



## RESEARCH ARTICLE

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# Problems with social acceptance and social victimization predict substance use among U.S. Reserve/Guard soldiers

Rachel A. Hoopsick<sup>1</sup> | Bonnie M. Vest<sup>1</sup> | D. Lynn Homish<sup>2</sup> |  
Gregory G. Homish<sup>2</sup>

<sup>1</sup>Department of Family Medicine, Jacobs School of Medicine and Biomedical Sciences, University at Buffalo, The State University of New York, Buffalo, New York

<sup>2</sup>Department of Community Health and Health Behavior, School of Public Health and Health Professions, University at Buffalo, The State University of New York, Buffalo, New York

**Correspondence**

Rachel A. Hoopsick, Department of Family Medicine, Jacobs School of Medicine and Biomedical Sciences, State University of New York at Buffalo, 3435 Main Street, 335 Kimball Tower, Buffalo, NY 14214. Email: rachelh@buffalo.edu

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**Abstract**

The effects of negative social interactions/experiences on substance use have largely been studied in civilian populations, but less is known about United States Army Reserve/National Guard (USAR/NG) soldiers—a high-risk group. We examined the associations between problems with social acceptance, social victimization, and substance use among USAR/NG soldiers, and examined potential differences by deployment history. The sample consisted of soldiers who completed baseline and 1-year follow-up assessments ( $N = 445$ ) of Operation: SAFETY, an ongoing study of USAR/NG soldiers. We examined the effects of baseline problems with social acceptance/social victimization on nonmedical use of prescription drugs (NMUPD), illicit drug use, frequent heavy drinking (FHD), and alcohol problems at follow-up. Significant effects were small in magnitude but consistent in direction. Greater problems with social acceptance were associated with higher odds of NMUPD and illicit drug use. Greater social victimization was associated with higher odds of NMUPD and illicit drug use. There were no differences by deployment history. Problems with social acceptance/social victimization were not associated with FHD or alcohol problems. Problems with social acceptance/social victimization may contribute to drug use among USAR/NG soldiers. Intervention programs should address social issues, regardless of deployment history.

**KEYWORDS**

alcohol use, drug use, military, social acceptance, social victimization

## 1 | INTRODUCTION

The associations between negative social interactions or experiences and substance use have been well documented among adolescent and young adult populations. Among adolescents/young adults, being the victim of bullying (i.e., social victimization) has been associated with alcohol use (H. J. Thomas, Connor, et al., 2017), binge drinking (H. J. Thomas, Connor, et al., 2017), drunkenness (Kritsotakis, Papanikolaou, Androulakis, & Philalithis, 2017; Lambe & Craig, 2017), cannabis use (Lambe & Craig, 2017; H. J. Thomas, Connor, et al., 2017), and nonmedical use of prescription drugs (NMUPD) and illicit drug use (H. J. Thomas, Connor, et al., 2017). Further, a recent meta-analysis identified bullying victimization as a probable causal factor for

substance use among adolescents (Moore et al., 2017). Less is known about negative social interactions among adults. One notable exception is workplace bullying, which has been associated with alcohol problems (Nielsen, Gjerstad, & Frone, 2018) and drug use (Niedhammer et al., 2011) among adults. Problems with social acceptance have also been shown to increase the risk of substance use. Among adults, social rejection was associated with alcohol consumption (Laws, Ellerbeck, Rodrigues, Simmons, & Ansell, 2017), and loneliness has been shown to be associated with heavy drinking and drug use (Mannes et al., 2016).

Service members are at greater risk for problems with alcohol and other substances than civilians (Bray, Brown, & Williams, 2013; Green, Beckham, Youssef, & Elbogen, 2014; Hoopsick, Fillo, Vest, Homish, & Homish, 2017; Jacobson et al., 2008; Milliken, Auchterlonie, & Hoge,

2007; J. L. Thomas et al., 2010). Further, there is an abundance of literature demonstrating the effects of deployment on mental health and substance use outcomes among service members (Bray & Hourani, 2007; Hassija, Jakupcak, Maguen, & Shipherd, 2012; Jacobson et al., 2008; Larson, Mohr, Jeffery, Adams, & Williams, 2016; Milliken et al., 2007; Renshaw, Rodrigues, & Jones, 2009; M. M. Thomas, Harpaz-Rotem, Tsai, Southwick, & Pietrzak, 2017; Vest, Heavey, Homish, & Homish, 2017; Vest, Homish, Hoopsick, & Homish, 2018). Thus, negative social interactions or experiences may contribute to even greater risk for substance use among this already high-risk group.

