Prevention of Alcohol and Other Drug Overuse Among Nightclub Patrons: A Randomized Trial of a Group-Based Mobile Intervention at Nightclubs

HILARY F. BYRNES, PH.D.,^{a,*} BRENDA A. MILLER, PH.D.,^a BETH BOURDEAU, PH.D.,^b MARK B. JOHNSON, PH.D.,^c DAVID B. BULLER, PH.D.,^d JULIA BERTELETTI, M.S.W.,^d & VERONICA A. ROGERS, B.S.^a

^aPrevention Research Center, Pacific Institute for Research and Evaluation, Berkeley, California

^bDivision of Prevention Science, University of California San Francisco, San Francisco, California

^cPacific Institute for Research and Evaluation, Calverton, Maryland

^dKlein Buendel, Inc., Golden, Colorado

ABSTRACT. Objective: Electronic music dance events (EMDEs) at nightclubs attract young adults engaging in high-risk alcohol and other drug (AOD) use. Studies show that most patrons arrive at clubs in groups and that these peer groups influence drinking. Therefore, peer groups are a natural context for preventing risk behaviors. This article examined outcomes of a randomized controlled trial of a group-based mobile intervention at nightclubs, Nightlife Safety Plans (NSP). **Method:** The sample comprised 352 groups, consisting of 959 participants (45.3% female) at 41 events across seven nightclubs hosting EMDEs. Club patrons were surveyed anonymously and completed breath tests as they entered and exited clubs. Oral fluid samples collected from patrons at exit assessed drug use. Analyses examining assignment to NSP versus a control condition on fire safety predicted individual- and group-level

protective strategy use and AOD use, controlling for background variables. **Results:** At the individual level, participation in NSP was related to increased protective actions to keep group members safe. No effects were found on actions to keep oneself safe or in response to overuse. At the group level, assignment to NSP was related to a higher average number of group safety strategies. Participation in NSP was associated with lower blood alcohol concentration but unrelated to tetrahydrocannabinol and cocaine. **Conclusions:** NSP appears to be efficacious for increased protective actions to keep group members safe from overuse and for reduced blood alcohol concentration among EMDE patrons. The findings support the use of an intervention utilizing group-based strategies presented proximal to risk settings. (*J. Stud. Alcohol Drugs*, 80, 423–430, 2019)

ELECTRONIC MUSIC DANCE EVENTS (EMDEs) at nightclubs draw young adults engaging in heavy alcohol and other drug (AOD) use (Gripenberg-Abdon et al., 2012; Hughes et al., 2011; Miller et al., 2009, 2013b; Reed et al., 2013). EMDEs frequently attract patrons who have already used AOD before arriving at clubs (Miller et al., 2013b). At exit, almost one quarter of patrons test positive for drugs (18.4%), three quarters have consumed alcohol (71.3%), and almost half (44.9%) are impaired or intoxicated from alcohol.

Influence of social groups

Research shows that most (91.6%) club patrons arrive in groups (Miller et al., 2015). Social groups affect behavior

through social comparison and social identity processes (Festinger, 1954; Hogg, 2012; Hornsey, 2008; Levine & Moreland, 1990). Individuals routinely compare themselves to peers and adjust their attitudes and behavior to match. The Theory of Normative Social Behavior (Rimal & Real, 2005) proposes that associations between behavior and perceptions of the prevalence of that behavior (e.g., descriptive norms) are moderated by (a) the strength of ties to one's reference group (i.e., group identity), (b) believing the behavior will result in positive outcomes (i.e., outcome expectations), and (c) perceived pressure to conform to certain behaviors (i.e., injunctive norms). As such, people who believe many others drink will be more likely to drink if they see themselves as more like these social referents. Perceiving positive outcomes from drinking or social pressure to drink also increases the likelihood of drinking.

Considerable evidence indicates influences of peers on drinking (Dumas et al., 2014; O'Grady et al., 2011; Phua, 2011). Individuals frequently overestimate both the amount that peers drink and peers' approval of drinking; this leads to increased drinking to match perceived norms (Borsari & Carey, 2001; Neighbors et al., 2007). Research indicates effects of group characteristics (e.g., expectations for group AOD use), beyond individual characteristics, on risky behavior at nightclubs (Lau-Barraco et al., 2012; Miller et al., 2013a; Reed et al., 2013).

