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Sociodemographic and substance use characteristics associated with typologies and composition of social support networks among youth experiencing homelessness in Los Angeles, USA

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Abstract

Youth experiencing homelessness are a vulnerable population with increased behavioural health risks. Social networks are a consistent correlate of youths' substance use behaviours. However, less is known about the reciprocal relationships among these constructs. This study classified youth experiencing homelessness according to their social support network type (e.g. instrumental, emotional, service) and composition (e.g. family, peers, service staff) and linked their membership in these social network classes to sociodemographic and substance use characteristics. Four waves of cross-sectional data were collected between October 2011 and June 2013 from youth experiencing homelessness, ages 14–29, at three drop-in centres in Los Angeles, CA (N = 1,046). This study employed latent class analysis to identify subgroups of youth experiencing homelessness according to the type and composition of their social support networks. Multinomial logistic regression analyses were then conducted to identify the sociodemographic and substance use characteristics associated with social support network class membership. Five latent classes of youths' social support networks were identified: (a) high staff emotional and service support; (b) high home-based peer and family emotional, service and instrumental support; (c) moderate street- and home-based peer emotional support; (d) low or no support and (e) high home-based peer and family emotional and instrumental support. Multinomial logistic regression models indicated that race/ethnicity, gender, sexual orientation, literal homelessness, former foster care experience, depression, heroin and marijuana use were significant correlates of social support network class membership. Results indicate distinct classes of social support networks among youth experiencing homelessness, with certain sociodemographic and substance use characteristics implicated in youths' social networks.

KEYWORDS
homeless, relationships, risk factors, social networks, social support, substance use, youth

1 | INTRODUCTION

Any individual aged 25 years or younger who is unable to live in a safe environment with a relative, and has no other safe and stable living arrangement is considered to be experiencing homelessness (Federal Register, 2011). A 2018 study estimated that 3.5 million youth in the United States between the ages of 18 and 25 experienced homelessness in the past year (Morton et al., 2018). Youth experiencing homelessness are among the most vulnerable individuals in the United States and face an array of challenging life circumstances, including abandonment, abuse and neglect, and domestic and community violence (Fisher, Florsheim, & Sheetz, 2005; Keeshin & Campbell, 2011; Stewart et al., 2004; Tyler & Beal, 2010). These youths also often carry marginalised identities and experiences in regards to gender, sexual orientation, race/ethnicity and socioeconomic status. These challenges may, in turn, affect youths' affiliations with others and systems of support both on and off the streets.

Unlike housed youths, youth experiencing homelessness are faced with changes in their social support networks as they lose connections with family and friends and form new social networks while living on the streets. These social networks provide emotional, instrumental and service support to youth as well as link youth to unhealthy or risky behaviours (Johnson Whitbeck, & Hoyt, 2005; Rice, Stein, & Milburn, 2008). Moreover, 30%–40% of youth experiencing homelessness also have experiences in foster care at some point in their lives (Bender, Yang, Ferguson, & Thompson, 2015; Yoshioka-Maxwell & Rice, 2017), and many youths run away or age out of the foster care system. Indeed, nearly two-thirds of youths aging out of foster care experience homelessness within the first 6 months of transitioning from foster care (Dworsky & Courtney, 2009), and experiencing homelessness may subsequently lead to the cessation of the already limited supports among these youths (Hagan & McCarthy, 2005).

Experiencing homelessness not only affects youths' development of social relationships but it also exposes youth to specific health risk behaviours, such as substance use; substance use is commonly linked to youths' social networks (Wenzel, Tucker, Golinelli, Green, & Zhou, 2010). High rates of substance use are well documented, with studies suggesting that up to 75% of youth experiencing homelessness report alcohol and/or marijuana use (Bousman et al., 2005; Martino et al., 2011; Santa Maria, Narendorf, & Cross, 2018; Zhao, Kim, Li, Hsiao, & Rice, 2018). In addition, studies have found that youth experiencing homelessness commonly engage in illicit substance use behaviours, such as methamphetamine (Greene, Ennett, & Ringwalt, 1999; Nyamathi, Hudson, Greengold, & Leake, 2012), cocaine/crack (Greene et al., 1999; Nyamathi et al., 2012), prescription drug (Al-Tayyib, Rice, Rhoades, & Riggs, 2014; Barman-Adhikari, Al-Tayyib, Begun, Bowen, & Rice, 2017), heroin (Barman-Adhikari, Rice, Winetrobe, & Petering, 2015) and injection drug use (Greene et al., 1999; Nyamathi et al., 2012; Parriott & Auerswald, 2009; Roy et al., 2011).

