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The Social Context of Homeless Women's Alcohol and Drug Use

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Abstract

Background—Substance use poses a significant threat to the health of women, and homeless women are more likely to use alcohol and drugs than other women. Addressing risk factors in this population requires a focus on the social context of substance use among homeless women.

Methods—Participants were 445 homeless women who were randomly sampled and interviewed in shelter settings about the characteristics of their personal networks. Binomial logistic regressions predicted days of binge drinking and of using marijuana, crack, cocaine, and methamphetamine or other amphetamines in the past 6 months.

Results—Homeless women with a greater proportion of heavy alcohol users in their personal networks had greater odds of engaging in binge drinking, and women with a greater proportion of drug users in their networks had greater odds of using marijuana, cocaine, crack, and methamphetamine or other amphetamines. Women with a greater proportion of individuals in their networks that they had met in school or through work had lower odds of marijuana, cocaine, and crack use.

Conclusions—Findings suggest the importance of structural solutions in addressing homeless women's alcohol and drug use, including greater access to treatment and recovery support for alcohol and drug problems as well as depression, and enhancing employment and educational opportunities for homeless women.

Keywords

homeless women; networks; alcohol use; drug use

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Conflict of interest

None of the authors has a conflict of interest.

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1. Introduction

1.1. Substance use and homeless women

Substance use poses a significant threat to the health of women (Hoffman, Klein, Eber, and Crosby, 2000; NIAAA, 2005). It has been argued that substance abuse research should include a greater focus on women, particularly those who have been traditionally underserved (Grella, Joshi, and Hser, 2000; Nyamathi, Leake, and Gelberg, 2000). Although rates of substance use among homeless women vary somewhat by study and sample source, homeless women have consistently been found to have higher rates of alcohol and drug use than other women, including women with low incomes but who are not homeless (Bassuk et al., 1996; Tuten et al., 2003). For example, among homeless women in Los Angeles, 49.5% reported drug use and 32.6% reported binge drinking during the past 12 months, compared to 16.7% and 17.2% for drug use and binge drinking, respectively, among low-income housed women (Wenzel et al., 2004). In a study of women using free food programs in San Francisco, 53% reported heavy alcohol use and 27% engaged in crack or cocaine use in the past 30 days (Riley et al., 2007). The substances most commonly used by homeless women are alcohol, marijuana, and crack/cocaine (Bassuk et al., 1998; Robertson et al., 1997; Tucker, D'Amico et al., 2005). Recent research has documented an upward trend in the use of amphetamines and methamphetamine, although limited attention has focused on these substances among homeless women (Das-Douglas et al., 2007; Nyamathi et al., 2008). The prevalence and negative health consequences of alcohol and drug use call for a better understanding of the risk factors for homeless women's use. Such an understanding may lead to more effective interventions to prevent and address the misuse of substances in this vulnerable population.

1.2. Social context of substance use

Consistent with ecological theories of behavior (Bronfenbrenner, 1979; Stokols, 1992; Sallis et al., 2006), understanding why individuals engage in substance use requires a focus on factors that extend beyond a given individual to include the social context (Williams and Latkin, 2007). Focusing on characteristics of the individual to the exclusion of the social context in which an individual's attitudes and behaviors are shaped may limit the effectiveness of interventions to address these behaviors (Logan et al., 2002; Williams and Latkin, 2007). Much of our understanding of how networks are related to substance use in urban community samples is based on substance abuse treatment populations and drug using networks (Latkin et al., 1995; Manuel et al., 2007). Previous studies have examined social support in relation to homeless women's substance use (e.g. Nyamathi, Leake, Keenan et al., 2000) but have not attended to the larger networks which may include supportive peers as well as other affiliations that may influence drinking and drug use.

Examination of homeless women's personal networks enables a fuller understanding of social context. Social networks are naturally occurring groups within which members (also termed, "alters") may influence each other's behaviors through social comparison processes, social sanctions and rewards, information exchange, and socialization of new members (Latkin et al., 1995). Personal networks encompass the ties that surround a single focal individual, in this case, a homeless woman (McCarty et al., 1997). Homeless women's personal networks are the focus of this paper.

1.3. Characteristics of personal networks

Personal networks vary along a number of dimensions that may be associated with substance use, including the types of people (alters) in the network and their behaviors, quality of relationships with alters, and the degree of connection among alters. Exploratory research suggests that homeless women's networks may be diverse, including but not limited to relatives, sex partners, and people met in shelters on the street, and through employment

(Tucker et al., in press). There is a range of potential, social influences on homeless women's substance use that remains poorly understood. Among urban, predominantly African American, residents of Baltimore, having ties to employed persons appeared to be protective against drug use (Williams and Latkin, 2007). Behaviors of alters are generally associated with behaviors of respondents.