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*Correspondence may be sent to Hilary F. Byrnes at the Prevention Research Center, 2160 Shattuck Avenue, Suite 601, Berkeley, CA 94704, or via email at: hbyrnes@prev.org.

Peer groups as settings for prevention

Because social groups influence risky behavior, they are a natural context for prevention. Evidence indicates that young adults intervene with their peers' drinking, most often to take care of the other person (Boekeloo & Griffin, 2009; Howard et al., 2007). A study of college students found a variety of strategies implemented to prevent AOD-related problems among peers, such as monitoring alcohol use among the group and taking care of friends who become sick from AOD use (Howard et al., 2007). The few studies conducted among nightclub patrons found that most are willing to intervene with their peers in risky situations (Byrnes et al., 2016).

Group-based interventions are effective in reducing alcohol use among young adults (Boekeloo & Griffin, 2009; Boekeloo et al., 2009). For example, the Peers as Family intervention, implemented with incoming freshmen (Boekeloo et al., 2009), reduced weekly alcohol use. The SafeNights Intervention (Kelley-Baker et al., 2011) was a group-based intervention to reduce aggression experiences among young women crossing the Mexican border to attend bars in Tijuana. Intervention participants used more strategies than controls and had fewer aggressive experiences. An adaptation on college campuses showed that intervention participants significantly reduced negative experiences compared with controls (Todaro Brooks et al., 2013).

Current study

In this article, outcomes were examined for groups participating in a randomized controlled trial of a group-based mobile intervention at nightclubs, Nightlife Safety Plans (NSP), as compared with a control condition on fire safety. The intervention aimed to provide groups with skills to (a) identify early indicators of high-risk behaviors and (b) use safety strategies with group members to keep the group safe regarding AOD overuse and physical and sexual aggression at nightclubs, and (c) prevent impaired driving/riding. The brief, interactive intervention was delivered on tablets before club entry, proximal to the high-risk setting. Examples provided during the intervention are tailored based on the group's areas of highest risk, determined through real-time online calculations using baseline survey measures. This article focuses on outcomes related to AOD overuse. Analyses tested the hypotheses that (a) participants in the experimental condition would use more AOD-related protective strategies with group members than controls and (b) intervention participants would use less AOD than controls.

Most group-based interventions have focused on college students; however, the majority of club patrons are young adults not enrolled in school (Miller et al., 2013a, 2013b). This intervention expands efforts to reach high-risk young adults who are being missed by college-based approaches. A group-based intervention strategy fits the way in which

most young adults experience clubs (i.e., in groups) and uses naturally existing social groups to address public health in a high-risk environment.

Method*Participants and recruitment*

Groups were recruited for a randomized controlled trial that tested a group-based mobile intervention to reduce risk behaviors among club patrons. Data collection occurred at 41 events across seven nightclubs hosting EMDEs throughout San Francisco (a large, diverse urban setting) from June 2016 to October 2017, on Friday and Saturday nights, when attendance was greatest. For clubs to be eligible, managers/owners had to agree to participate and have at least 200 patrons on a typical weekend night. Participants were recruited using portal methodology (Johnson et al., 2012; Miller et al., 2005, 2009, 2013b): Research staff approached the first person to cross an imaginary line on the sidewalk in front of clubs. Because the intervention is group based, only people approaching in groups were recruited. That person and their group members were invited to participate.

To be eligible, patrons had to be entering the club and not working there. A total of 2,260 groups were approached (Supplemental Figure A). Some groups ($n = 854$) did not stop to listen to recruitment, whereas others ($n = 1,044$) listened but declined to participate. Ten groups were excluded for other reasons (e.g., worked at club). Among groups stopping to listen to recruitment, 25% ($n = 352$) participated. Participants provided informed consent, and all study procedures were approved by the Pacific Institute for Research Evaluation's institutional review board.

Procedures

Participants received \$15 at club entrance and \$25 upon exiting for completing an interview, filling out surveys on tablets, taking breath tests for alcohol at entry and exit, and providing oral fluid for drug testing at exit. Participation was anonymous, so names and other identifying information were not obtained. At entry, participants were given wristbands with a unique code number so that entry and exit data could be linked. Code numbers also allowed connecting data within groups.

