral and Social Sciences, Center for Alcohol and Addiction Studies, Box G-S121-5, Providence, RI, 02912. Phone: 573.619.1538. Fax: 401.863.6647. mary_miller@brown.edu..
emma.brett@okstate.edu / leavens@ostatemail.okstate.edu / thad.leffingwell@okstate.edu, ellen.meier@okstate.edu, brian_borsari@brown.edu

research may examine the efficacy of descriptive normative feedback and the importance of military-specific norms in alcohol interventions for SSM/Vs.

1. Introduction

Heavy drinking (consumption of 5 or more drinks on one occasion) has remained at a relatively stable 20 percent among military personnel since the 1980s (Ames & Cunradi, 2004/2005; Bray et al., 2010; Brown, Bray, & Hartzell, 2010), with rates even higher (33.3%) among military-affiliated students in the college setting (Boynton Health Service, 2012). However, research examining patterns of alcohol use among student service members/Veterans (SSM/Vs) is limited (Barry, Whiteman, & MacDermid Wadsworth, 2012a; Barry, Whiteman, MacDermid Wadsworth, & Hitt, 2012b; Whiteman & Barry, 2011; Widome, Laska, Gulden, Fu, & Lust, 2011). Studies including both student Veterans and active duty student service members have found that SSM/Vs drink at rates similar to their civilian peers, although binge drinking among SSM/Vs is associated with more consequences and mental health problems (Barry et al., 2012a,b). Conversely, in a survey of over 300 student Veterans (excluding active duty student service members), Veterans reported drinking more (past month, past year, and per occasion) than civilian students but did not differ significantly from their civilian peers in prevalence of high-risk drinking, estimated blood alcohol concentrations, or alcohol-related consequences (Boynton Health Service, 2012). Given the discrepancy of these findings, the extent to which interventions designed for civilian students may generalize to SSM/Vs is unclear.

Personalized feedback interventions (PFIs), which provide information on the normative nature and personal consequences of drinking, are the most widely used and empirically supported alcohol interventions for adults and college students to date (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Riper et al., 2009). Among civilian college students, the most consistent mechanism of action in interventions for alcohol misuse has been change in descriptive norms, or perceptions of how much or how often one drinks in comparison to similar peers (Borsari & Carey, 2000; Doumas, Haustveit, & Coll, 2010; Kulesza, McVay, Larimer, & Copeland, 2013; Larimer & Cronce, 2007; Neighbors, Larimer, & Lewis, 2004; Turrisi et al., 2009; Walters et al., 2009). According to Social Comparison and Social Identity Theories, these comparisons are effective in changing behavior, at least in part, because college students lack objective measures of appropriate drinking and make decisions regarding their drinking based on comparisons to individuals they perceive as similar to themselves in opinion, personality, background, and/or lifestyle (Cialdini, 1995; Festinger, 1957; Gilbert, Giesler, & Morris, 1995; Tajfel, 1982). Preliminary data indicate that PFIs are also effective in reducing drinking quantity and frequency among active duty military personnel (Pemberton et al., 2011), with outcomes mediated by changes in perceptions of how one's drinking compares to that of active duty service members of the same age (Williams, Herman-Stahl, Calvin, Pemberton, & Bradshaw, 2009). This implies that military-specific normative referents may be helpful in eliciting behavior change among

military personnel. To our knowledge, however, no studies have examined normative perceptions of alcohol use among college SSM/Vs. Because SSM/Vs may not readily identify with civilian peers, they may not be motivated to drink in ways that they perceive as consistent with the typical college student. Increased understanding of SSM/Vs' patterns and perceptions of drinking in comparison to their civilian peers is needed in order to inform intervention and prevention efforts.

Coping behaviors may also have a differential impact on the drinking patterns of SSM/Vs, as those who have been exposed to combat are at greater risk of symptoms related to post-traumatic stress (Barry et al., 2012a). From a social learning perspective, individuals who expect that drinking will ameliorate negative affect may use alcohol in place of more adaptive coping and social skills (Bandura, 1998; Cooper, Russell, & George, 1988). Consistent with this theory, coping motives for alcohol use have been linked to heavy alcohol use among both SSM/V and civilian college student groups (Cooper et al., 1988; Whiteman & Barry, 2011); however, they seem to play a particularly important role in heavy alcohol use and alcohol-related consequences among SSM/Vs (Whiteman & Barry, 2011). Avoidant coping has also been found to predict continued problematic drinking following discharge from military service (Norman, Schmied, & Larson, 2014). Based on these data, avoidant coping strategies may serve as an important risk factor for alcohol-related consequences among SSM/Vs and, therefore, may be an important target for interventions.

The current study aimed to inform future interventions for college alcohol misuse by improving understanding of the normative comparisons and coping behaviors that may impact behavior change among SSM/Vs. We examined four hypotheses. First, consistent with previous studies of SSM/Vs (Barry et al., 2012b), it was hypothesized that SSM/Vs' drinking patterns would be similar to those of their civilian peers. Second, because research has found consistently that individuals who engage in high-risk drinking misperceive the alcohol use of their peers (Lewis & Neighbors, 2006; Perkins, Haines, & Rice, 2005), it was expected that SSM/Vs would overestimate drinking of both typical and military-affiliated college students. Third, because both avoidant coping and coping-related motives for substance use have been linked to problematic drinking among military personnel (Norman et al., 2014; Whiteman & Barry, 2011), it was expected that (a) avoidant and substance-related coping strategies would predict increased drinking and alcohol-related consequences among SSM/Vs and (b) coping strategies would account for a greater amount of variance in alcohol use outcomes among SSM/Vs than civilian college students. Finally, because normative misperceptions have been linked to personal drinking behaviors in a number of previous studies (Lewis & Neighbors, 2006; Perkins et al., 2005), it was hypothesized that (a) both military-specific and typical student norms would predict alcohol use and consequences among SSM/Vs after accounting for demographic variables and coping strategies and (b) typical but not military-specific norms would predict alcohol use outcomes among civilian college students.