Network members who engage in substance use and other risky behaviors may exert social pressure on women to use substances (Manuel et al., 2007; Tucker, D'Amico et al., 2005), or may present opportunities for women to engage in substance use (Manuel et al., 2007). Primary or steady sex partners (i.e. boyfriends, husbands) may be particularly influential in women's substance use (Amaro and Hardy-Fanta, 1995). Homeless women's networks may also include abusive sex partners, and women may engage in substance use to cope with the distress associated with abuse (Salomon et al., 2002). The quality of women's relationships with alters, defined in terms of informational and tangible support and emotional closeness may also influence substance use. Support and closeness may have protective effects on health and be instrumental in stress reduction (Uchino et al., 1996). Greater support has been associated with reduced frequency of marijuana use among homeless women (Tucker, D'Amico et al., 2005). Density, the degree of connection (ties) among alters in the network may influence substance use through norms supportive of substance use but has not previously been examined among homeless women. Among urban drug users, greater density has been associated with greater frequency of injection drug use (Latkin et al., 1995).

1.4. The present study

We are guided in this study by an ecological model which recognizes that health-related behaviors can be most productively understood and addressed when levels of influence in addition to the intrapersonal or individual level are investigated (Sallis et al., 2006; Stokols, 1992). We focus on one of these additional levels of influence, the interpersonal or social context. The goal of this study is to obtain a more comprehensive understanding of homeless women's alcohol and drug use by attending to characteristics of the social context. We operationalize social context in terms of homeless women's personal networks; specifically, the types and behaviors of alters in their networks, the quality of relationships with alters, and the density of networks. This is the first study to examine personal networks of homeless women in relationship to substance use. A better understanding of the complicated social context of alcohol and drug use may inform more effective interventions to curb these unhealthy behaviors in a highly vulnerable and marginalized population.

2. Methods

2.1. Study participants

Participants in this study were 445 homeless women who were randomly sampled and interviewed in temporary shelter settings in the central region of Los Angeles County for a study of substance use and sexual risk (Wenzel, 2005). Data were collected over a period of 10 months between June, 2007 and March, 2008. Women were eligible if they were at least age 18, had vaginal or anal sex with a male partner in the past 6 months, spoke and understood English as their primary language, and did not have significant cognitive impairment. Of the 472 women who screened eligible for the study, 451 women were interviewed. Of these 451 women, 5 women were later found to be ineligible because they reported having had only oral sex, and one woman had completed only half of the interview. Six women were therefore excluded, leaving a sample size of 445 women and a response/completion rate of 94% (445/472). Individual computer-assisted face-to-face structured interviews were conducted by trained female interviewers. Women were paid \$20 for their participation in the one hour and 15 minute long interview. The research protocol was approved by the institutional review board

of RAND and a Certificate of Confidentiality was obtained from the U.S. Department of Health and Human Services.

2.2. Study design

Women were sampled from facilities with a simple majority of homeless residents (persons who would otherwise live in the streets or who sleep in shelters and have no place of their own to stay). Although women sampled from these facilities were not initially screened for homelessness on an individual basis, 73% of them indicated that they currently did not have a regular place to stay (e.g., own house, apartment, or room, or the home of a family member or friend) and 90% indicated that they had previously stayed in a homeless setting (e.g., mission or homeless shelter, the street) because they had no regular place to stay. Consistent with previous work (Elliott et al., 2006; Tucker, Wenzel et al., 2005; Wenzel et al., 2004), we aimed to achieve a sample of women representative of those living in the diverse array of temporary shelter settings available within Los Angeles County. Other researchers have used shelter facility-based sampling approaches in studies investigating substance use among homeless women (Bassuk et al., 1998; Nyamathi, Leake, Keenan et al., 2000; Robertson et al., 1997; Smith et al., 1993).

Potentially eligible settings were those that provided temporary shelter: emergency shelters; transitional living facilities; detox centers; rehabilitation centers; mental health facilities; and HIV/AIDS transitional homes in the study area. We excluded facilities serving only persons less than 18-years-old, facilities that only serve men, domestic violence shelters, SRO and board-and-care hotels, facilities whose population was not majority homeless and whose average resident length of stay was more than one year. The latter criteria therefore excluded detox-only facilities. Our discussions with facility staff indicate that all prefer and most expect abstinence or sobriety; however, screening and enforcement vary widely. Policies on abstinence and sobriety may have implications for substance use rates among the women in this study.