What is known about this topic

- Youth experiencing homelessness are among the most vulnerable individuals in the United States and face an array of challenging life circumstances.
- Youth experiencing homelessness are more likely than their housed peers to be characterised by few or poor social support networks.
- Youth experiencing homelessness with few or poor social support networks are at increased risk for engaging in risky behaviours, such as substance use.

What this paper adds

- Subgroups of youth experiencing homelessness vary according to the type and composition of their social support networks.
- Certain sociodemographic and substance use characteristics are significant correlates of homeless youths' social support network class membership.

Existing research has identified social network support type (e.g. instrumental, emotional, service) and support composition (e.g. family, peers, service providers) as contributing factors to youths' substance use. It is considered important to account for the type and composition of social support networks, given that patterns of social influence are usually neither random nor equal among all network members. Typically, research on youth experiencing homelessness has focused on the problematic influence of peers on risk-taking behaviours, with little attention given to positive impacts of social support or affiliation with pro-social relationships (Rice, Milburn, & Rotheram-Borus, 2007). However, evidence from various studies suggest that homeless youths' relationships are not confined to street associations alone (Rice et al., 2007; Wenzel et al., 2012). For example, in their study, Johnson et al. (2005) found that over 80% of youth reported having at least one non-street relationship. Likewise, Wenzel et al. (2012) reported that, on an average, youth designated that 17.91% of their networks were comprised of relatives or family members. More significantly, even though relatives comprised less than 20% of their networks, a majority of youth (67%) stated that they primarily relied on their relatives for instrumental and emotional support.

Increases in substance use among youth experiencing homelessness is associated with the behaviours of their risk-taking peers. For example, youths' connections to specific substance-using peers is associated with their own use of illicit drugs (Barman-Adhikari et al., 2015; Martino et al., 2011). Maintaining connections with home-based peers and supportive family members has a positive function for most youth experiencing homelessness. For example, Rice et al. (2007) found that associations with pro-social peers' reduced hard drug use (cocaine, methamphetamine and heroin) over time (Rice et al., 2007). Likewise, other

studies have found that youth who have connections with family members are less likely to report engaging in any substance use (Ennett, Bailey, & Federman, 1999; Wenzel et al., 2010). Notably, it is not just the presence of social relationships but the absence of a support system that could be problematic. One particular study found that youth with no reported social support networks are almost three times more likely to engage in illicit substance use (Ennett et al., 1999). Despite knowledge that social support networks are associated with youths' substance use behaviours, the sociodemographic and substance use characteristics that may influence the composition of, and the type of support provided within, youths' social networks are largely absent from the literature.

1.1 | Current study

To our knowledge, no studies have provided typologies and composition of social support networks among youth experiencing homelessness and linked their membership in these social support networks to sociodemographic and substance use characteristics. In fact, most of the extant research has investigated social networks as determinants of a range of health risk behaviours among youth experiencing homelessness. Therefore, this study used a person-centred analytic approach, latent class analysis, to allow for the classification of youth experiencing homelessness into mutually exclusive classes based on their reported composition and type of social supports. In addition, to advance research in this area by identifying the composition of youths' social networks as well as the type of support provided to youth, this study included classifying youth according to the emotional, instrumental and service support provided by street-based peer, home-based peer, family and staff social networks. Furthermore, to provide a more nuanced understanding of the factors influencing youths' relationships, this study examined the sociodemographic and substance use characteristics implicated in the social support networks of youth experiencing homelessness.

2 | METHODS

2.1 | Sample and procedures

Four waves of cross-sectional data were collected from youth experiencing homelessness, ages 14–29 years, at three drop-in centres in Los Angeles, CA, between October 2011 and June 2013 (N = 1,046). The parent study from which these data come from was designed to collect both egocentric and sociometric data. Social network analysis can be conducted at two levels: egocentric and sociometric analyses. In egocentric (or local) networks, only the ego (or the respondent) is interviewed about their network contacts. On the other hand, in sociometric (or global) data, members of the entire delineated community are queried regarding their relationships to each other. One of the main aims of the parent study was to provide unique sociometric data over time.