Randomization occurred through a coin toss: a quick, inexpensive method that works well for large samples (Ferreira & Patino, 2016) in real-world late-night settings. Before each night of data collection, a coin was flipped to determine whether odd- or even-numbered groups would receive the intervention that night (vs. a control). Only data collection supervisors knew nightly assignments and revealed each group's condition to one data collector after that group's surveys were completed, using the information to launch

the applications. Groups in the control condition ($n = 179$) received an intervention regarding fire safety in clubs on a tablet, whereas those in the experimental condition ($n = 173$) received the NSP.

Intervention

NSP is a brief, group-based intervention delivered before a night at the club to reduce physical and sexual aggression, overuse of AOD, and impaired driving/riding, tailored to each group's risks. The intervention uses social influences in positive, nonjudgmental ways to encourage patrons to protect their group members, with intervention messages focused on group interaction. NSP takes a harm-reduction approach by providing strategies for reducing group problems. Harm reduction aims to reduce adverse consequences rather than preventing the risk behavior (Des Jarlais, 1995; MacMaster, 2004; Single, 1995). NSP has four objectives: (a) to determine group risk levels, (b) to encourage awareness of early indicators of problems to avoid escalation, (c) to provide steps for group members to protect each other in the club, and (d) to facilitate group discussion and consensus making about safety.

Data from an earlier study (Miller et al., 2013a, 2013b), as well as pilot data from the current study, were used to develop regression algorithms for predicting group risk levels. When all group members completed online baseline surveys, algorithms were calculated in real time to assess risk levels for each participant on each outcome. Individual risk scores for drug use were predicted from self-reports of recent use of cannabis, cocaine, and Ecstasy (3,4-methylenedioxymethamphetamine [MDMA]), as well as intentions to use drugs in the club; risk scores for alcohol use were predicted from self-reported recent alcohol use, plans to drink, and being "high" at the moment; risk scores for experiencing physical aggression were predicted from 30-day history of experiencing physical or sexual aggression in a club, currently being intoxicated or high, and age; and risk scores for experiencing sexual aggression were predicted by sex, age, 30-day history of experiencing sexual aggression, and recently using MDMA. Each algorithm predictor variable significantly contributes to our assessment of risk. We revised (and backward tested) the algorithms over multiple samples (from prior studies), retaining only those variables that persist across samples. The risk categories derived from our algorithm risk scores demonstrate predictive validity (i.e., there is a greater likelihood of risky behavior in the high- vs. low-risk groups).

Before we applied the algorithms, a process for managing missing data was used. In some cases, missing scores were replaced with the most conservative response; for example, when asked, "How many times have you been punched, kicked or pushed while visiting a club during the past 30 days," missing responses were replaced with 0. For gender, a "missing" category was created. In other cases, the central tendency of the group was used. For example, when indicat-

ing how much they planned to drink, missing responses were assigned the median for that group.

Quantitative risk scores were used to compute ordinal risk levels for groups and each outcome, based on the highest risk level of any group member and distributional thresholds established from earlier data sets. Groups were coded as low or high risk for each outcome, except for alcohol overuse, for which low-, medium-, and high-risk categories were produced. The alcohol and other drug misuse categories were combined to form an AOD overuse category. Risk of impaired driving/riding was coded as high if the group had a driver and that driver was at moderate or greater risk for alcohol overuse.

The intervention involved showing examples of strategies for reducing harm, with groups receiving examples specific to the risks they were most vulnerable to. To present the group with appropriate examples, research staff entered the group ID into the app, which called to an online database with the calculated risk. Each group received appropriate examples for their two highest risk categories. For example, if a group's highest risk scores were for AOD overuse and sexual aggression, the intervention would use a set of example strategies related to AOD overuse and then a set of example strategies related to sexual aggression. However, if groups were not high risk for any outcomes, they were presented with default strategy examples regarding physical aggression and AOD overuse.

The intervention consisted of three elements. First, patrons were given examples of early indicators of overuse, indicators of potential for escalation of physical aggression, or indicators of interactions escalating toward sexual aggression, depending on the group's highest risk areas, to encourage awareness of early indicators of problems. Second, de-escalating steps were demonstrated to provide simple actions organized around a mnemonic, that is, the three O's: Outreach (provide outreach by approaching the friend and checking in, using nonconfrontational approaches), Options (provide options to a group member if a problem is identified), and Out (know when the group should get out of the club to avoid further problems). Last, groups were prompted to discuss and agree on their top strategies for each of the three O's, to facilitate group discussion and consensus making about safety. Patrons selected at least one strategy their group would use from a checklist and choices were input into the app, or they could indicate their own strategies. Groups reported their willingness to implement plans made while using NSP. Almost all groups (96.2%) reported that everyone in their group was willing to implement NSP.