Women were drawn from 52 eligible facilities in Los Angeles County and selected by means of a stratified random sample, with shelters serving as sampling strata. A strict proportionate-to-size (PPS) stratified random sample (i.e., sampling a fixed proportion of the population from every facility) would have been overly burdensome on the larger facilities. Thus, small departures were made from PPS and corrected with sampling weights.

2.3. Measures

2.3.1. Substance use—Binge drinking was assessed through a question asking women how often during the past 6 months they had 4 or more drinks containing any kind of alcohol within a two-hour period (0="not at all" to 9="everyday"). Women were also asked how often during the past 6 months they used cocaine or crack, marijuana, amphetamines or methamphetamine, and heroin (0="not at all" to 9="everyday"). Frequency of use items and response scales were modified from NIAAA Task Force (NIAAA, 2003) recommended items. Frequency of use items have previously been employed in interviews with homeless women to assess substance use over a past 6-month period (Nyamathi, Leake and Gelberg, 2000; Tucker, Wenzel et al., 2005). Such items have demonstrated favorable reliability and validity (Anglin et al., 1996; Dowling-Guyer et al., 1994). The 10 possible response options for each substance were transformed into the number of days of binge drinking and drug use out of 180 possible days of use (e.g. "not at all" was translated as zero days and "every day" was translated as 180 days). This transformation resulted in binomially distributed outcome variables, allowing us to use binomial logistic regression to model the probability of substance use on any given day during the past 6 months. Our analyses therefore predict the probability of binge drinking and of using each of four types of drugs (i.e. marijuana, crack, cocaine, methamphetamine or other

amphetamines) on any given day during the past 6 months. (Because only 19 (4.3%) of 445 women reported any heroin use, we excluded heroin use as an outcome.)

2.3.2. Individual characteristics—We adjusted for individual characteristics of the women in our consideration of social context. These included age (continuous), years of education (less than 12 years vs. at least 12 years or GED), race and ethnicity, marital status (currently married versus other), depression (yes vs. no), and incarceration history (yes vs. no). Depression has been associated with substance use among homeless women (Bassuk et al., 1998; Tucker, D’Amico et al., 2005). We used a three-item measure to screen for a past-12-month diagnosis of depression (Rayburn et al., 2005; Rost et al., 1993). Because jails have become a “collection point” for vulnerable populations in urban areas (Freudenberg et al., 2005) and incarceration may be a marker for risky behaviors including substance use (Kim et al., 2002), we assessed incarceration history by asking the women how many nights in their lifetime they had spent in jail, prison, or juvenile lock-up. A dichotomous variable represented spending any nights in such settings.

2.3.3. Personal network characteristics—Network characteristics are measured in terms of types and behaviors of alters (i.e., alcohol use, drug use, risky sex, victimization from sex partner alters), quality of relationship between respondents and alters (i.e., tangible and informational support from alters, emotional closeness with alters), and density (i.e., degree of connection among alters). We used established procedures for conducting personal network interviews (McCarty et al. 1997; McCarty 2002). First, we asked respondents to provide first names of 20 individuals ages 18 or older that they knew, who knew them, and that they had contact with sometime during the past year or so. Contact could be face-to-face, by phone, mail or e-mail. We used a general name generator (i.e. name anyone) rather than a specific name generator (e.g. name family) to allow for identification of a greater diversity of network members. We constrained network size to be the same (20 alters) across respondents to maximize comparability of network structure measures across respondents (Mehra, Kilduff and Brass, 2001). Twenty alters has been shown to capture structural and compositional variability present in personal networks (McCarty, Kilworth and Rennell, 2007). Second, we asked a series of questions about the alters, their behaviors, and their relationship with the respondent. Third, for each unique pair of network alters we asked if these two people knew each other and how often they interacted.

To reduce respondent burden, most of the questions asked in the second step were asked of 12 alters selected via a stratified probability sample from the 20 named alters. Questions in the third step were asked only for the 12 sampled alters (Golinelli et al., under review; McCarty, Killworth and Rennell, 2007). A Monte Carlo simulation analysis conducted during a formative stage of this study supported that this reduction could be made without biasing measure of network structure (Golinelli et al., under review). The 20 named alters were stratified into sex partners and non-sex partners. Sex partners were sampled with a higher probability (or with certainty if the respondent reported 4 or fewer sex partners). We stratified by sex partners to accommodate additional goals of the parent project, which included obtaining an understanding of sexual risk behaviors (Wenzel, 2005). Measures computed on the 12 out of 20 selected alters were weighted to account for the differential sampling probabilities and thus to correct for potential bias (Golinelli et al., under review).