Social support, camaraderie, and brother/sisterhood relationships have long been posited as positive aspects of military service and crucial to the ability to perform under stressful conditions (Hinojosa & Hinojosa, 2011; Little, 1955, 1964). Strong unit and social support have also been shown to be protective against mental health problems among military populations (Goldmann et al., 2012; Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009; Polusny et al., 2009; Vest et al., 2017) and may be more strongly associated with mental health outcomes than military experiences themselves (Goldmann et al., 2012). Although research has examined the presence/absence of social support, less is known about the effects of social problems (i.e., victimization and acceptance) on substance use in military populations. Given the role of social relationships in the military, and evidence that social problems contribute to substance use among civilians, we hypothesized that problems with social acceptance and social victimization may contribute to further risk for substance use in an already high-risk population.

Over one third of the U.S. military is comprised of Reserve/Guard service members, the greatest proportion of which are U.S. Army Reserve and National Guard (USAR/NG) soldiers, with the remaining reservists coming from other branches of the U.S. military (Defense Manpower Data Center, 2017). Reserve/Guard service members have stressors that are unique to their part-time service, which may contribute to adverse outcomes. Service members belonging to Reserve components of the military tend to spend less time with their units compared with active duty service members (Griffith, 2010, 2015). This is important to note, given research demonstrating a potentially protective effect of strong unit support in the military. From a social-psychological perspective, the part-time nature of service for Reserve/Guard service members lends itself to feelings of partial inclusion (Griffith, 2010), which may make these service members more susceptible to the sequelae of problems with social acceptance and social victimization. Additional research is needed to characterize the social experiences of USAR/NG soldiers and to determine how these experiences might further contribute to substance use.

Although active duty and Reserve/Guard service members share common roles and combat experiences, Reserve/Guard service members are at greater risk for problems with substance use (Cohen, Fink, Sampson, & Galea, 2015; Griffith, 2010; Jacobson et al., 2008; Milliken et al., 2007). Reserve/Guard service members test positive for illicit drugs at two to three times the rate of active duty service members (Platteborze, Kippenberger, & Martin, 2013). Further, military deployments have greater effects on the mental well-being of Reserve/Guard service members compared with active duty service members (Cohen et al., 2015; Griffith, 2010; Jacobson et al., 2008; Milliken et al., 2007).

Spending limited time with their units, Reserve/Guard soldiers may lack the protection conferred by social support in active duty populations. Thus, these part-time service members may be particularly vulnerable to the effects of negative social interactions or experiences.

We sought to fill the gaps in the literature regarding problems with social acceptance, social victimization, and substance use among Reserve/Guard populations by examining a subset of data from Operation: SAFETY (Soldiers and Families Excelling Through the Years), an ongoing survey-based study examining the health and well-being of USAR/NG soldiers and their partners. We examined the relation between baseline problems with social acceptance and social victimization and each of the following substance use outcomes at follow-up: NMUPD, illicit drug use, frequent heavy drinking (FHD), and alcohol problems. Further, we examined whether or not these relations differed by deployment history (never-deployed vs. ever-deployed). We hypothesized that greater problems with social acceptance and social victimization would be associated with a greater likelihood of NMUPD and illicit drug use, as well as greater FHD and alcohol problems. We also hypothesized that there would be no differences in these relations on the basis of deployment history. Our *a priori* hypotheses were not preregistered.