NSP consisted of 15 pages with engaging graphics and interactive content, presented on tablets. On average, groups spent 5 minutes and 29 seconds ($SD = 1$ minute, 27 seconds) on the NSP app and 1 minute, 52 seconds ($SD = 1$ minute, 4 seconds) on the control app. The control app contained 13 pages.

Measures

Primary outcome measures. At the individual level, three protective strategy questions were used: (a) actions to keep oneself safe, (b) actions to keep group members safe, and (c) actions in response to group AOD problems. These questions were developed for the study to specifically match the content and goals of the intervention.

(A) *PROTECTIVE ACTIONS TO KEEP ONESELF SAFE:* Patrons reported whether they took any of seven possible actions to stay safe that night (e.g., identified club security and staff). Items were summed to create an index of protective actions to keep themselves safe.

(B) *PROTECTIVE ACTIONS TO KEEP THE GROUP SAFE:* Patrons were asked whether they took any of five possible actions to keep their group safe that night at the club (e.g., monitored or encouraged friends to limit or pace their drinking or other drug use). Items were summed to create an index of protective actions to keep the group safe.

(C) *ACTIONS IN RESPONSE TO GROUP AOD PROBLEMS:* Patrons reported whether they took any of four possible actions in response to a group member experiencing AOD problems (e.g., suggested to my friend that they eat/drink/go outside). Items were summed to create an index.

At the group level, four variables were calculated to assess protective strategies used by the group as a whole: (a) the group mean score of the number of actions taken to keep oneself safe, (b) the group mean score of the number of actions taken to keep the group safe, (c) the highest group member score of the number of actions taken to keep oneself safe, and (d) the highest group member score of the number of actions taken to keep the group safe. For (c) and (d) above, the highest group member score was used because it indicates the most strategies that at least one member is engaging in. NSP was designed so that to be effective, not every group member needs to implement the strategies, as implementation by at least one member can prevent negative outcomes.

Secondary outcome measures. Alcohol and other drug use were assessed as secondary outcome measures. Results were not available in the field.

(A) *DRUG USE:* Oral fluid samples were obtained upon exit from the club using the Quantisal collection device (Immunalysis Corporation, Pomona, CA) to assess drug use. Substances were organized into seven categories: (a) tetrahydrocannabinol (THC); (b) cocaine, including benzoylecgonine, cocaethylene, and norcocaine; (c) amphetamine/3,4-methylenedioxy-methamphetamine (MDMA), including methamphetamine, methylenedioxy-amphetamine (MDA), and methylenedioxyethylamphetamine (MDEA); (d) opiates/analgesics, including morphine, codeine, oxycodone, 6-acetylmorphine, hydrocodone, hydromorphone, and oxycodone; (e) methadone; (f) phencyclidine (PCP); and (g) ketamine. Within each drug category, the drug with the highest level present in the oral fluid was

used to indicate the drug use level for that category. For example, if norcocaine was present in the highest amount out of the four drugs in the cocaine category (Category b), levels of norcocaine would be used to reflect levels of the cocaine category. Because opiates/analgesic drugs had differing measurement scales, each drug variable in the category (Category d) was standardized before using the highest value as an indicator of drug use level for that category. Cocaine and THC values were used in analyses because of low rates of other drugs. Note that entry drug data were not collected because our experience with previous samples is that there is very little difference between entry and exit drug use.

(B) *ALCOHOL USE:* During entry and exit assessments, the Mark V Alcovisor (PAS Systems International, Fredericksburg, VA) was used to obtain breath samples to estimate blood alcohol concentration (BAC).

Covariates. Background variables were included as covariates: gender, ethnicity, age, group size, drinking/other drug use history at clubs, risk level, and time of club entry (early entry [before 10:30 P.M.], mid-entry [10:30–11:30 P.M.], and late entry [after 11:30 P.M.]).

(A) *DRINKING/OTHER DRUG USE HISTORY AT CLUBS:* Patrons reported the number of drinks they had on average in the past 30 days at a club (0 = *did not drink* to 10 = *10 or more drinks*). They also reported, for both marijuana and cocaine, the number of times they used each drug either before arriving or while at the club during the past 30 days (0 = *none* to 3 = *three or more*).