Three mutually exclusive variables represented the types of alters named by the respondents: relatives (versus other), non-relative male sex partners (versus other), and non-relatives who were not male sex partners (versus others). Sex partners included primary/steady partners like boyfriends, casual partners, and need-based (sex trade) partners. Respondents also identified where they had met each non-relative alter. Three items assessed behaviors of alters. Using a 3-point Likert scale. Respondents indicated for each alter how likely (1=unlikely to 3=very

likely) they thought it was that he or she, during the past 6 months 1) drank alcohol to the point of being high, drunk, or buzzed; 2) used drugs like pot, crack, or something else; or 3) had multiple sex partners, had sex with someone they did not know, or did not use a condom with a new partner. We calculated the percent who were perceived to be “somewhat likely” or “very likely” to have engaged in these three sets of behaviors.

Using the Conflict Tactics Scale (Straus et al., 1996) and Psychological Maltreatment of Women Inventory (Tolman, 1999) as modified in our previous work (Tucker, D’Amico et al., 2005; Wenzel et al., 2004), women were asked whether sex partner alters had perpetrated physical or psychological violence against them. Women were asked one question for each partner to determine physical violence, and five questions to determine psychological violence. For each women, we derived the sum of sex partner alters who had perpetrated any act of physical or psychological violence.

Women were asked how often during the past 6 months each alter was available to provide advice or information to help solve a problem (informational support), and how often he or she was available to provide needed food, money, clothes or a place to stay (tangible support) (1=“never” to 4=“often”) (Koegel and Burnam, 1991; Sherbourne and Stewart, 1991; Wenzel, 1999). A third item developed for this study asked women how emotionally close they felt to each alter most of the time (1=“not at all” to 4=“quite a bit”). We calculated the percentage of alters who had provided either informational or tangible support (i.e., a score of 2 or greater), and the percentage of emotionally close alters (i.e., score of 2 or greater).

Density is an index varying between 0 and 1 that represents the proportion of ties in a network relative to the total number of possible ties. Measures of network density were calculated for respondents’ overall personal networks, and for alters who were likely to drink to intoxication, to use drugs, and to engage in risky sex (i.e., sex without a condom). These three behaviors represent three risk sub-groups of the network. To investigate these sub-groups of alters, we calculated structure measures including only those individuals identified as having one of these risk factors.

2.4. Analyses

The use of a disproportionate random sampling technique and differential non-response rates require the use of design and non-response weights to represent the target population from the sample of respondents. All analyses incorporate these weights and account for the modest design effect that they induce, using the linearization method (Skinner, 1989). There is a small amount of missing data for some of the predictor variables (1.6%) due to the fact that 7 women were not able to name at least 12 alters. We had decided a priori that network measures would not be computed for those respondents who were not able to name at least 12 alters. With the missing data for seven women on network measures, the analytic sample size for multiple regression analysis is 438.

To understand the association of social context and individual-level factors to women’s alcohol and drug use, we used binomial logistic regression (McCullagh and Nelder, 1989) to model the probability of use of each substance on any given day during the past 6 months. Exponentiating the estimated coefficients yields odds ratios, interpreted as the increase in odds of substance abuse on any given day attributable to a unit increase in the associated predictor. One of the underlying assumptions of this model is that the 180 days are independent. Substance abuse patterns almost certainly violate this assumption and result in overdispersion, a greater variability in the number of days of use than we would expect under a binomial model. We use robust standard errors to account for the overdispersion.

We first examined each personal network characteristic in bivariate association with each substance use outcome. Each candidate predictor variable associated with a measure of substance use frequency at $p < .10$ in bivariate analyses was retained and included in initial multivariate models for all five substance use outcomes. We then trimmed from the multivariate models all those variables that were not significant at $p < .10$ for any of the five outcomes. In other words, if a variable was significant in multivariate models at $p < .10$ for at least one of the five outcomes it was retained in all models. Individual characteristics (age, race and ethnicity, education, marital status, depression, and incarceration history) were retained in all models as control variables.

Because preliminary analyses showed that variables representing the percentage of all alters who engaged in alcohol use, drug use, and risky sex were highly correlated with the variables representing these three behaviors among sex partner alters specifically, we computed all multivariate models using only the variables derived for all alters. In the final, trimmed models, we then substituted the variables specific to primary (steady) sex partner alters to determine whether results using all-alters versus primary sex partners were consistent.