## 2 | MATERIAL AND METHODS

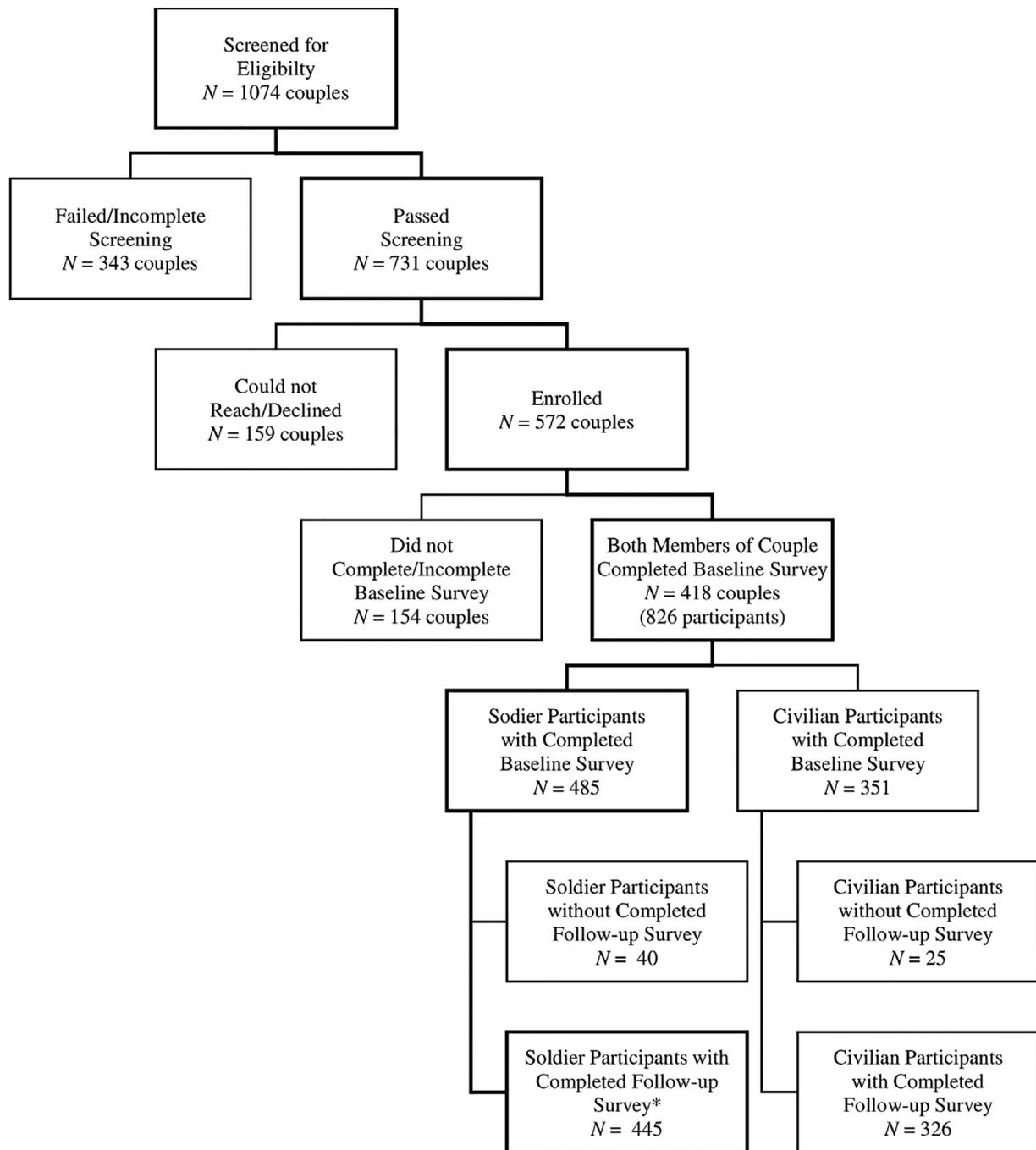
### 2.1 | Recruitment

We recruited participants for Operation: SAFETY from 47 units across New York State between 2014 and 2015. Participation in Operation: SAFETY involved the completion of yearly online surveys. In order to be eligible for the study, the following inclusion criteria must have been met: (a) the couple was married or living as if married; (b) one member of the couple was a current Army Reserve Soldier or National Guard Soldier; (c) the soldier was between the ages of 18 and 45; (d) both partners were able to speak and understand English; (e) both partners were willing and able to participate; and (f) both partners had at least one alcoholic beverage in the past year.

A total of 731 soldiers and partners were eligible for inclusion in Operation: SAFETY (Figure 1). Of those, 572 (78%) agreed to participate and 83% of couples ( $N = 472$  couples, 65% of those eligible) completed some part of the survey. Baseline surveys were only included in the current study if both partners completed ( $N = 418$  couples). A total of 485 soldiers completed the baseline survey, of which 445 also completed the second annual survey (92% retention rate of soldiers from baseline to first follow-up). Additional study methods have been published elsewhere (Devonish et al., 2017; Heavey, Homish, Goodell, & Homish, 2017; Vest et al., 2017). Whereas the Operation: SAFETY study includes couples, the current substudy focused only on soldier participants.

### 2.2 | Procedures

Participants completed three online surveys (baseline with two yearly follow-ups) administered through StudyTrax™, a secure



**FIGURE 1** Flow diagram of participant screening, enrollment, and retention

\*Analytic sample of current study

HIPAA-compliant online survey programming software that allowed for data encryption. Each participant received a \$60 check for completing the baseline survey and \$70 for each of the two follow-up surveys (\$200 per person/\$400 couple over the study period). The protocol was approved by the University at Buffalo, The State University of New York, the Army Human Research Protections Office, Office of the Chief, Army Reserve, and the Adjutant General of the National Guard.