(B) *RISK FOR OVERUSE:* Based on results from algorithms, risk for overuse was positive if the group's algorithm result met the threshold criteria to be considered "high-risk" for overuse.

Analyses

Descriptive analyses examined background and key variables overall and by condition. To determine differences by condition, accounting for clustering within event and group, mixed-model regressions in SPSS Version 21 (IBM Corp., Armonk, NY) were used to test simple effects of the intervention on each continuous background variable. Parallel models were conducted for categorical background variables in Mplus Version 7 (Muthén & Muthén, 1998–2015).

To examine effects of the intervention on key outcomes, multilevel models via mixed-model regressions in SPSS 21 were conducted to account for nesting by event and group. Outcomes were individual- and group-level protective strategy scores and BAC, THC, and cocaine values. Analyses used an intent-to-treat approach to examine assignment to the intervention as a predictor after controlling for background variables, history of drinking/other drug use (drinking for BAC model, and THC or cocaine for the relevant drug use model), and risk level. Listwise deletion was used for missing cases.

TABLE 1. Rates, means, and standard deviations for demographic and background variables overall and by intervention condition, at club entry

Variable	Overall		Intervention group		Control group		<i>b</i>
	<i>M</i> or %	<i>SD</i>	<i>M</i> or %	<i>SD</i>	<i>M</i> or %	<i>SD</i>	
Individual demographics							
Age	27.99	6.35	27.63	6.10	28.31	6.56	-0.73
Female	45.3%	—	44.1%	—	46.3%	—	-0.05
Non-White	55.8%	—	54.5%	—	56.9%	—	-0.06
Group demographics							
Group size	3.38	1.43	3.34	1.41	3.42	1.45	0.01
Average group age	28.32	5.81	27.93	5.33	28.69	6.23	-0.75
% female in group	45.3%	—	44.2%	—	46.4%	—	-0.03
% White in group	43.3%	—	44.1%	—	42.5%	—	0.02
Entry time							0.06
Early	26.1%	—	27.2%	—	25.0%	—	
Mid	35.7%	—	35.5%	—	35.8%	—	
Late	38.3%	—	37.3%	—	39.2%	—	
AOD use							
BAC	0.05	0.05	0.05	0.05	0.06	0.05	-0.01
Drinking history at clubs	3.45	1.80	3.40	1.91	3.50	1.70	-0.02
Marijuana history at clubs	0.82	1.12	0.92	1.16	0.73	1.08	0.18
Cocaine history at clubs	0.44	0.89	0.44	0.87	0.44	0.91	0.03

Notes: AOD = alcohol and other drug; BAC = blood alcohol concentration.

Because of the short duration of time between club entry and exit ($M = 1$ hour, 54 minutes, $SD = 1$ hour, 3 minutes), levels of AOD at entry (owing to using AOD before arrival) directly contribute to and are a part of exit levels, rather than being independent measures. Therefore, we conducted analyses predicting exit AOD without controlling for entry level but controlling for history of AOD use in clubs. This approach also fits our primary concern regarding the cumulative risk from AOD use for the evening and how this risk was influenced by NSP to inform prevention strategies that address risks at exit.

Results

Sample

The sample comprised 352 groups (959 participants) and ethnicity/race was reported as follows: 44.2% White, 21.5% Asian, 7.9% African American, 1.7% Pacific Islander, 1.3% Native American, 7.1% multiracial, 6.8% other, and 9.5% unknown. One fifth (21.1%) were Hispanic. Additional sample characteristics at entry are presented in Table 1. Table 2 presents information on key variables at exit, overall and by condition. No significant differences were found at baseline between conditions. Few differences were found between conditions at exit.

Intervention effects

Protective strategies. At the individual level, intervention participants used significantly more protective actions to keep group members safe (Table 3) as compared with con-

trols. No significant effects were found on protective actions to keep oneself safe or actions in response to overuse. At the group level (Table 4), participation in NSP was significantly related to a higher average number of group safety strategies. The intervention was unrelated to actions taken to keep oneself safe.

Alcohol and other drug use. Intervention participants had significantly lower BACs (Table 5). No significant effects were found for THC or cocaine.

Discussion

The NSP appears efficacious for increased protective actions to keep group members safe from overuse and for reduced BAC among EMDE patrons. Given elevated levels of risk behaviors at nightclubs (Miller et al., 2005, 2009, 2013b), it is important to identify and implement effective protective strategies in this high-risk population. Consistent with theoretical and empirical evidence supporting the influence of peer groups on risk behavior (Bandura, 1973; Dumas et al., 2014; O'Grady et al., 2011; Phua, 2011), NSP uses the peer group as a context for intervention, proximal to the risk setting.