2. Material and methods

2.1 Participants and Procedure

Undergraduate students at a large, public university in the Southern Plains were recruited via campus flyers, snowball sampling, and a research pool of introductory psychology and speech students to participate in an online study of student perceptions of alcohol and drug use. Student service members/Veterans (SSM/Vs) were also recruited directly via email. After providing informed consent, participants completed an online assessment of demographic variables, substance use, and perceptions of peers' substance use online from remote locations. Students in introductory classes received course credit in exchange for their participation, and all participants' names were entered into a raffle of eight $25 pre-paid VISA gift cards. Participants' names were entered once for their participation and once again for every referral they made to the study.

2.2 Measures

2.2.1 Demographics—Participants provided information regarding their gender, age, military status, year in school, race/ethnicity, marital status, and sexual orientation. Military status options included none, active duty, reserves, honorably discharged, dishonorably discharged, other than honorably discharged, and prefer not to respond. Those who indicated military affiliation were then asked to indicate their branch of service and number of deployments.

2.2.2 Alcohol use—Typical drinking quantity and frequency were assessed using the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985), which has been used in numerous studies of college student drinking (Larimer et al., 2007; Marlatt et al., 1998). Participants estimated the number of standard drinks they consumed and hours spent drinking on each day of a typical week in the past month. They also estimated the number of drinks consumed and hours spent drinking on their heaviest drinking occasion in the past month. Frequency of binge drinking was obtained using a gender-specific question that asked women/men to report the number of times per month they consume four/five or more drinks in a two-hour period (NIAAA, 2004).

2.2.3 Alcohol-related consequences—Past-month alcohol-related consequences were assessed using the 24-item Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ; Kahler, Strong, & Read, 2005; Kahler, Hustad, Barnett, Strong, & Borsari, 2008). Participants indicated their agreement (yes/no) with items such as, "I have said or done embarrassing things while drinking," and, "I have passed out from drinking." The B-YAACQ has demonstrated high internal consistency in research with college students (α = .89; Kahler et al., 2005) and in this sample (α = .95).

2.2.4 Descriptive normative perceptions (norms)—Perceptions of peers' drinking behaviors (descriptive norms) were obtained using the Drinking Norms Rating Form (Baer, Stacy, & Larimer, 1991). Participants estimated the number of standard drinks they believe the *typical male/female student* consumes on each day of a typical week in the past month. In addition, they estimated the number of standard drinks they believe the *typical male/*

female student in the military consumes on each day of a typical week. For both ratings, scores were summed to calculate the perceived quantity of same-sex peers' drinking in a typical week. In final analyses, normative perceptions were recoded such that each students' descriptive norm value was sex-specific (i.e., 'typical student drinks per week' estimations for male students reflect perceptions of the typical *male* student, while 'typical student drinks per week' estimations for female students reflect perceptions of the typical *female* student).

2.2.5 Coping strategies—The 28-item Brief COPE (Carver, 1997) was used to assess participants' use of 14 coping strategies. In contrast to the original measure, which specifies an event with which one has been coping, instructions for the current study began, "These items deal with ways you've been coping with the stress in your life." Participants were asked to indicate how frequently they engage in various coping behaviors (e.g., "Turn to work or other activities to take my mind off things," and, "Get emotional support from others") on a scale from one ("I don't do this at all") to four ("I do this a lot"). Avoidant coping was measured using two reverse-scored items, "I concentrate my efforts on doing something about the situation I'm in," and, "I take action to try to make the situation better." Substance-related coping was measured by the items, "I use alcohol or other drugs to make myself feel better," and, "I use alcohol or other drugs to help me get through it." For each subscale (coping strategy), items were summed to create total scores. The Brief COPE has demonstrated adequate test-retest reliability among community samples of adults (Carver, 1997). In the current sample, the full scale (α = .91) and substance-related (α = .87) and avoidant coping (α = .80) subscales demonstrated acceptable internal consistency.

2.3 Data Screening and Analysis Plan

A sample of 412 college students (n = 122 SSM/Vs) participated in a larger study examining differences in patterns of substance use across male and female SSM/Vs and civilian students on campus. The current study examined the subset of those participants (N = 324; n = 105 SSM/Vs) who reported alcohol consumption in the past year. Those included in analyses were more likely than those excluded to be male [χ^2 (1, N = 395) = 30.48, p < .001] and civilian [χ^2 (1, N = 394) = 14.21, p < .001]. There were no differences between those included or excluded in ethnicity [χ^2 (1, N = 389) = 0.07, p = .79], age [t(393) = 1.59, p = .11], class year [χ^2 (3, N = 377) = 7.34, p = .06], marital status [χ^2 (1, N = 378) = 0.38, p = .54], or fraternity/sorority affiliation [χ^2 (1, N = 393) = 0.83, p = .36]. Of those included, five additional participants were excluded for self-reported dishonesty on the questionnaire.

Data were screened for outliers, missing values, and violations of assumptions of analysis of covariance. Outliers were replaced with the value that was three standard deviations and one integer above the mean (Tabachnick & Fidell, 2006). After recoding outliers in this way, skewness and kurtosis estimates fell within the normal range (Kline, 2011). No imputation procedures were used for missing values comprising less than 5% of participants' data; therefore, sample sizes vary across analyses. Although the standard deviations for mean estimates varied considerably across groups (see Table 1), larger variances were generally associated with larger, rather than smaller, group sizes, indicating that the *F*-statistic

depicted is likely conservative and that the population variances may reflect nonnormality in the true populations (Stevens, 2009).