Sociometric data collected over time would reveal whether risk is related to positions in networks and if these risk-taking positions endure over time, independent of the individual youth. For the egocentric data analysis, since we were interested in understanding individual network typologies rather than the properties of the network themselves, we combined the four waves of data. Data collection techniques and survey items remained consistent across the four waves of the study.

All youth who accessed services at these agencies were eligible and invited to participate. Youths 18 years or older provided informed consent, and 14- to 17-year-old youths provided informed assent. The institutional review board (IRB) waived parental consent for youth younger than 18 years because they are unaccompanied minors who may not have a parent or guardian to provide consent. The IRB also approved all survey items and procedures. To honour participant's time, they received $20 in cash or gift cards, depending on their preference.

Youth experiencing homelessness were recruited for the study as they were signing up for services at the respective drop-in centres. Recruitment was conducted for 19 days at each agency during each wave. Trained interviewers were present for the duration of the service hours to inform youth about the study and recruit them if they agreed to participate. Interviewers, on an average, received 40 hrs of training, which included lectures, conducting mock-surveys, ethics related to research and responding to emergencies. Once youth agreed to participate in the study, informed consent or assent was obtained from each youth, with the caveats that child abuse and homicidal and suicidal ideation would be reported.

The data collection consisted of two parts: a computerised self-administered survey and an interviewer-administered social network interview. The computerised self-administered survey also included an audio-assisted version for those with literacy issues and could be completed in both English and Spanish.

The second part of the survey involved a face-to-face social network mapping interview conducted by a research team member. To prevent recall bias, a multiple elicitation method was used to generate names of people that youth experiencing homelessness considered to be a part of their social networks. The following prompt was first read: 'Think about the last month. Who have you interacted with? These can be people you interacted with in person, on the phone, or through the Internet'. After youth stopped nominating social connections, an additional 15 prompts to solicit nominees were read, and they follow: 'These might be friends; family; people you hang out with/chill with/kick it with/have conversations with; people you party with—use drugs or alcohol with; boyfriend/girlfriend; people you are having sex with; baby mama/baby daddy; case worker; people from school; people from work; old friends from home; people you talk to, on the phone or by email; people from where you are staying/squatting with; people you see at this agency; and other people you know from the street'. Interviewers paused between each prompt to allow youth to nominate additional social connections before proceeding to the next prompt.

2.2 | Measures

2.2.1 | Sociodemographic characteristics

Sociodemographic characteristics included age (measured in years), gender (male, female and transgender), race/ethnicity (African American, Latinx, White and other race), sexual orientation status [sexual minority (lesbian, gay, bisexual, or queer) and heterosexual], literal homelessness (yes, no), former foster care experience (yes, no) and depressive symptoms (yes, no).

Homelessness type was operationalised using the definition put forward by Tsemberis et al. (2007). They define homelessness as a condition which is characterised by a lack of consistent residence. Young people were categorised as literally homeless if they indicated that they were living on the streets, in abandoned buildings, or living in emergency shelters. Youth were categorised as unstably housed if they indicated that they were living in transitional living programmes or with friends or relatives.

Depressive symptoms were assessed by the 10-item Center for Epidemiological Studies Depression Scale (CES-D; Kohout, Berkman, Evans, & Cornoni Huntley, 1993). Any score equal to or above 10 is considered depressed. Youth were categorised as depressed (coded as 1) if they scored 10 or above, otherwise they were categorised as not experiencing depressive symptoms (coded as zero).

2.2.2 | Substance use

Recent (i.e. past 30 days) use of prescription drugs, heroin, methamphetamines, ecstasy, injection drugs, cocaine, alcohol and marijuana were assessed with an identical question asked for each substance: 'During the past 30 days, how many times have you used [substance]?' The response options ranged from *0 times*, *1 or 2 times*, *3 to 9 times*, *10 to 19 times*, *20 to 39 times* and *40 times or more*. These questions were dichotomised to address the skewed distribution, and to attain sufficient statistical power.

2.2.3 | Social support networks

In the social network interview, youth identified: which of their reported alters could be counted on to lend them money, give them food or a place to stay (i.e. instrumental support), which alters they could count on emotionally (ability to feel cared for or confide in a network alter; i.e. emotional support), and which alters they could go to for advice about social services such as help with housing, food, clothes, casework, etc. (i.e. service support). Alters were then distinguished by their relationship to the participant. Youth identified whether the alter was a family member (i.e. biological, step, adopted, mother, father, sister, etc.), a staff member at a service agency, a peer that they knew before becoming homeless (i.e. home-based peer) or a peer that was also homeless (i.e. street-based peer).