3. Results

3.1. Descriptive characteristics

3.1.1. Individual characteristics and substance use—As shown in Table 1, African Americans were the largest racial or ethnic group represented in our sample (40.17%), followed by women who self-identified as White, non-Hispanic (25.86%), and Hispanic (22.77%). The majority of respondents (55.33%) screened positive for a diagnosis of past 12-month depression, and had spent time in jail or prison during their lifetime (62.17%). Days of substance use during the past six months ranged from a mean of 9.65 (SD=40.02) for marijuana use to 19.51 (SD=51.75) for use of methamphetamine or other amphetamines. Binge drinking occurred 12.80 (SD=40.25) days on average during the past 6 months. In terms of simple rates of any past 6-month substance use, 27.6% had engaged in binge drinking, and 51.2% had used drugs: 29.7% had used marijuana, 20.5% crack, 16.8% cocaine, and 23.2% methamphetamines or other amphetamines (not shown in Table 1). (As noted in Section 2.3.1, because only 4.3% of women had used heroin in the past 6 months, we excluded heroin as an outcome.) Reported drug use among women in our study during the past 6 months was similar to that reported during a longer, 12-month period (49.5%) in an earlier study of sheltered women in Los Angeles (Wenzel et al., 2004), and similar to or lower than rates reported for a past-30 day period among homeless women using free food programs in San Francisco (Riley et al., 2007).

3.1.2. Personal network characteristics—In terms of the types of alters who made up women's social networks, persons who were neither relatives nor sex partners represented the majority on average (59.58%), followed by relatives (28.36%) and persons who were current or previous sex partners (12.05%). The shelter was the most common setting in which respondents met alters (20.04%). The second most common of these settings was employment or school (10.83%). Almost one-third of all alters on average (33.19%) were reported by respondents to have drunk alcohol to intoxication in the past 6 months. Slightly smaller proportions had engaged in drug use (28.72%) and risky sex (29.28%). Women named on average less than one sex partner in their network who had perpetrated violence at some time. More than half of all women's alters were reported to have provided tangible or informational support in the past six months (64.68%), and women reported feeling emotionally close to almost three-fourths (71.33%) of alters. Women's personal networks had an average density of 0.30, which corresponds to networks in which 30 percent of all possible ties are present.

3.2. Multivariate modeling: Predictors of binge drinking and drug use

Table 2 shows results of the multivariate binomial logistic regression modeling of days of substance use (i.e. binge drinking, marijuana, crack, cocaine, amphetamines/methamphetamines) during the past 6 months. Trimmed models are reported. Odds ratios are interpreted as the increase in odds of use of the particular substance on any given day that is attributable to a unit increase in the associated predictor. Findings are statistically significant if they achieve $p < .05$.

Personal network characteristics overall significantly predicted days of binge drinking and days of using marijuana, crack, cocaine, and methamphetamine or other amphetamines. Homeless women's odds of using marijuana (OR=.98; 95% CI=.96, .998), crack (OR=.95; 95% CI=.91, .996), and cocaine (OR=.95; 95% CI=.92, .98) on any given day during the past 6 months were decreased when their networks contained a larger proportion of alters that they met through school or employment. For homeless women with a greater proportion of alters met through the criminal justice system, odds of binge drinking were decreased (OR=0.63; 95% CI=.52, .75).

Women with a larger proportion of binge drinkers in their networks had increased odds of binge drinking (OR=1.02; 95% CI=1.00, 1.03) but decreased odds of crack use (OR=.98; 95% CI=.97, .997). Drug using alters in homeless women's networks were associated with increased days of marijuana use (OR=1.02; 95% CI=1.01, 1.04), crack use (OR=1.04, 95% CI=1.02, 1.05), cocaine use (OR=1.04, 95% CI=1.02, 1.06), and methamphetamine or amphetamine use (OR=1.05, 95% CI=1.03, 1.06), but not binge drinking. In an analysis (not depicted in Table 2) that replaced the variables representing the percentage of all alters who used alcohol and drugs with the variables representing the percentage of primary sex partner alters who engaged in these two behaviors, there was one difference in the results reported above: Having a greater percentage of primary sex partners who used drugs did not significantly predict women's cocaine use. Having a greater number of abusive sex partner alters in the network was associated with greater odds of marijuana use (OR=1.55; 95% CI=1.05, 2.29) but was not associated with use of any other drugs or binge drinking. Tangible or informational support was associated with decreased odds of use of only one substance, marijuana (OR=.98, 95% CI=.96, .996). Emotional closeness was associated with increased odds of cocaine use (OR=1.03, 95% CI=1.01, 1.05).