Chi-square and analysis of variance were used to examine demographic differences between groups. Univariate analyses of covariance were used to determine between-group differences in drinking-related outcomes across male and female SSM/V and civilian groups (Hypothesis 1). Analyses controlled for age and marital status, both of which have been associated with heavy drinking (Donovan, Jessor, & Jessor, 1983; Jackson, Sher, Gotham, & Wood, 2001; Lee, Chassin, & MacKinnon, 2015), because SSM/Vs tend to be older and are more likely than civilian students to be married (Whiteman & Barry, 2011). Effect sizes were calculated using eta-squared (Cohen, 1973), and Bonferroni's adjustment was used to control for inflation in Type I error in post hoc comparisons. One-sample t-tests were used to determine the accuracy of SSM/Vs' perceptions of typical and military-affiliated college students' drinking (in comparison to true drinking patterns reported by the current sample), and paired samples t-tests were used to determine differences in their perceptions of typical versus military-affiliated college students' alcohol use (Hypothesis 2). Finally, standard linear regression was used to determine the utility of normative perceptions and coping behaviors in predicting alcohol-related outcomes (drinks per week, alcohol-related consequences) among SSM/Vs and civilian students (Hypotheses 3 and 4). Effect sizes for regression parameter estimates were calculated using the formula $d = 2t/df$ (Rosenthal & Rosnow, 1991).

3. Results

3.1 Sample characteristics

Three hundred nineteen participants (62% male, 77% White) reporting alcohol use in the past year were included in current analyses. Chi-square and analysis of variance techniques were used to determine demographic differences between groups. The majority of SSM/Vs ($n = 105$) were heterosexual, Caucasian men over the age of 21 years who had been deployed and were unaffiliated with a sorority/fraternity (see Table 1). SSM/Vs ($M = 25.88$, $SD = 6.40$) were older than civilian participants [$M = 19.70$, $SD = 2.64$; $t(122) = -9.50$, $p < .001$, $CI_{95} = -7,46, -4.89$]. They were also more likely than civilian participants to be married [21% vs. 3%; $\chi^2(1) = 26.32$, $p < .001$, Cramer's V = .29] and to identify with the LGBTQ community [12% vs. 4%; $\chi^2(1) = 7.16$, $p = .01$, Cramer's V = .15]. Represented branches of the military included Army (51%; 1 active duty, 32 reserves, 21 Veteran), Air Force (20%; 3 active duty, 11 reserves, 7 Veteran), Marine Corps (16%; 2 reserves, 15 Veteran), and Navy (12%; 3 reserves, 10 Veteran). Female SSM/Vs ($n = 22$) were represented in all branches: Army ($n = 9$), Marine Corps ($n = 1$), Navy ($n = 6$), and Air Force ($n = 6$). Forty-nine percent of SSM/Vs reported being deployed at least once (range = 0-6). Among SSM/Vs, 18 (17%) reported using substances to cope with stress a moderate amount or a lot of the time, and 9 (9%) reported using avoidant coping strategies a moderate amount or a lot of the time.

3.2 Group differences in alcohol use and related behaviors

Univariate analyses of covariance, controlling for age and marital status, were used to determine differences in drinking-related outcomes across male and female SSM/V and civilian groups (see Table 1 for complete descriptive and statistical information). Between-group effect sizes were calculated using η^2 (Cohen, 1973). Post hoc comparisons were conducted on all significant main effects, using Bonferroni's adjustment ($\alpha = .05/6 = .008$) to control for inflation in Type I error.

After accounting for differences in age and marital status, there were no significant differences in drinking outcomes within male (SSM/V vs. civilian) or female (SSM/V vs. civilian) groups (see Table 1). However, male participants (both SSM/Vs and civilians) reported consuming significantly greater amounts of alcohol than female participants (both SSM/Vs and civilians), both in a typical week and on their heaviest drinking episode in the past month. In terms of frequency of drinking, male participants (both SSM/Vs and civilians) reported drinking more frequently in a typical week and engaging in more binge-drinking episodes per month than female civilian participants, while female SSM/Vs did not differ significantly from any other group. Accordingly, male participants (both SSM/Vs and civilians) also reported experiencing a greater number of alcohol-related consequences than female civilians.

3.3 Descriptive normative perceptions of drinking among SSM/Vs

One-sample t-tests were used to determine if SSM/Vs overestimated the quantity and frequency of drinking among same-sex 'typical' and 'military-affiliated' college students, and paired samples t-tests were used to determine if SSM/Vs' perceptions of typical versus military-affiliated college students' drinking were significantly different. True drinking patterns reported by the current sample, which were used as test values in one-sample t-test analyses, are depicted in Table 1. Given that outcomes were designed to inform interventions for SSM/Vs, only SSM/Vs ($n = 105$) were included in analyses.

Male SSM/Vs significantly overestimated the weekly drinking quantities of both typical male [$M_{\text{perceived}} = 19.71$, $M_{\text{actual}} = 11.47$; $t(77) = 5.66$, $p < .001$, $CI_{95} = 5.34, 11.13$] and military-affiliated male students [$M_{\text{perceived}} = 21.59$, $M_{\text{actual}} = 8.98$; $t(77) = 7.73$, $p < .001$, $CI_{95} = 9.36, 15.86$]. They also overestimated the frequency of drinking among typical [$M_{\text{perceived}} = 4.05$, $M_{\text{actual}} = 2.06$; $t(77) = 8.23$, $p < .001$, $CI_{95} = 1.51, 2.47$] and military-affiliated [$M_{\text{perceived}} = 4.17$, $M_{\text{actual}} = 2.01$; $t(77) = 8.59$, $p < .001$, $CI_{95} = 1.66, 2.66$] college students in a typical week. Their estimations of typical versus military-affiliated students' weekly drinking quantities [$t(77) = 1.52$, $p = .13$, $CI_{95} = -4.35, 0.58$] and frequencies [$t(77) = 0.51$, $p = .61$, $CI_{95} = -0.57, 0.34$] were not significantly different.