### 2.3 | Participants

In the current research, we examined a subset of data from soldier participants who completed the first two annual surveys (i.e., baseline and first follow-up) of the ongoing study, Operation: SAFETY ( $N = 445$  soldiers). Soldiers who completed the baseline survey but did not complete the first follow-up survey were excluded from the current study. In cases where participants were missing data for one or more variables, his or

**TABLE 1** Baseline characteristics of U.S. Army Reserve and National Guard soldiers

Characteristic	N = 445% (n) or mean ( $\pm$ SD)
Sex	
Male	79.3% (353)
Female	20.7% (92)
Age (years)	31.6 ( $\pm$ 6.4)
Race/ethnicity	
Non-Hispanic White	81.0% (354)
Non-Hispanic Black	5.7% (25)
Hispanic	8.5% (37)
Other	4.8% (21)
Education	
High school graduate	12.6% (56)
Some college	55.3% (246)
College degree	32.1% (143)
Total family income	
$\leq$ \$19,999	7.4% (32)
\$20,000 to \$59,999	42.4% (183)
\$60,000 to \$99,999	32.4% (140)
$\geq$ \$100,000	17.8% (72)
Relationship status	
Married	67.1% (294)
Cohabiting	32.9% (144)
Years of service	9.3 ( $\pm$ 5.9)
Rank	
Enlisted	85.6% (369)
Officer	14.4% (62)
Deployment history	
Ever-deployed	58.0% (258)
Never-deployed	42.0% (187)

Abbreviation: SD, standard deviation.

her nonmissing data were retained to maximize the data available on an analysis by analysis basis. The sample included soldiers who reported never having been deployed ( $n = 187$  soldiers), as well as soldiers who reported at least one deployment ( $n = 258$ ). The majority of participants were male, non-Hispanic White, had at least some college education, and were married. Soldiers served an average (standard deviation) of 9.3 (5.9) years in the military, and most were enlisted soldiers (Table 1).

## 2.4 | Measures

### 2.4.1 | Baseline problems with social acceptance and social victimization

We used the five-item Social Acceptability and four-item Social Victimization subscales of the Survey of Recent Life Experiences (SRLE; Kohn & Macdonald, 1992) to measure the extent to which participants' lives

were affected by these problems in the 12 months prior to the baseline assessment. Items are scored on a scale of 1 (*Not at All*) to 4 (*Very Much*), with higher scores indicating greater problems. Example items from the Social Acceptability subscale ( $\alpha = .78$ ) include "social rejection," "social isolation," and "being ignored." Example items from the Social Victimization subscale ( $\alpha = .78$ ) include "being taken for granted," "having contributions overlooked," and "being taken advantage of."

### 2.4.2 | Nonmedical use of prescription drugs and illicit drug use at follow-up

To assess current (i.e., past 3 months) NMUPD and illicit drug use at follow-up, we used the NIDA Modified Alcohol, Smoking, and Substance Involvement Screening Test 2.0. This instrument was vigorously tested with three phases to examine and ensure reliability and validity across diverse settings and cultures (WHO ASSIST Working Group, 2002). NMUPD was defined as using prescription stimulants, sedatives, opioids, or other prescription drugs without a medical provider's prescription, in greater amounts, more often, longer, or for a reason other than as prescribed. Illicit drug use included the use of cannabis, cocaine or crack, stimulants, inhalants, sedatives, hallucinogens, and street opioids. We dichotomized current use (yes/no) for NMUPD and illicit drug use, separately, for our analyses.

### 2.4.3 | FHD at follow-up

Consistent with other research (Homish & Leonard, 2007), we assessed FHD at follow-up using the maximum report of two items: (a) the reported frequency of getting drunk in the past year, ranging on a 9-point scale from 1 (*Never*) to 9 (*Every Day*) in the past year, and (b) the frequency in the past year of five/four or more drinks in a single setting for men/women, respectively, ranging on a 9-point scale from 1 (*Never*) to 9 (*Every Day*) in the past year.

### 2.4.4 | Alcohol problems at follow-up

We used the Alcohol Use Disorders Identification Test (AUDIT) to assess alcohol problems at follow-up (Babor & Del Boca, 1992; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). This 10-item measure consists of questions about current alcohol use and alcohol-related consequences and is scored 0–4 on a Likert scale with responses ranging from *Never* to *Daily or Almost Daily*. Summary scores range from 0–40, with higher scores indicating greater alcohol problems ( $\alpha = .78$ ).