At both the individual and group level, assignment to the intervention was significantly related to more protective actions to keep the group safe compared with control group assignment. Although no significant relations were found regarding protective actions to keep oneself safe, this is consistent with the goals of NSP, which focus on keeping group members, rather than oneself, safe. No significant effects were found for actions in response to overuse. It may be that patrons would respond to situations in which group members

TABLE 2. Rates, means, and standard deviations for key outcome variables overall and by intervention condition, at club exit

Variable	Overall		Intervention group		Control group		<i>b</i>
	<i>M</i> or %	<i>SD</i>	<i>M</i> or %	<i>SD</i>	<i>M</i> or %	<i>SD</i>	
Safety strategies at exit							
Individual level							
Protective actions to keep self safe	2.43	1.36	2.46	1.38	2.40	1.35	0.03
Protective actions to keep group safe	2.03	1.25	2.17	1.30	1.91	1.20	0.26*
Response to overuse	0.25	0.85	0.21	0.77	0.28	0.92	-0.06
Group level							
Group mean score of actions taken to keep self safe	2.36	1.03	2.37	1.07	2.36	1.00	-0.05
Group mean score of actions taken to keep group safe	2.01	0.91	2.14	0.96	1.90	0.85	0.23*
Highest group member score of actions taken to keep self safe	3.08	1.39	3.01	1.43	3.13	1.36	-0.18
Highest group member score of actions taken to keep group safe	2.71	1.40	2.81	1.40	2.63	1.39	0.16
AOD at exit							
BAC	0.07	0.06	0.07	0.06	0.07	0.05	-0.01
THC	21.4%	—	24.1%	—	19.0%	—	-0.16
Cocaine	14.8%	—	16.3%	—	13.4%	—	-0.13

Notes: **Bold** indicates statistical significance. BAC = blood alcohol concentration; THC = tetrahydrocannabinol.

* $p < .05$.

TABLE 3. Relationship between intervention assignment and individual protective strategies, controlling for risk level and demographics

Variable	Protective actions to keep self safe			Protective actions to keep group safe			Response to overuse		
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>
Intervention	0.07	0.12	0.54	0.31	0.10	3.05**	-0.03	0.06	-0.46
Risk for overuse	0.05	0.16	0.32	-0.20	0.13	-1.53	0.04	0.08	0.52
Female	0.36	0.11	3.19**	0.09	0.10	0.92	-0.01	0.06	-0.14
Non-White	0.03	0.12	0.24	0.11	0.10	1.03	-0.05	0.06	-0.87
Early club entry	-0.05	0.16	-0.29	-0.18	0.13	-1.39	0.02	0.08	0.19
Mid club entry	-0.13	0.14	-0.93	-0.36	0.12	-2.98**	-0.02	0.07	-0.25
Group size	-0.04	0.05	-0.95	-0.03	0.04	-0.67	0.04	0.02	1.86
Age	-0.01	0.01	-1.39	-0.01	0.01	-1.55	-0.01	0.01	-1.79

Notes: Late club entry was the reference group for early and mid-entry. **Bold** indicates statistical significance.

** $p < .01$.

needed help because of overuse, regardless of whether they received an intervention.

Assignment to NSP was also related to significantly lower BAC levels compared with control group assignment. However, no significant differences were found for THC or cocaine. This may be partly the result of the nightclub context, a setting that allows drinking openly. However, other drugs are used less frequently than alcohol among club patrons.

Limitations include that the study was conducted in one West Coast city, potentially limiting generalizability to other geographic locations. Assessing the impact of NSP in different geographic settings is an important future direction. However, the ethnically diverse sample included in this study indicates that the findings likely apply to a wider group. Recruitment rates present a limitation. Street recruitment at

clubs is difficult, resulting in lower recruitment rates than for studies using other forms of recruitment. The sample was also limited to focus only on clubs that feature EMDEs. Further, differing seasons and dates for data collection may have influenced the findings, but these were random, rather than systematic, variations; therefore, any impact should be minimized.