Female SSM/Vs also overestimated the typical weekly drinking quantities of both typical female [$M_{\text{perceived}} = 10.69$, $M_{\text{actual}} = 3.43$; $t(19) = 6.38$, $p < .001$, $CI_{95} = 4.62, 9.12$] and military-affiliated female students [$M_{\text{perceived}} = 10.30$, $M_{\text{actual}} = 3.50$; $t(19) = 3.39$, $p = .003$, $CI_{95} = 2.52, 10.68$]. In addition, they overestimated the frequency of drinking among both typical [$M_{\text{perceived}} = 3.50$, $M_{\text{actual}} = 1.07$; $t(19) = 5.70$, $p < .001$, $CI_{95} = 1.54, 3.32$] and military-affiliated female students [$M_{\text{perceived}} = 2.85$, $M_{\text{actual}} = 1.59$; $t(19) = 2.61$, $p = .02$,

CI$_{95}$ = 0.25, 2.27]. Similar to findings for male SSM/Vs, they believed that civilian and military-affiliated female students drank similar quantities [$t(19) = 0.12$, $p = .90$, CI$_{95}$ = −3.18, 3.58] at similar frequencies per week [$t(19) = 1.58$, $p = .13$, CI$_{95}$ = −0.21, 1.51].

3.4 Importance of descriptive norms and coping strategies in predicting alcohol use and consequences

Standard linear regression was used to determine the utility of normative perceptions and coping behaviors in predicting alcohol-related outcomes among SSM/Vs and civilian students. Four separate regression models were conducted, one predicting typical weekly drinking quantity and the other predicting alcohol-related consequences among (a) SSM/Vs and (b) civilian college students. In all models, age, marital status, substance-related coping, avoidant coping, typical student quantity norms, and military-specific quantity norms were entered simultaneously. Standard, rather than sequential, regression was used to account for lack of theory guiding ordered effects. The significance of each predictor, adjusted R^2 statistics, and regression coefficients for each variable are depicted in Table 2. Effect sizes for regression parameter estimates were calculated using the formula $d = 2t/df$ (Rosenthal & Rosnow, 1991).

Among SSM/Vs, substance-related coping and typical student descriptive norms were the only significant predictors of drinking quantity or consequences (see Table 2). In the model predicting typical weekly drinking quantity, substance-related coping [$t(89) = 1.71$, $p = .001$, $d = .08$] and perceptions of greater drinking quantities among typical college students [$t(89) = 2.92$, $p = .004$, $d = .07$; Adj. $R^2 = .29$] predicted heavier personal drinking among SSM/Vs; age, marital status, avoidant coping, and military-specific norms were not significant predictors. In the model predicting alcohol-related consequences, only substance-related coping strategies [$t(87) = 5.78$, $p < .001$, $d = .13$; Adj. $R^2 = .31$] predicted greater problems with drinking among SSM/Vs.

Among civilian college students, substance-related coping and typical student norms were significant predictors of alcohol use and consequences (see Table 2). In the model predicting typical weekly drinking quantity, substance-related coping [$t(200) = 3.65$, $p < .001$, $d = .04$] and perceptions of greater drinking quantities among typical college students [$t(200) = 4.35$, $p < .001$, $d = .04$; Adj. $R^2 = .22$] predicted heavier personal drinking among civilian students; age, marital status, avoidant coping, and military-specific norms were not statistically significant predictors. In the model predicting alcohol-related consequences, only substance-related coping strategies [$t(197) = 7.71$, $p < .001$, $d = .08$; Adj. $R^2 = .26$] predicted greater problems with drinking among civilian students (see Table 2).

4. Discussion

To our knowledge, this is the first study to examine the utility of normative perceptions in predicting alcohol use among SSM/Vs. SSM/Vs in the current sample reported drinking patterns that were similar to those of their civilian peers, which is consistent with previous research including both active duty student service members and student Veterans (Barry et al., 2012b). Studies including only student Veterans found more pronounced differences in alcohol use between student Veterans and civilian students (Boynton Health Service, 2012;

Widome et al., 2011). The reason for the discrepancy between these findings is unclear. It is possible that combat exposure, rather than deployment itself, increases alcohol use among SSM/Vs (Bray, Brown, & Williams, 2013; Jacobson et al., 2008). It may also be that difficulty adjusting to civilian life following military discharge leads to high-risk drinking among Veterans (Norman et al., 2014). Regardless, it seems that a large number of both SSM/Vs and civilian students engage in problematic alcohol use.

SSM/Vs in the current study overestimated true drinking quantities and frequencies of both typical and military-affiliated student peers. Specifically, male SSM/Vs reported believing that male students consume eight more standard drinks and drink on two more days per week than they actually do. While less pronounced, female SSM/Vs estimated that female students consume six more standard drinks and drink on two more days per week than is truly the case. This suggests that descriptive normative feedback, contrasting personal alcohol use and perception of peers' drinking with peers' actual rates of drinking, may be a viable intervention strategy for SSM/Vs.

Surpisingly, perceptions of typical – but not military-affiliated – student drinking significantly predicted drinks consumed per week among SSM/Vs. This is consistent with findings that age-based norms predict alcohol use among Veterans in primary care (Aldridge-Gerry, Cucciare, Ghaus, & Ketroser, 2012) and that changes in normative perceptions lead to changes in alcohol use among active duty service members (Williams et al., 2009). However, the fact that military-specific norms did not contribute significantly to the prediction of drinking among SSM/Vs contradicts theoretical models, in which comparisons to a group perceived as more similar to the self would be expected to be more salient (Festinger, 1957). This also conflicts with recent research in which overestimations of military, but not civilian, drinking predicted personal drinking among active duty Army personnel (Neighbors et al., 2014) and young adult Veterans (Pedersen, Marshall, Schell, & Neighbors, 2015). Notably, however, neither of these studies examined military personnel in collegiate contexts. It is possible that, as SSM/Vs return to the college environment, they begin to interact and socialize with more civilian than military-affiliated peers, in which case civilian drinking norms become more salient. Consistent with the finding that SSM/Vs did not perceive significant differences between typical and military-affiliated students' drinking, it may also be that SSM/Vs perceive heavy drinking as common in both military and collegiate contexts and adapt their drinking to the perceived norms of the majority (which, on most college campuses, would be civilians). In this case, the increased specificity of the reference group may not account for unique variance in outcomes. Conversely, it may be that SSM/Vs selectively associate with more military-affiliated than civilian students (Rumann & Hamrick, 2010), in which case their perception of the 'typical student' may encompass military-specific norms.