### 2.4.5 | Deployment history

Soldiers self-reported history of deployment (ever/never) at each wave. For the purposes of the current research, we used history of deployment reported at the follow-up assessment.

## 2.4.6 | Covariates

We included several potential confounders in the adjusted analyses: sex, years of military service, anxiety symptomatology, depression symptomatology, and marital satisfaction. Soldiers self-reported his or her sex at the baseline assessment. Years of military service included the total years of active duty service (if applicable) and years of Reserve/Guard service. Marital satisfaction has been shown to be a strong protective factor against the effects of military-related stress on poor mental health (Vest et al., 2017) and alcohol problems (Vest et al., 2018) among Reserve/Guard soldiers. We used the Marital Adjustment Test (Locke & Wallace, 1959), a 15-item Likert-based scale, to assess marital satisfaction. Responses to each question are summed for a total relationship satisfaction score, and higher scores indicate a stronger marriage/romantic partnership ( $\alpha = .77$ ). Neuroticism, including anxiety, has been associated with alcohol and other substance use in large community samples (Dash et al., 2019; Studer et al., 2017). Additionally, social victimization has been shown to be associated with anxiety in adolescence (Wu, Zhang, Cheng, & Hu, 2018) and adulthood (Woo et al., 2019). To control for the potential confounding effects of anxiety, we assessed baseline anxiety symptomatology with the 10-item Severity Measure for Generalized Anxiety Disorder (Craske et al., 2013). These items examine anxiety symptomatology over the past 7 days ( $\alpha = .91$ ). Research has demonstrated that poor socialization is associated with depression in military populations (Kruse, Hagerty, Byers, Gatien, & Williams, 2014; Teo et al., 2018). Depression has also been shown to be an independent risk factor for substance use among military populations (Calhoun et al., 2018; Fetzner, Abrams, & Asmundson, 2013). We assessed baseline depression symptomatology using the PHQ-8 (Kroenke et al., 2009). The PHQ-8 assesses the frequency that the respondent has experienced symptoms of depression over the last 2 weeks ( $\alpha = .91$ ).

## 2.5 | Statistical analyses

We performed all analyses using Stata version 15.1 software (Stata Corporation, College Station, TX). Descriptive statistics were used to characterize the study sample. We separately examined the effects of baseline problems with social acceptance and social victimization on four substance use outcomes at first follow-up: NMUPD, illicit drug use, FHD, and alcohol problems. Given that NMUPD and illicit drug use were parameterized as dichotomous variables, we examined the relation between problems with social acceptance/social victimization emotions and these substance use outcomes using logistic regression models. Odds ratios (ORs) and 95% confidence intervals (CIs) are reported. FHD and alcohol problems are count variables that can only take non-negative integer values in a limited range; therefore, we used negative binomial regression models to examine their relations with problems with social acceptance and social victimization. Risk ratios (RRs) and 95% CIs are reported. All models were then adjusted for sex, years of military service, anxiety symptomatology, depression symptomatology, and marital satisfaction. We separately examined

the interaction effects of problems with social acceptance and deployment history, as well as social victimization and deployment history by adding an interaction term to each of the final adjusted models. All unadjusted, adjusted, and interaction models were each bootstrapped with 1,000 replications to enhance the accuracy of inferences made.

## 3 | RESULTS

### 3.1 | Descriptive results

Among this sample of USAR/NG soldiers, 17.8% reported engaging in heavy drinking or drunkenness at least two to three times per month. The mean AUDIT score was 4.3 (3.8) at first follow-up, with 10.6% of the sample having an AUDIT score of 8 or greater, which is a clinical indicator of alcohol problems (Babor & Del Boca, 1992; Saunders et al., 1993). Additionally, 4.3% of the sample reported current NMUPD and 5.8% of the sample reported current illicit drug use at first follow-up. The average Social Acceptability and Social Victimization subscales of the SRLE were 8.2 (2.6) and 6.3 (2.4), respectively. Notably, 17.6% of the sample reported experiencing social rejection, 27.6% reported experiencing social isolation, 56.2% reported being taken for granted, 48.1% reported having his or her contributions overlooked, and 39.1% reported being taken advantage of in the last 12 months prior to baseline.