Instrumental, emotional and service social network support from street-based peers, home-based peers, family and staff members were assessed separately by calculating the proportion of each of these categories of people who were nominated as providers of emotional, instrumental and service support (Johnson et al., 2005). Proportions were used as a mechanism of controlling for network size. Since the resulting distribution was skewed, the measures included in analyses were transformed into binary indicators. The median is regarded as an ideal threshold for dichotomising skewed measures (Wang, Fan, & Willson, 1996). A median split was used to dichotomise the amount of social network support (instrumental, emotional and service) received from street-based peers, home-based peers, family, and staff members.

The median for all the social network support variables ranged from 0% to 0.07%; therefore, all the social network support items were dichotomised on 'zero'; that is, youth who indicated that they had at least one member from their network (whether family, peer or staff) who they perceived as providers of emotional, instrumental or service support were coded as '1' and youth who said that they did not have at least one member providing said support were categorised as '0'. In all, 12 dichotomous social network support variables were generated in this manner (i.e. street-based peer emotional, instrumental, service support; home-based peer emotional, instrumental, service support; family emotional, instrumental, service support; staff emotional, instrumental, service support).

2.3 | Data analysis

In SPSS 25.0, descriptive statistics (means, standard deviations or percentages) were calculated to describe the sociodemographic and substance use characteristics of the sample of youth experiencing homelessness.

Latent class analyses were conducted using Mplus (version 8; Muthén & Muthén, 1998–2017) on the sample of youth experiencing homelessness. All 12 dichotomous social network support variables were included in the model to allow classification of subgroups of homeless youth who report particular social networks. All models were estimated in two stages. In the first stage, 100 random sets of starting values and 50 optimisations were generated and 20 iterations were specified. Final solutions were accepted for the second stage after several replications. For the second stage, we used the Lo–Mendell–Rubin adjusted likelihood ratio test (LMR LRT; Tech 11) as well as the LRTSTARTS option (Tech 14) for the bootstrap likelihood ratio test (BLRT) *p* values, which also specified that, for the *k* − 1 class model, 40 random sets of starting values and 10 optimisations were generated. For the *k* class model, 200 random sets of starting values and 100 optimisations were generated. Several steps were taken to identify the best fitted model using an iterative process to evaluate estimates from models that specified 2–7 classes. The best fitted model was selected using the following criteria: (a) smaller Akaike information criterion values for the *k* class model relative to the *k* − 1 model (AIC; Akaike, 1987), (b) smaller sample-size adjusted Bayesian information criterion values for the *k* class model relative to the *k* − 1 class model (Adjusted BIC; Sclove, 1987), (c) significance values for the *k* class model were compared to those of the *k* − 1 class model for the LMR LRT (Lo, Mendell, & Rubin, 2001), (d)

significance values for the *k* class model were compared to those of the *k* − 1 class model for the BLRT (Nylund, Asparaouhov, & Muthén, 2007) and (e) classes contained more than 5% of the total sample. We also ensured that the best fitted model included classes that were meaningful to understanding social support network characteristics in relation to substance use among homeless youth.

After elucidating the latent class structure of the social networks of youth experiencing homelessness, multinomial logistic regression analyses were then conducted to identify the sociodemographic and substance use characteristics associated with social network class membership. A three-step method was used in which characteristics associated with class membership were summarised in a multidimensional frequency table (the latent class model is estimated), frequency counts were reweighted by matrix multiplication (the most likely class variable is created) and reweighted frequency counts were included in the multinomial logistic regression model (the most likely class variable is used as a latent class indicator variable); specifically, class membership was estimated in relation to sociodemographic and substance use characteristics (auxiliary variables) while adjusting for misclassification bias (Vermunt, 2010).

3 | RESULTS

3.1 | Sample characteristics

Descriptive statistics of sociodemographic and substance use characteristics of youth experiencing homelessness are presented in Table 1. Youth experiencing homelessness were between the ages of 14 and 29 years. The majority of youth identified as male, heterosexual, and racially or ethnically identified as white, followed by African American, other race and Latinx. Slightly more than half of youth indicated they were literally homeless, about one-third reported former foster care experience, and the majority endorsed symptoms of depression. Regarding substance use, the most commonly used substance among youth was marijuana, followed by alcohol, methamphetamines, prescription drugs, cocaine, ecstasy and heroin. Approximately 13% of youth reported injection drug use.