Substance-related coping strategies were also associated with drinking outcomes among both SSM/Vs and civilian students. Consistent with previous research (Whiteman & Barry, 2011), the majority of SSM/Vs denied using alcohol to cope with stress (e.g., "I use alcohol or other drugs to make myself feel better"). Within this sample, however, use of substances to cope was the only significant predictor of alcohol-related consequences among SSM/Vs and civilian college students. This is consistent with research indicating that avoidant coping

(in this case, substance use) is related to greater alcohol use among Veterans, regardless of normative beliefs (Aldridge-Gerry et al., 2012). However, avoidant coping as measured more generally (e.g., "I take action to try to make the situation better" – reversed scored) was not significantly associated with alcohol-related consequences in this sample. Therefore, it seems that specific avoidant coping strategies (i.e., substance use) may be more indicative of alcohol-related problems than more general avoidance techniques, which theoretically may be alternated with active coping strategies.

4.1 Clinical Implications

Findings of the current study have several implications for future intervention and prevention efforts for SSM/Vs. First, personalized feedback interventions targeting misperceptions of peers' typical drinking quantities may be effective in reducing alcohol use among SSM/Vs, and military-specific norms may not be necessary in eliciting this behavior change. Previous studies have had success in predicting and changing drinking patterns among Veterans and active duty military personnel using age-based norms (Aldridge-Gerry et al., 2012; Pemberton et al., 2011). However, current findings suggest that military-specific norms may not explain unique variance in drinking outcomes among military personnel and Veterans in college. This is consistent with recent studies, in which typical student norms were more effective than gender-, race-, and Greek affiliation-specific referents in eliciting changes in alcohol use among college students (LaBrie et al., 2013) and may be due in part to the tendency for discrepancies between self and others' drinking to become less pronounced as the reference group becomes more specific (Borsari & Carey, 2003). Collectively, findings suggest that typical student norms may be sufficient for alcohol interventions targeting SSM/Vs. Moreover, based on findings that substance-related coping strategies were the only significant predictor of alcohol-related consequences among SSM/Vs and civilian students, coping-specific intervention strategies (e.g., Stasiewicz et al., 2013), which are not typically included in brief interventions for college alcohol misuse (see Miller et al., 2013), may also be helpful in eliciting changes in alcohol-related consequences among college students.

4.2 Limitations and Future Directions

The current study has several limitations worth noting. First, only 30% of the total sample was affiliated with the military, despite specific efforts to recruit SSM/Vs. However, only five percent of students on the campus where this study was conducted are SSM/Vs (70% male, 30% female); therefore, this particular limitation may speak to the potential difficulty of recruiting SSM/Vs for research studies. Future studies may consider utilizing more outreach on campus, devoting research assistants specifically to recruitment efforts, or utilizing stronger incentives for SSM/Vs in order to ensure the representativeness of SSM/V populations. Second, although it is useful in establishing proof of concept that may be utilized in future studies, the use of cross-sectional data limits our ability to infer causality between predictors and drinking outcomes. Longitudinal studies are an important next step in evaluating potential associations between normative perceptions, substance-related coping, and alcohol use within this population. Third, SSM/Vs were not asked to report their history of combat exposure in assessment measures. Military-affiliated students who have been exposed to combat are more likely to endorse symptoms of post-traumatic stress,

which have been associated with problematic drinking and alcohol-related consequences (Barry et al., 2012a). Therefore, future research may examine differences in drinking behavior among SSM/Vs as a function of combat exposure. Finally, current findings suggest that military-specific norms may be less important in predicting drinking outcomes among SSM/Vs, perhaps in part because they affiliate with or are surrounded by civilian college students; future research may examine the individuals with whom SSM/Vs typically drink when drinking socially (e.g., civilian students, other SSM/Vs, military friends).

4.3 Conclusion

Both SSM/Vs and civilian college student drinkers overestimate the alcohol use of their peers. Despite the theoretical importance of similarity to normative referents, military-specific norms did not significantly improve the prediction of SSM/Vs' personal drinking behavior when accounting for typical college student norms. Rather, greater perceived drinking among typical college students and more frequent use of substance-related coping strategies were significant predictors of greater alcohol use and/or consequences among both SSM/Vs and civilian students. Findings suggest that normative perceptions and coping behaviors may be important targets for alcohol interventions and that traditional normative interventions (which reference typical student drinking patterns) may be sufficient to motivate behavior change among SSM/Vs. Continued research is warranted on the importance of various intervention components in eliciting changes in alcohol misuse among SSM/Vs as well as their mechanisms of effect.

Acknowledgments

References

Aldridge-Gerry A, Cucciare MA, Ghaus S, Ketroser N. Do normative perceptions of drinking relate to alcohol use in US Military Veterans presenting to primary care? Addictive Behaviors. 2012; 37:776–782. doi:10.1016/j.addbeh.2012.02.017. [PubMed: 22424825]

Ames G, Cunradi C. Alcohol use and preventing alcohol-related problems among young adults in the military. Alcohol Research & Health. 2004/2005; 28:252–257.

Bandura A. Health promotion from the perspective of social cognitive theory. Psychology & Health. 1998; 13:623–649. doi:10.10880/08870449808407422.

Barry AE, Whiteman SD, MacDermid Wadsworth SM. Implications of posttraumatic stress among military-affiliated and civilian students. Journal of American College Health. 2012a; 60:562–573. doi:10.1080/07448481.2012.721427. [PubMed: 23157198]

Barry AE, Whiteman S, Wadswroth SM, Hitt S. The alcohol use and associated mental health problems of student service members/veterans in higher education. Drugs: Education, Prevention and Policy. 2012b; 19:415–425. doi:10.3109/09687637.2011.647123.

Baer JS, Stacy A, Larimer M. Biases in the perception of drinking norms among college students. Journal of Studies on Alcohol and Drugs. 1991; 52:580–586.