### 3.2 | Effects of problems with social acceptance on substance use

In unadjusted models, greater problems with social acceptance at baseline were associated with a higher odds of current NMUPD (OR = 1.29, 95% CI [1.12, 1.49];  $p < .001$ ) and illicit drug use at first follow-up (OR = 1.26, 95% CI [1.11, 1.43];  $p < .001$ ). The effects of social acceptance on current NMUPD (adjusted OR [AOR] = 1.23, 95% CI [1.01, 1.51];  $p < .05$ ) and current illicit drug use (AOR = 1.25, 95% CI [1.09, 1.44];  $p < .01$ ) remained significant after controlling for sex, years of military service, anxiety symptomatology, depression symptomatology, and marital satisfaction. Problems with social acceptance were not associated with FHD or alcohol problems in any models (Table 2).

### 3.3 | Effects of problems with social victimization on substance use

Greater social victimization at baseline was associated with a higher odds of current NMUPD (OR = 1.31, 95% CI [1.12, 1.52];  $p < .01$ ) and current illicit drug use (OR = 1.24, 95% CI [1.09, 1.42];  $p < .01$ ) at first follow-up. After controlling for sex, years of military service, anxiety symptomatology, depression symptomatology, and marital satisfaction, greater social victimization was still associated with a higher odds of NMUPD (AOR = 1.24, 95% CI [1.01, 1.54];  $p < .05$ ) and illicit drug use (AOR = 1.21, 95% CI [1.02, 1.44];  $p < .05$ ). Social victimization was not associated with FHD or alcohol problems (Table 3).

**TABLE 2** Effect of problems with social acceptance on substance use among U.S. Army Reserve and National Guard soldiers

Variable	Nonmedical use of prescription drugs		Illicit drug use		Frequent heavy drinking		Alcohol problems	
	OR [95% CI]	AOR [95% CI]	OR [95% CI]	AOR [95% CI]	RR [95% CI]	ARR [95% CI]	RR [95% CI]	ARR [95% CI]
Problems with social acceptance	1.29*** [1.12, 1.49]	1.23* [1.01, 1.51]	1.26*** [1.11, 1.43]	1.25** [1.09, 1.44]	1.00 [0.98, 1.02]	0.99 [0.96, 1.02]	1.02 [0.99, 1.06]	1.02 [0.99, 1.07]
Sex <sup>a</sup>		0.64 [0.13, 3.17]		0.37 [0.10, 1.37]		0.90 [0.78, 1.03]		0.67*** [0.54, 0.83]
Years of military service		1.01 [0.89, 1.14]		0.94 [0.86, 1.04]		0.99 [0.98, 1.00]		0.99 [0.98, 1.01]
Anxiety		1.04 [0.94, 1.17]		1.01 [0.92, 1.11]		1.01 [1.00, 1.03]		1.02 [0.99, 1.04]
Depression		1.03 [0.87, 1.22]		1.04 [0.94, 1.16]		1.00 [0.98, 1.01]		0.98 [0.96, 1.01]
Marital satisfaction		1.00 [0.98, 1.03]		1.00 [0.98, 1.01]		1.00 [0.99, 1.00]		1.00 [0.99, 1.00]

Abbreviations: AOR, adjusted odds ratio; ARR = adjusted risk ratio; CI, confidence interval; OR, odds ratio; RR, risk ratio.

<sup>a</sup>Male is the reference group.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**TABLE 3** Effect of problems with social victimization on substance use among U.S. Army Reserve and National Guard soldiers

Variable	Nonmedical use of prescription drugs		Illicit drug use		Frequent heavy drinking		Alcohol problems	
	OR [95% CI]	AOR [95% CI]	OR [95% CI]	AOR [95% CI]	RR [95% CI]	ARR [95% CI]	RR [95% CI]	ARR [95% CI]
Problems with social victimization	1.31** [1.12, 1.52]	1.24* [1.01, 1.54]	1.24** [1.09, 1.42]	1.21* [1.02, 1.44]	1.00 [0.98, 1.03]	1.00 [0.97, 1.03]	1.02 [0.98, 1.05]	1.00 [0.97, 1.05]
Sex <sup>a</sup>		0.69 [0.14, 3.37]		0.42 [0.11, 1.59]		0.89 [0.77, 1.02]		0.68*** [0.55, 0.84]
Years of military service		1.00 [0.89, 1.12]		0.94 [0.86, 1.03]		0.99 [0.98, 1.00]		0.99 [0.98, 1.01]
Anxiety		1.04 [0.92, 1.17]		1.01 [0.92, 1.11]		1.01 [0.99, 1.03]		1.02* [1.01, 1.05]
Depression		1.04 [0.87, 1.23]		1.05 [0.94, 1.19]		1.00 [0.98, 1.01]		0.99 [0.96, 1.02]
Marital satisfaction		1.00 [0.99, 1.02]		1.00 [0.99, 1.01]		1.00 [0.99, 1.00]		1.00 [0.99, 1.00]

Abbreviations: AOR, adjusted odds ratio; ARR, adjusted risk ratio; CI, confidence interval; OR, odds ratio; RR, risk ratio.