3.2 | Latent classes of social support networks among youth experiencing homelessness

As indicated in Table 2, the five-class solution was identified as the best fitted model for the sample of youth experiencing homelessness based on the various fit indices and selection criteria. With regard to the proportion of youth in each class, 5% (*n* = 53) was classified into class 1, 8% (*n* = 73) was classified into class 2, 10% (*n* = 109) was classified into class 3, 68% (*n* = 716) was classified into class 4 and 9% (*n* = 95) was classified into class 5. The proportion of youth experiencing homelessness in class 1 were likely to experience high staff emotional (0.80) and service (0.85) support. This class is identified as the *high staff emotional and service support* class. The

TABLE 1 Sociodemographic and substance use characteristics of youth experiencing homelessness

Characteristic	Youth experiencing homelessness (*N* = 1,046)
	M (SD)
Age	21.34 (2.16)
	n (%)
Race/ethnicity	
African American	244 (23.8)
Latinx	139 (13.5)
White	400 (39.0)
Other race	243 (23.7)
Gender	
Male	735 (71.6)
Female	275 (26.8)
Transgender	17 (1.7)
LGBQ	251 (24.9)
Literal homelessness	582 (55.9)
Former foster care experience	330 (31.5)
Depression	945 (94.6)
Injection drug use	145 (13.9)
Substance use[a]	
Prescription drug use	247 (23.6)
Heroin use	157 (15.0)
Methamphetamine use	298 (28.5)
Ecstasy use	200 (19.1)
Cocaine use	215 (20.6)
Alcohol use	543 (51.9)
Marijuana use	633 (60.5)

Abbreviation: LGBQ, lesbian, gay, bisexual, or queer sexual orientation status.
[a]Prevalence of substance use reported in the prior 30 days.

second class included the proportion of youth who were likely to experience high home-based peer emotional (0.95), service (1.00), and instrumental (0.85) support as well as high family emotional (0.92), service (0.76), and instrumental (0.79) support. Class 2 is referred to as the *high home-based peer and family emotional, service and instrumental support* class. Class 3 was primarily characterised by the proportion of youth who were likely to experience moderate street-based peer emotional (0.59) support and home-based peer emotional (0.63) support. Therefore, this class is named the *moderate street- and home-based peer emotional support* class. The fourth class included youth experiencing homelessness who reported low or no support across any domain. This class is identified as the *low or no support* class. Finally, class 5 was characterised by the proportion of youth who were likely to experience high home-based peer emotional (1.00) and instrumental (1.00) support as well as high family emotional (1.00) and instrumental (0.98) support. This class

TABLE 2 Fit indices for latent class models of social support networks among youth experiencing homelessness

Model fit indices	Number of classes					
	2	3	4	5	6	7
Log-likelihood	−3,059.32	−2,984.95	−2,802.04	−2,733.58	−2,695.42	−2,658.46
Entropy	0.97	0.96	0.97	0.97	0.96	0.98
AIC	6,168.63	5,832.52	5,706.07	5,595.16	5,544.84	5,496.92
Adjusted BIC	6,213.05	5,900.04	5,796.68	5,708.86	5,681.64	5,656.82
LMR p value	<0.001	<0.001	<0.001	<0.001	0.13	<0.01
BLRT p value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Class size	312, 734	186, 145, 715	93, 167, 75, 711	53, 73, 109, 716, 95	93, 63, 60, 55, 717, 58	45, 714, 52, 43, 103, 63, 26
Class proportion	0.30, 0.70	0.18, 0.14, 0.68	0.09, 0.16, 0.07, 0.68	0.05, 0.08, 0.10, 0.68, 0.09	0.09, 0.06, 0.06, 0.05, 0.68, 0.06	0.04, 0.68, 0.05, 0.04, 0.10, 0.06, 0.03