Borsari B, Carey KB. Effects of a brief motivational intervention with college student drinkers. Journal of Consulting and Clinical Psychology. 2000; 68:728–733. doi:10.1037/0022-006X.68.4.728. [PubMed: 10965648]

Borsari B, Carey KB. Descriptive and injunctive norms in college drinking: A meta-analytic integration. Journal of Studies on Alcohol. 2003; 64:331–341. [PubMed: 12817821]

Boynton Health Service. Health and health-related behaviors: Minnesota postsecondary student Veterans. University of Minnesota; Minneapolis-Saint Paul, MS: 2012.

Bray RM, Brown JM, Williams J. Trends in binge and heavy drinking, alcohol-related problems, and combat exposure in the US military. Substance Use & Misuse. 2013; 48:799–810. doi: 10.3109/10826084.2013.796990. [PubMed: 23869454]

Bray RM, Pemberton MR, Lane ME, Hourani LL, Mattiko MJ, Babeu LA. Substance use and mental health trends among U.S. military active duty personnel: Key findings from the 2008 DoD Health Behavior Survey. Military Medicine. 2010; 175:390–399. [PubMed: 20572470]

Brown JM, Bray RM, Hartzell MC. A comparison of alcohol use and related problems among women and men in the military. Military Medicine. 2010; 175:101–107. [PubMed: 20180479]

Carey KB, Scott-Sheldon LA, Carey MP, DeMartini KS. Individual-level interventions to reduce college student drinking: A meta-analytic review. Addictive Behaviors. 2007; 32:2469–2494. doi: 10.1016/j.addbeh.2007.05.004. [PubMed: 17590277]

Carver CS. You want to measure coping but your protocol's too long: Consider the Brief COPE. International Journal of Behavioral Medicine. 1997; 4:92–100. [PubMed: 16250744]

Cialdini RB. Principles and techniques of social influence. Advanced social psychology. 1995; 256:281.

Cohen J. Eta-squared and partial eta-squared in fixed factor ANOVA designs. Educational and Psychological Measurement. 1973; 33:107–112. doi:10.1177/001316447303300111.

Collins RL, Parks GA, Marlatt GA. Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. Journal of Consulting and Clinical Psychology. 1985; 53:189–200. doi:10.1037/0022-006X.53.2.189. [PubMed: 3998247]

Cooper ML, Russell M, George WH. Coping, expectancies, and alcohol abuse: A test of social learning formulations. Journal of Abnormal Psychology. 1988; 97:218–230. doi: 10.1037/0021-843X.97.2.218. [PubMed: 3385075]

Doumas DM, Haustveit T, Coll KM. Reducing heavy drinking among first year intercollegiate athletes: A randomized controlled trial of web-based normative feedback. Journal of Applied Sport Psychology. 2010; 22:247–261. doi:10.1080/10413201003666454.

Donovan JE, Jessor R, Jessor L. Problem drinking in adolescence and young adulthood: A follow-up study. Journal of Studies on Alcohol. 1983; 44:109–137. [PubMed: 6865420]

Festinger, L. A theory of cognitive dissonance. Stanford University Press; 1957.

George, D.; Mallery, M. SPSS for Windows Step by Step: A Simple Guide and Reference 17.0 Update (10a Ed). Pearson; Boston, MA: 2010.

Gilbert DT, Giesler RB, Morris KA. When comparisons arise. Journal of Personality and Social Psychology. 1995; 69:227–236. [PubMed: 7643304]

Jackson KM, Sher KJ, Gotham HJ, Wood PK. Transitioning into and out of large-effect drinking in young adulthood. Journal of Abnormal Psychology. 2001; 110:378–391. doi:10.1037/0021-843X.110.3.378. [PubMed: 11502081]

Jacobson IG, Ryan MA, Hooper TI, Smith TC, Amoroso PJ, Boyko EJ, Bell NS. Alcohol use and alcohol-related problems before and after military combat deployment. Journal of the American Medical Association. 2008; 300:663–675. [PubMed: 18698065]

Kahler CW, Hustad J, Barnett NP, Strong DR, Borsari B. Validation of the 30-day version of the Brief Young Adult Alcohol Consequences Questionnaire for use in longitudinal studies. Journal of Studies on Alcohol and Drugs. 2008; 4:611–615. [PubMed: 18612578]

Kahler CW, Strong DR, Read JP. Toward efficient and comprehensive measurement of the alcohol problems continuum in college students: The Brief Young Adult Alcohol Consequences Questionnaire. Alcoholism: Clinical and Experimental Research. 2005; 29:1180–1189. doi: 10.1097/01.ALC.0000171940.95813.A5.

Kline, RB. Principles and Practice of Structural Equation Modeling. 3rd. Guilford Press; New York, NY: 2011.

Kulesza M, McVay MA, Larimer ME, Copeland AL. A randomized clinical trial comparing the efficacy of two active conditions of a brief intervention for heavy college drinkers. Addictive Behaviors. 2013; 38:2094–2101. doi:10.1015/j.addbeh.2013.01.008. [PubMed: 23410849]

LaBrie JW, Lewis MA, Atkins DC, Neighbors C, Zheng C, Kenney SR, Larimer ME. RCT of web-based personalized normative feedback for college drinking prevention: are typical student norms good enough? Journal of Consulting and Clinical Psychology. 2013; 81:1074–1086. doi:10.1037/a0034087. [PubMed: 23937346]

Larimer ME, Cronce JM. Identification, prevention, and treatment revisited: Individual-focused college drinking prevention strategies 1999-2006. Addictive Behaviors. 2007; 32:2439–2468. doi:10.1016/j.addbeh.2007.05.006. [PubMed: 17604915]

Larimer ME, Lee CM, Kilmer JR, Fabiano PM, Stark CB, Geisner IM, Neighbors C. Personalized mailed feedback for college drinking prevention: A randomized clinical trial. Journal of Consulting and Clinical Psychology. 2007; 75:285–293. doi:10.1037/0022-006X.75.2.285. [PubMed: 17469886]

Lewis MA, Neighbors C. Social norms approaches using descriptive drinking norms education: A review of the research on personalized normative feedback. Journal of American College Health. 2006; 54:213–218. [PubMed: 16450845]