A number of individual characteristics of the homeless women contributed significantly to understanding binge drinking and drug use. Older women had increased odds of binge drinking (OR=1.03; 95% CI=1.00, 1.06), and of using crack (OR=1.04, 95% CI=1.01, 1.08) and cocaine (OR=1.05, 95% CI=1.00, 1.10), but had lower odds of using methamphetamine or other amphetamines (OR=.94, 95% CI=.89, .98). African American women had significantly greater odds of using marijuana (OR=1.96, 95% CI=1.05, 3.67), and crack (OR=3.12, CI=1.37, 7.09), but lower odds of using methamphetamine or other amphetamines (OR=.18, 95% CI=.06, .53). Incarceration (OR=2.37, 95% CI=1.02, 5.48) was significantly associated with marijuana use. Homeless women who experienced depression during the past 12 months had significantly increased odds of binge drinking in the past 6 months (OR=2.11; 95% CI=1.02, 4.35).

4. Discussion

Findings indicate that homeless women's social context is important to understanding substance use, consistent with an ecological model that health-related behaviors can be most productively understood when levels of influence in addition to intrapersonal characteristics are investigated (Sallis et al., 2006; Stokols, 1992). Women who reported greater proportions of drug using alters in their networks reported a greater probability of marijuana, crack, cocaine, and methamphetamine or other amphetamine use during the past 6 months. This finding is

consistent with research conducted among other urban drug users (Williams and Latkin, 2007) and suggests that the drug users in homeless women's networks may have communicated norms supportive of drug use (Pilowsky et al., 2007). With the exception of cocaine use, these findings were replicated with drug using alters who were specifically primary sex partners, reinforcing the potentially important influence of these partners in homeless women's drug use (Amaro and Hardy-Fanta, 1995). Further research may be useful to understand why primary partners' drug use did not appear to affect women's cocaine use.

Binge drinking was predicted by alters' heavy alcohol use, a finding replicated when we examined the potential influence of alcohol using primary sex partners specifically. Alcohol use may be affected by drinking behaviors of peers through social normative influences (Borsari and Carey, 2001; Maddock and Glanz, 2005). Our findings similarly suggest the importance of an influential social environment that encourages or provides opportunities for homeless women's alcohol use. Binge drinking was not predicted by alters' use of drugs. As a legal substance, alcohol may be more readily obtained when desired than illicit drugs, thus perhaps rendering the behaviors of drug-using peers less influential in affecting women's use of alcohol.

Alters' alcohol use to intoxication was important to women's crack use, in that women reported fewer days of crack use when they had a greater proportion of alcohol users in their networks. This result, and that women's drinking was not predicted by alters' drug use, suggest differences in the social contexts of alcohol and drug use. That an alcohol using network predicted a lower probability of crack use whereas a drug using network predicted a higher probability of crack use, for example, may suggest differences in the "culture" of heavy alcohol use as opposed to drug use that is reflected in social normative influences. Crack use in particular has been closely linked to women's street-based survival activities such as prostitution (Wechsberg, Dennis and Stevens, 1998). Although studies have shown that crack use is often accompanied by alcohol use (Zule et al., 2002), our data do not permit identification of the drugs used by women's alters.

The notion of a difference between heavy alcohol using and drug using networks is further supported by the finding that women with a greater percentage of alters met through the criminal justice system experienced significantly fewer days of binge drinking. Incarceration experiences of indigent persons, particularly ethnic minorities, is often due to drug-related activities (Human Rights Watch, 2000; Iguchi et al., 2002; Moore and Elkavich, 2008). More research is needed to clarify the influence of the social context on homeless women's alcohol use, and the influence of their alcohol-involved networks on drug use. Further investigation is also warranted to understand how network alters with incarceration experiences influence homeless women's substance use. Network density does not appear to carry significant potential for normative influence on the substance use of homeless women.

The composition of homeless women's networks appears to confer both risk and protection. Results indicate that disassociation from alcohol-involved networks might be beneficial for homeless women with alcohol problems, and disassociation from drug-involved networks might be beneficial for women with drug problems. Homeless women with networks having greater proportions of persons met through school and employment had a reduced probability of marijuana, crack, and cocaine use. Connections with such individuals may have a protective influence on risk for substance use. Our findings suggest the importance of structural solutions that include stable housing and enhanced employment and educational opportunities. Support for housing and opportunities for employment have been found to be important in maintaining sobriety among homeless persons in drug treatment (Milby et al., 2004). Housing can provide a stable base away from risky members of the network; employment and education can enhance exposure to pro-social influences and healthy behaviors of others (Nyamathi et al., 2000;

Williams and Latkin, 2007). As noted by Padgett et al. (2008), the standard warning in treatment and recovery to maintain distance from people associated with substance use (Sun, 2007) may be especially challenging for a homeless person without housing and support services. Homeless persons tend to live in impoverished neighborhoods burdened by disproportionate rates of substance use, crime, and other social ills. Homeless persons lack economic resources and may also lack skills that facilitate reciprocal, prosocial, and health-promoting relationships (Padgett et al., 2008). The combination of housing, education, and employment may enhance the capacity of women to develop healthier affiliations.