<sup>a</sup>Male is the reference group.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

### 3.4 | Interaction effects

Existing literature on substance use in military populations has largely only focused on service members who have experienced deployment. Therefore, we examined a sample never- and ever-deployed USAR/NG soldiers and tested for differences in these relations on the basis of deployment history.

#### 3.4.1 | Interaction effects of problems with social acceptance and deployment history on substance use

There were no significant interactions between social acceptance and deployment history on any of the following substance use outcomes: FHD

(AOR = 0.97, 95% CI [0.92, 1.01];  $p > .05$ ), alcohol problems (AOR = 0.99, 95% CI [0.93, 1.06];  $p > .05$ ), NMUPD (AOR = 1.09, 95% CI [0.70, 1.70];  $p > .05$ ), and illicit drug use (AOR = 0.90, 95% CI [0.64, 1.27];  $p > .05$ ).

#### 3.4.2 | Interaction effects of problems with social victimization and deployment history on substance use

Social victimization did not have a significant interaction with deployment history on FHD (AOR = 1.01, 95% CI [0.97, 1.06];  $p > .05$ ), alcohol problems (AOR = 1.01, 95% CI [0.95, 1.08];  $p > .05$ ), NMUPD (AOR = 1.35, 95% CI [0.11, 16.34];  $p > .05$ ), or illicit drug use (AOR = 1.06, 95% CI [0.75, 1.50];  $p > .05$ ).

## 4 | DISCUSSION

Our findings demonstrate that problems with social acceptance and social victimization are prevalent among USAR/NG soldiers and that these problems are associated with future substance use. Although the observed effect sizes were modest, our findings were consistent in strength and direction. Our results show that problems with social acceptance and social victimization at baseline are associated with a greater likelihood of NMUPD and illicit drug use at follow-up, but not FHD or alcohol problems. Although existing literature on substance use in military populations tends to focus on service members who have been deployed, we found that there were no differences in these relationships on the basis of deployment history. This suggests that USAR/NG soldiers are vulnerable to the effects of negative social experiences on drug use, regardless of deployment history. To our knowledge, this is the first examination of the effects of problems with social acceptance and social victimization on substance use among Reserve/Guard service members—a high-risk population with unique social stressors.

Consistent with literature among civilian populations, our findings demonstrated a significantly increased propensity for drug use following greater social stress among USAR/NG soldiers. Negative social interactions and experiences might exacerbate problems experienced by these soldiers, particularly in the context of having limited military-related social support given their status as part-time soldiers. This is important to consider, as social support has been shown to be associated with a lower prevalence of violent behaviour (Worthen et al., 2017), less post-traumatic stress disorder symptomology (DiMauro, Renshaw, Smith, & Vogt, 2016; Pietrzak et al., 2010), and less anger (Vest et al., 2017) among service members. Additionally, stronger unit cohesion has been shown to buffer the effects of combat deployment on avoidant coping behaviours (McAndrew et al., 2017). Given the protective nature of social support, our results support our hypothesis that it is not only the absence of social support but also the presence of negative social interactions that are related to substance use problems, regardless of deployment.

Limited research suggests that there may be a biological explanation for the association between these types of social problems and substance use. Research by Hsu et al. (2015) demonstrated that among those with major depressive disorder, there was a reduction in the endogenous opioid release in multiple brain regions during episodes of social rejection. Other research has shown that illicit substances buffer the effect of simulated social rejection on mood and self-esteem (Frye, Wardle, Norman, & de Wit, 2014). Animal models have also shown chronic social isolation to be associated with increases in opioid receptor responsiveness, but downregulation of the dopamine system, which results in vulnerability to substance use (Karkhanis, Rose, Weiner, & Jones, 2016; Lesscher et al., 2015) and behaviours related to dependence, such as persistence of substance-seeking behaviour (Cortes-Patino, Serrano, & Garcia-Mijares, 2016). Taken together, these mechanisms suggest that negative social interactions and experiences may exacerbate problems already faced by USAR/NG soldiers, resulting in self-medication to cope.