Marlatt GA, Baer JS, Kivlahan DR, Dimeff LA, Larimer ME, Quigley LA, Williams E. Screening and brief intervention for high-risk college student drinkers: Results from a 2-year follow-up assessment. Journal of Consulting and Clinical Psychology. 1998; 66:604–615. doi:10.1037/0022-006X.66.4.604. [PubMed: 9735576]

Miller MB, Leffingwell T, Claborn K, Meier E, Walters S, Neighbors C. Personalized feedback interventions for college alcohol misuse: An update of Walters & Neighbors (2005). Psychology of Addictive Behaviors. 2013; 27:909–920. doi:10.1037/a0031174. [PubMed: 23276309]

National Institute on Alcohol Abuse and Alcoholism. NIAAA council approves definition of binge drinking. NIAAA Newsletter; Winter. 2004 2004Retrieved March 14, 2013 from http://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.htm

Neighbors C, Larimer ME, Lewis MA. Targeting misperceptions of descriptive drinking norms: Efficacy of a computer-delivered personalized normative feedback intervention. Journal of Consulting and Clinical Psychology. 2004; 72:434–447. doi:10.1037/0022-006X.72.3.434. [PubMed: 15279527]

Neighbors C, Walker D, Rodriguez L, Walton T, Mbilinyi L, Kaysen D, Roffman R. Normative misperceptions of alcohol use among substance abusing Army personnel. Military Behavioral Health. 2014; 2:203–209. doi:10.1080/21635781.2014.890883.

Norman SB, Schmied E, Larson GE. Predictors of continued problem drinking and substance use following military discharge. Journal of Studies on Alcohol and Drugs. 2014; 75:557–566. [PubMed: 24988254]

Pedersen ER, Marshall GN, Schell TL, Neighbors C. Young adult Veteran perceptions of peers' drinking behavior and attitudes. Psychology of Addictive Behaviors. 2015 doi:10.1037/adb0000120.

Pemberton MR, Williams J, Herman-Stahl M, Calvin SL, Bradshaw MR, Bray RM, Mitchell GM. Evaluation of two web-based alcohol interventions in the military. Journal of Studies on Alcohol and Drugs. 2011; 72:480–489. [PubMed: 21513685]

Perkins HW, Haines MP, Rice R. Misperceiving the college drinking norm and related problems: A nationwide study of exposure to prevention information, perceived norms, and student alcohol misuse. Journal of Studies on Alcohol. 2005; 66:470–478. [PubMed: 16240554]

Riper H, van Straten A, Keuken M, Smit F, Schippers G, Cuijpers P. Curbing problem drinking with personalized feedback interventions: A meta-analysis. American Journal of Preventive Medicine. 2009; 36:247–255. doi:10.1016/j.amepre.2008.10.016. [PubMed: 19215850]

Rosenthal, R.; Rosnow, R. Essentials of Behavioral Research: Methods and Data Analysis. McGraw Hill; New York, NY: 1991.

Rumann CB, Hamrick FA. Student veterans in transition: Re-enrolling after war zone deployments. The Journal of Higher Education. 2010; 81:431–458.

Stasiewicz PR, Bradizza CM, Schlauch RC, Coffey SF, Gulliver SB, Gudleski GD, Bole CW. Journal of Substance Abuse Treatment. 2013; 45:433–443. doi:10.1016/j.jsat.2013.05.012. [PubMed: 23876455]

Stevens, JP. Applied Multivariate Statistics for the Social Sciences. 5th. Taylor & Francis Group, LLC; New York, NY: 2009.

Tabachnick, BG.; Fidell, LS. Using multivariate statistics. 5th. Haper and Row; New York, NY: 2006.

Tajfel H. Social psychology of intergroup relations. Annual Review of Psychology. 1982; 33:1–39. doi:10.1146/annurev.ps.33.020182.000245.

Turrisi R, Larimer ME, Mallett KA, Kilmer JR, Ray AE, Mastroleo NR, Montoya H. A randomized clinical trial evaluating a combined alcohol intervention for high-risk college students. Journal of Studies on Alcohol and Drugs. 2009; 70:555–567. [PubMed: 19515296]

Walters ST, Vader AM, Harris TR, Field CA, Jouriles EN. Dismantling motivational interviewing and feedback for college drinkers: A randomized clinical trial. Journal of Consulting and Clinical Psychology. 2009; 77:64–73. doi:10.1037/a0014472. [PubMed: 19170454]

Whiteman SD, Barry AE. A comparative analysis of student service member/veteran and civilian student drinking motives. Journal of Student Affairs Research and Practice. 2011; 48:297–313. doi:10.2202/1949-6605.6322. [PubMed: 22328965]

Widome R, Laska MN, Gulden A, Fu SS, Lust K. Health risk behaviors of Afghanistan and Iraq War veterans attending college. American Journal of Health Promotion. 2011; 26:101–108. doi: 10.4278/ajhp.090826-QUAN-278. [PubMed: 22040391]

Williams J, Herman-Stahl M, Calvin SL, Pemberton M, Bradshaw M. Mediating mechanisms of a military web-based alcohol intervention. Drug and Alcohol Dependence. 2009; 100:248–257. doi: 10.1016/j.drugalcdep.2008.10.007. [PubMed: 19081206]

Highlights

■ Military-affiliated and civilian students significantly overestimated peers' drinking.

■ Military-specific norms did not improve prediction of typical weekly drinking among SSM/Vs.

■ Only use of substances to cope predicted alcohol-related consequences.

■ Interventions targeting misperceptions of typical student drinking may be effective for SSM/Vs.