Listwise deletion in analyses is another limitation. This method can lower statistical power and could cause bias in results if missing data is not random. However, because the study collects data over time, our primary source of missing data is because of participant attrition at exit, and there is no evidence of differences in response rates by condition on key AOD items. Because of this, we use listwise deletion instead of imputing entire surveys for missed waves of data.

TABLE 4. Relationship between intervention assignment and group-level protective strategies, controlling for risk level and demographics

Variable	Group mean score of actions taken to keep self safe			Group mean score of actions taken to keep group safe			Highest group member score of actions taken to keep self safe			Highest group member score of actions taken to keep group safe		
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>
Intervention	-0.06	0.13	-0.50	0.23	0.11	2.01*	-0.15	0.16	-0.95	0.21	0.16	1.36
Risk for overuse	0.11	0.16	0.69	-0.15	0.14	-1.07	-0.02	0.20	-0.09	-0.29	0.20	-1.45
% female	0.47	0.18	2.67	0.10	0.16	0.64	0.51	0.23	2.25*	0.26	0.22	1.17
% White	0.04	0.17	0.22	0.06	0.15	0.40	0.06	0.21	0.27	0.03	0.21	0.15
Early club entry	-0.06	0.16	-0.35	-0.16	0.15	-1.09	0.08	0.21	0.40	-0.17	0.21	-0.82
Mid club entry	-0.04	0.15	-0.28	-0.32	0.13	-2.41*	0.10	0.19	0.54	-0.34	0.19	-1.86
Group size	-0.06	0.06	-0.93	-0.04	0.05	-0.66	0.19	0.08	2.46*	0.25	0.08	3.29**
Mean age	-0.01	0.01	-0.99	-0.02	0.01	-1.89	-0.02	0.01	-1.24	-0.02	0.01	-1.52

Notes: Late club entry was the reference group for early and mid-entry. **Bold** indicates statistical significance.

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

TABLE 5. Relationship between intervention assignment and alcohol and other drug use at exit, controlling for risk level and demographic variables

Variable	BAC			THC			Cocaine		
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>
Intervention	-0.01	0.01	-2.03*	17.13	17.16	1.00	74.67	181.10	0.41
Risk for overuse	0.00	0.01	-0.18	96.78	21.47	4.51***	62.73	222.71	0.28
Female	0.00	0.00	-0.46	-9.22	17.01	-0.54	-285.19	173.73	-1.64
Non-White	0.00	0.00	-0.77	-21.47	16.88	-1.27	-76.41	175.64	-0.44
Early club entry	-0.01	0.01	-2.04*	26.14	21.94	1.19	-156.07	234.57	-0.67
Mid club entry	-0.01	0.01	-1.33	-14.77	19.62	-0.75	103.66	208.41	0.50
Drinking/other drug use history at clubs	0.01	0.00	5.95***	28.56	7.85	3.64***	328.78	100.87	3.26**
Group size	0.00	0.00	-0.30	8.42	6.45	1.30	123.49	68.90	1.79
Age	0.00	0.00	-2.02*	1.62	1.38	1.17	10.64	14.46	0.74

Notes: Late club entry was the reference group for early and mid-entry. **Bold** indicates statistical significance. BAC = blood alcohol concentration; THC = tetrahydrocannabinol.

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

Important strengths of this study include using biological measures of AOD use instead of self-report measures. Tailoring the intervention to the risks that a group is most likely to experience is also a strength and may be important in building participant engagement and in providing strategies for problems that are most likely to be encountered. For example, if a group is at high risk for AOD overuse and sexual aggression but is shown example strategies related to physical aggression, the group may pay less attention and be less motivated to implement intervention strategies. Last, as EMDEs attract young working adults who are not enrolled in college (Miller et al., 2013a, 2013b), this intervention has potential to reduce problems for high-risk young adults not being reached by college-based approaches.

The results have important implications for prevention efforts in nightclubs. The findings provide further support for the use of the social group as a context for prevention of high-risk behaviors. As peers have a strong influence on drinking and other risk behaviors (Borsari & Carey, 2001, 2003; Neighbors et al., 2007, 2008), the peer group is a natural setting for prevention. This approach may be especially suited to nightclub prevention, as patrons tend to arrive in groups (Miller et al., 2015).

This study emphasizes the importance of using existing ecological niches that attract high-risk young adults. By implementing a group-based strategy, the intervention uses the importance of peer influence on risk behaviors in these settings. In addition, implementing the intervention right before entering a high-risk setting is a novel way for it to provide the most saliency and the strongest impact.

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