Interestingly, despite observing associations with drug use, our results showed no relation between problems with social acceptance or social victimization on FHD or alcohol problems. In contrast, previous research demonstrated an association between workplace bullying and alcohol problems among civilian adults (Nielsen et al., 2018). Given the high rates of alcohol consumption and alcohol problems in military populations in general (Bray et al., 2013; Green et al., 2014; Hoopsick et al., 2017; Jacobson et al., 2008; Milliken et al., 2007; J. L. Thomas et al., 2010) and even higher rates among USAR/NG soldiers (Cohen et al., 2015; Griffith, 2010; Jacobson et al., 2008; Milliken et al., 2007), it is possible that our findings may be explained by a threshold of alcohol misuse. That is, these soldiers may already be engaging in regular heavy drinking experiencing significant alcohol problems such that negative social experiences do not contribute to an even *greater* risk. Further research is needed to understand why problems with social acceptance and social victimization appear to contribute to drug-related, but not alcohol-related, behaviours and problems among soldiers.

Our findings demonstrated that problems with social acceptance and social victimization have effects on NMUPD and illicit drug use among USAR/NG soldiers who have and have not been previously deployed. A significant proportion of Reserve/Guard service members may never deploy (Counts of Active Duty and Reserve Service Members and APF Civilians Location Country Report, 2016). Emerging research suggests that never-deployed service members are also at risk for psychiatric problems (Fink et al., 2016; Hoopsick et al., in press; Hoopsick, Homish, Bartone, & Homish, 2018; Hoopsick, Homish, Vest, & Homish, 2018; Jacobson et al., 2008; Kang et al., 2015; Russell et al., 2015; Trautmann et al., 2014; Wells et al., 2010; Worthen et al., 2015). In fact, recent work has demonstrated that never-deployed USAR/NG soldiers experience negative emotions related to having never been deployed (i.e., feelings of guilt and decreased value, camaraderie, and connectedness with one's unit) and that these feelings are associated with greater mental health symptomatology (Hoopsick, Homish, Bartone, et al., 2018) and alcohol problems (Hoopsick, Homish, Vest, et al., 2018). Furthermore, given the important functions served by social relationships in the military, these findings demonstrate the negative effects of social problems, which may be important for understanding substance use in the military, regardless of deployment. The current results show that individuals who had never experienced deployment or combat still engaged in drug use in the presence of negative social interactions. This indicates that individuals' social support and experiences (within and outside of the military) should be considered when examining risk factors for substance use, regardless of deployment history.

### 4.1 | Limitations

Several limitations of the current study should be acknowledged. First, as with all survey-based epidemiological research, there is a potential for response bias. However, social desirability bias is less likely, given the use of a confidential survey. Second, all participants were required

to be married or living as married to be enrolled in this study, which may limit generalizability, though data show that the majority of U.S. service members are married (Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy, 2015). Soldiers recruited from New York State may not be representative of all units nationally, but the military occupational specialties of these units were diverse, including combat, medical, logistics, and support roles. It is also possible that substance use prior to baseline contributed to problems with social acceptance and social victimization. Longitudinal work is needed to examine changes in these problems over time. Additionally, it is not known whether or not these USAR/NG soldiers experienced these problems with social acceptance and social victimization within civilian or military contexts. Future research should examine this distinction in order to identify the most effective setting(s) within which to intervene. Given that the prevalence of problems with social acceptance and social victimization was high in this sample using the SRLE, the inclusion of a measure of workplace bullying or harassment in future research might further clarify the nuanced experiences of USAR/NG soldiers. Although perceptions of social acceptance and victimization are important, a more objective measure would better tease apart extreme social experiences from more mild daily social stressors in their relation to substance use. Lastly, our significant findings were consistently small in magnitude, suggesting that there are other important factors contributing to substance use in this population.

## 4.2 | Conclusions

Our findings demonstrate that USAR/NG soldiers experience problems with social acceptance and social victimization, and these problems were associated with NMUPD and illicit drug use. Furthermore, there were no differences on the basis of deployment history. Additional research is needed to further explore the social interactions experienced by this population, the contexts in which they occur, and how they might contribute to an increased risk for substance use over time. Given the unique stressors experienced by Reserve/Guard service members with their part-time service (Griffith, 2010, 2015), our work highlights the need for enhanced social support interventions and systematic screening for substance use problems among service members, regardless of deployment history.

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## CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

## ORCID

Rachel A. Hoopsick  <https://orcid.org/0000-0001-5992-9007>

Bonnie M. Vest  <https://orcid.org/0000-0002-3401-7367>

D. Lynn Homish  <https://orcid.org/0000-0002-1658-1482>

Gregory G. Homish  <https://orcid.org/0000-0003-2601-3283>

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