Table 1

Mean comparisons of drinking patterns and normative perceptions between student service members/Veterans (SSM/Vs) and civilian college students (N = 319)

	Male SSM/V (N = 83)	Male civilian (N = 116)	Female SSM/V (N = 22)	Female civilian (N = 98)	χ^2 (df)	p	V
	n (%)	n (%)	n (%)	n (%)			
Caucasian	60 (74.1)	97 (85.8)	15 (68.2)	75 (77.3)	6.07 (3)	.11	.14
Freshman	9 (10.8)	46 (40.0)	4 (18.2)	28 (28.6)	21.64 (3)	<.001	.26
Fraternity/sorority affiliation	7 (8.5)	53 (45.7)	1 (4.5)	29 (29.6)	39.27 (3)	<.001	.35
Married	17 (2.05)	3 (2.6)	5 (22.7)	4 (4.1)	26.56 (3)	<.001	.29
LGBT	6 (7.3)	3 (2.6)	6 (27.3)	5 (5.1)	19.40 (3)	<.001	.25
Deployed	47 (56.6)	N/A	4 (18.2)	N/A	10.29 (1)	.001	.31
	M (SD)	M (SD)	M (SD)	M (SD)	F(df)	p	η^2
Age	26.57 (6.79)[a,b,c]	19.76 (2.56)[a,d]	23.27 (3.77)[b,d,e]	19.63 (2.74)[c]	54.36 (3, 315)	<.001	.34
Drinking outcomes[‡]							
Drinks per week (DPW)	8.98 (9.00)[a,b]	11.63 (9.89)[c,d]	3.50 (4.31)[a,c]	3.43 (5.29)[b,d]	21.84 (3, 310)	<.001	.17
Peak drinks per occasion	7.59 (6.28)[a,b]	9.60 (6.15)[c,d]	3.23 (3.05)[a,c]	3.62 (3.49)[b,d]	28.25 (3, 311)	<.001	.21
Frequency per week	2.01 (1.49)[a]	2.09 (1.25)[b]	1.59 (1.37)	1.07 (1.13)[a,b]	12.30 (3, 310)	<.001	.11
Frequency binge per month	1.65 (2.39)[a]	3.11 (3.55)[b]	1.14 (2.73)	0.92 (1.69)[a,b]	11.96 (3, 311)	<.001	.10
Alcohol-related consequences	2.39 (4.58)[a]	3.13 (4.32)[b]	0.82 (1.99)	1.37 (2.87)[a,b]	5.22 (3, 303)	.002	.05
Perceived norms[‡][§]							
Typical student DPW	19.71 (12.85)[a,b]	17.29 (10.71)[c]	10.30 (4.81)[a]	10.69 (6.89)[b,c]	15.40 (3, 304)	<.001	.13
Typical student frequency	4.05 (2.14)[a]	3.32 (1.86)	3.50 (1.91)	2.78 (1.26)[a]	3.73 (3, 304)	.01	.04
Military student DPW	21.59 (14.40)[a,b,c]	8.45 (9.43)[a]	10.10 (8.72)[b]	5.14 (5.76)[c]	30.82 (3, 303)	<.001	.23
Military student frequency	4.17 (2.22)[a,b]	1.88 (1.82)[a]	2.85 (2.16)	1.71 (1.59)[b]	13.52 (3, 303)	<.001	.11
Coping strategies[‡]							
Avoidant coping	3.21 (1.62)	3.66 (1.75)	3.25 (1.45)	3.51 (1.44)	1.16 (3, 299)	.33	.01
Substance-related coping	3.29 (1.64)	3.15 (1.77)	2.70 (1.49)	2.82 (1.44)	2.07 (3, 300)	.10	.02

Note. Matching superscript letters indicate significant pairwise comparison ($p < .008$).

[‡] Analyses control for between-group differences in age and marital status.

[§] Values depict perceptions of drinking among same-sex students. DPW = drinks per (typical) week. V = Cramer's V.

Table 2

Final step of hierarchical regression outcomes for student service members/Veterans (n = 105) and civilian college students (n = 214)

Student Service Members/Veterans

	Criterion: Drinks Per Typical Week				
	B (SE)	*β*	*p*	*F*(df)	Adj. R^2
Age	−0.04 (0.13)	−.03	.78	7.50 (6, 89)[***]	.29
Marital status	−4.15 (2.10)	−.19	.05		
Substance use coping	1.710 (0.49)	.30	.001		
Avoidant coping	0.41 (0.48)	.07	.40		
Military norm	0.01 (0.08)	.02	.88		
Typical norm	0.26 (0.09)	.36	.004		

	Criterion: Alcohol-related Consequences[1]				
	B (SE)	*β*	*p*	*F*(df)	Adj. R^2
Age	−0.04 (0.06)	−.06	.57	8.07 (6, 87)[***]	.31
Marital status	−1.26 (1.02)	−.12	.22		
Substance use coping	1.44 (0.25)	.51	< .001		
Avoidant coping	−0.40 (0.24)	−.14	.10		
Military norm	−0.01 (0.04)	−.04	.78		
Typical norm	0.04 (0.04)	.13	.31		

Civilian Students

	Criterion: Drinks Per Typical Week				
	B (SE)	*β*	*p*	*F*(df)	Adj. R^2
Age	−0.26 (0.24)	−.08	.29	10.64 (6, 200)[***]	.22
Marital status	−0.34 (3.81)	−.01	.93		
Substance use coping	1.31 (0.36)	.24	< .001		
Avoidant coping	−0.38 (0.36)	−.07	.30		
Military norm	0.14 (0.07)	.13	.05		
Typical norm	0.27 (0.06)	.29	< .001		

	Criterion: Alcohol-related Consequences[1]				
	B (SE)	*β*	*p*	*F*(df)	Adj. R^2
Age	−0.12 (0.10)	−.09	.23	12.99 (6, 197)[***]	.26
Marital status	−0.15 (1.53)	−.01	.92		
Substance use coping	1.11 (0.15)	.49	< .001		
Avoidant coping	0.05 (0.15)	.02	.74		
Military norm	0.06 (0.03)	.12	.06		
Typical norm	0.01 (0.03)	.03	.65		

Note. Adj. = adjusted. Military norm = perception of military students' drinking quantity in a typical week. Typical norm = perception of typical students' drinking quantity in a typical week.

[1] In the past month.

*
$p < .05$,

**
$p < .01$,

***
$p < .001$.