There was limited evidence of the importance of relationship quality in protecting against women's alcohol and drug use. Tangible or informational support was associated only with significantly fewer days of marijuana use, consistent with a previous, longitudinal study of homeless women (Tucker, D'Amico et al., 2005). Absence of a significant association between social support and use of other drugs may reflect the addictive properties of crack, cocaine, and methamphetamine – support is likely not sufficient to help a woman overcome abuse or dependence but can serve as an important adjunct to treatment and recovery.

The current study also emphasizes the importance of individual characteristics of homeless women in association with drug use. Findings support the need to address comorbidity of mental health problems (Bassuk et al., 1998; Tucker, D'Amico et al., 2005). Depression affected more than half of the women in this study and significantly predicted women's binge drinking. For homeless women with substance use problems and depression, housing as well as educational and employment opportunities should be linked with treatment for substance abuse and depression.

A number of limitations should be noted. Data are cross-sectional and thus it cannot be definitively argued that women's networks influenced their substance use during the past 6 months. It is possible that expectations or policies regarding abstinence in the shelters from which we sampled the women may have impacted the level of substance use we observed. Our focus on reporting of substance use during the past 6 months rather than a shorter, past-30 day timeframe, for example, may have reduced the extent that substance use reporting was influenced by expectations of the particular shelter in which a woman was interviewed. Despite shelters' stated expectations for abstinence, substance use may nevertheless occur within them (Padgett et al., 2008). Additionally, the study relied on self-reports of substance use, as have other studies involving homeless persons (e.g., Nyamathi, Leake and Gelberg, 2000; Tucker, Wenzel et al., 2005). While there is concern about bias in self-report of sensitive information, self-report data on substance use have been highly correlated with objective measures (Nyamathi, Leake, Longshore et al., 2001). Another limitation is that behaviors of alters were not solicited directly from alters but rather reflected the perceptions of the respondent. Responses gathered in this way may be biased toward the respondents' expectations (Buchanan and Latkin, 2008); however, research has shown that perceptions of others' behaviors have an important influence on one's own cognitions and behaviors (Bronfenbrenner, 1979; Kelly and Kalichman, 2002; Wingood et al., 2001). Also regarding the alters, it may be that by limiting the number each woman name to 20, peripheral yet influential social ties were omitted from consideration. Despite these limitations, this study has succeeded in furthering our understanding of homeless women's alcohol and drug use through an investigation of the social context, thus providing needed direction for future research and interventions involving this vulnerable population.

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Table 1
Descriptive statistics (weighted): Respondent background characteristics, social network characteristics, and substance use N=445

Variables	Percent	Mean	S.D.
<u>Individual characteristics</u>			
Age		36.56	12.13
Race/ethnicity			
African American	40.17		
Hispanic	22.77		
White	25.86		
Native American/Alaskan Native	2.17		
Asian/Pacific Islander	1.38		
Other or multiracial	7.65		
At least high school (GED)	66.85		
Married	15.38		
Depression past 12 months	55.33		
Any time in jail or prison during lifetime	62.17		
<u>Personal network characteristics</u>			
<u>Network composition</u>			
<i>Type of alter</i> ⁺			
Relative (non-partner)		28.36	24.37
Non-relatives, non-partners		59.58	24.40
Non-relatives, male sex partners		12.05	10.59
<i>How (non-relative) alter was met:</i> ⁺ χ^2			
At a shelter		20.04	24.89
At employment or school		10.83	18.57
Through religious organization		2.31	10.28
Through alcohol or drug use		3.94	11.25
On the street		3.39	10.60
In the criminal justice system		0.63	3.58
<i>Behavior of all alters past 6 months:</i> ⁺			
Drank alcohol to intoxication		33.19	24.59
Used drugs		28.72	28.01
Engaged in risky sex		29.28	25.81
<i>Quality of relationship with alters past 6 months</i>			
Received any tangible or informational support from alter		64.68	28.68
Emotional closeness to alter		71.33	27.61
<i>Behavior of sex-partner alters past 6 months:</i> ⁺			
Drank alcohol to intoxication		36.69	42.92
Used drugs		38.66	42.68
Engaged in risky sex		39.30	41.97
Number of sex partner alters who perpetrated violence against respondent at any time	0.72	0.75	
<u>Network structure</u> ⁺			

Variables	Percent	Mean	S.D.
Density		0.30	0.22
Alcohol sub-group density		0.27	0.32
Drug sub-group density		0.25	0.32
Risky sex sub-group density		0.20	0.27
<u>Outcomes</u>			
<u>Days of substance use, past 6 months</u>			
Alcohol to intoxication		12.80	40.25
Crack		17.60	56.56
Cocaine		15.69	47.51
Marijuana		9.65	40.02
Methamphetamine, other amphetamines		19.51	51.75

⁺ Variables are calculated as percentage of alters with the given characteristic; the percentages reported are mean percentages across the alters of 445 respondents (sample size is 438 for network structure variables)

[†] List is not exhaustive thus percentages do not add up to 100%

Table 2

Multivariate binomial logistic regression models predicting days of substance use: drinking to intoxication, marijuana, crack, cocaine, methamphetamine/other amphetamines (weighted) + N = 438

Predictor Variables	Substance use past 6 months #			
	Binge drinking	Marijuana	Crack	Cocaine
Individual characteristics				
Age	1.03 (1.001, 1.06)*	0.96 (0.92, 1.005)	1.04 (1.01, 1.08)*	1.05 (1.004, 1.10)*
African American (vs. other)	0.65 (0.30, 1.41)	1.96 (1.05, 3.67)*	3.12 (1.37, 7.09)**	2.16 (0.77, 6.06)
Hispanic (vs. other)	0.75 (0.35, 1.61)	0.48 (0.18, 1.23)	0.69 (0.20, 2.47)	0.49 (0.10, 2.48)
At least high school (GED)	0.90 (0.47, 1.70)	1.39 (0.75, 2.58)	1.16 (0.57, 2.36)	1.52 (0.60, 3.90)
Married	0.85 (0.30, 2.42)	2.63 (1.17, 5.89)*	0.32 (0.10, 1.01)	0.62 (0.16, 2.31)
Depression past 12 months	2.11 (1.02, 4.35)*	1.36 (0.65, 2.84)	1.61 (0.82, 3.13)	1.48(0.66, 3.33)
Any time in jail or prison during lifetime	1.56 (0.70, 3.49)	2.37 (1.02, 5.48)*	1.81 (0.75, 4.40)	2.79 (0.91, 8.60)
Personal network characteristics				
<i>How (non-relative) alter was met (percent):</i>				
At employment or school	1.00 (0.98, 1.01)	0.98 (0.96, 0.998)*	0.95 (0.91, 0.996)*	0.95 (0.92, 0.98)**
On the street	1.00 (0.97, 1.02)	1.00 (0.98, 1.02)	1.03 (0.998, 1.05)	0.99 (0.97, 1.02)
In the criminal justice system	0.63 (0.52, 0.75)**	1.10 (0.99, 1.22)	0.97 (0.89, 1.06)	1.03 (0.90, 1.18)
<i>Behavior of all alters past 6 months:</i>				
Drank alcohol to Intoxication	1.02 (1.004, 1.03)*	1.00 (0.99, 1.02)	0.98 (0.97, 0.997)*	0.98 (0.97, 1.00)
Used drugs	1.01 (0.996, 1.02)	1.02 (1.01, 1.04)**	1.04 (1.02, 1.05)**	1.04 (1.02, 1.06)**
<i>Quality of relationship with alters past 6 months:</i>				
Received any tangible or informational support from alter	1.00 (0.99, 1.02)	0.98 (0.96, 0.996)*	1.01 (0.99, 1.02)	0.99 (0.98, 1.01)
Emotional closeness to alter	1.00 (0.98, 1.02)	1.02 (0.995, 1.04)	1.01 (0.9995, 1.03)	1.03 (1.01, 1.05)**
<i>Behavior of sex partner alters past 6 months: +</i>				
Number of sex partner alters who perpetrated violence against respondent at any time	1.46 (0.98, 2.18)	1.55 (1.05, 2.29)*	1.36 (0.84, 2.21)	1.27 (0.66, 2.46)

* p < .05;

p < .01

Models predicting the odds of substance use on any given day during the past 6 months; odds ratios and 95% confidence intervals depicted.

+ Table depicts results from final, trimmed models. Personal network characteristics not associated with any outcome at $p < .10$ in bivariate or initial multivariate models are excluded from final, trimmed models.