Abbreviations: Adjusted BIC, sample-size adjusted Bayesian information criterion; AIC, Akaike information criterion; BLRT, bootstrap likelihood radio test; LMR, Lo–Mendell–Rubin adjusted likelihood ratio test.
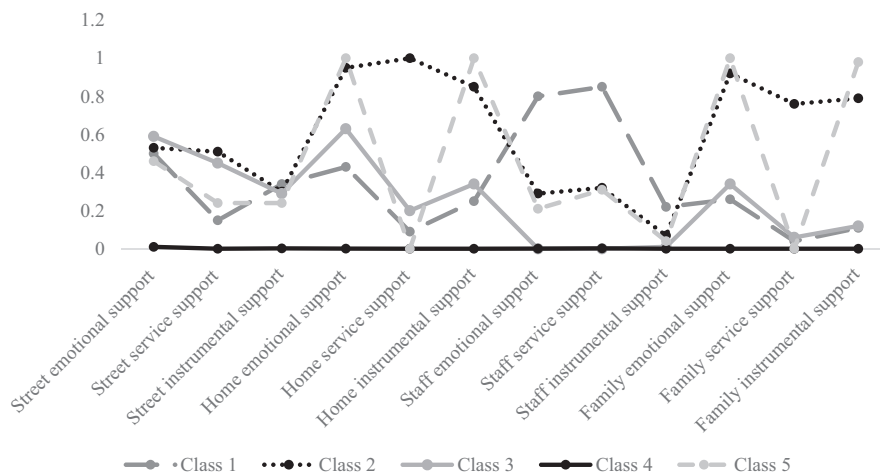
FIGURE 1 Proportion of youth experiencing homelessness classified by social support networks for the five-class solution. Note. Class 1 = High staff emotional and service support; Class 2 = High home-based peer and family emotional, service and instrumental support; Class 3 = Moderate street- and home-based peer emotional support; Class 4 = Low or no support; Class 5 = High home-based peer and family emotional and instrumental support

is referred to as the *high home-based peer and family emotional and instrumental support* class (Figure 1).

3.3 | Sociodemographic and substance use characteristics associated with social support network class membership

In the multinomial logistic regression models examining sociodemographic and substance use characteristics associated with social support network class membership among youth experiencing homelessness, race/ethnicity, gender, sexual orientation, literal homelessness, former foster care experience, depression, heroin and marijuana use were significant correlates of class membership. Specifically, African American and female youth each had roughly two times the odds of being in the *high home-based peer and family emotional and instrumental support* class than the *low or no support* class compared to their white and male counterparts, respectively. Conversely, youth who were literally homeless, had depression or identified as a sexual minority had greater odds of being in the *low*

or no support class than in a class with social supports. Former foster youth experiencing homelessness had almost two times the odds of being classified in the *high staff emotional and service support* class than the *low or no support* class.

Regarding substance use, youth who used heroin were at greater odds of being in the *low or no support* class than in the in the *high staff emotional and service support* class. However, youth who used marijuana had almost two and half times greater odds of being in the *high home-based peer and family emotional and instrumental support* class than in the *low and no support* class (Table 3).

4 | DISCUSSION

This study offered a number of important findings. Notably, this study demonstrated the importance of using a person-centred analytic approach (i.e. latent class analysis), which allowed us to represent the complex and varied dimensions of social support networks among youth experiencing homelessness. Using this method, distinct

TABLE 3 Multinomial logistic regression results of sociodemographic and substance use characteristics associated with social support network class membership among youth experiencing homelessness

Characteristic	Latent class solution for the five-class model (Class 4: *low or no support class* = reference class)							
	Class 1		Class 2		Class 3		Class 5	
	OR (SE)	95% CI	OR (SE)	95% CI	OR (SE)	95% CI	OR (SE)	95% CI
Characteristic								
Age	1.00 (0.07)	−0.15 to 0.14	0.96 (0.07)	−0.17 - 0.09	1.11 (0.06)	−0.00 - 0.21	1.01 (0.06)	−0.10 - 0.11
Race/ethnicity								
African American (White)	1.56 (0.41)	−0.35 to 1.24	1.90 (0.35)	−0.05 to 1.33	0.73 (0.37)	−1.03 - 0.40	2.34 (0.30)**	0.26 to 1.44
Latinx (White)	0.60 (0.57)	−1.64 to 0.60	2.01 (0.42)	−0.12 to 1.51	1.28 (0.40)	−0.53 to 1.03	1.77 (0.43)	−0.27 to 1.41
Other race (White)	0.64 (0.44)	−1.32 to 0.42	0.74 (0.41)	−1.12 to 0.51	0.58 (0.33)	−1.20 0.11	0.77 (0.37)	−0.98 to 0.45
Gender								
Female (male)	0.88 (0.37)	−0.86 to 0.61	1.37 (0.34)	−0.34 to 0.97	1.75 (0.32)	−0.07 to 1.18	2.68 (0.29)**	0.42 to 1.55
Transgender (male)[a]	0.94 (1.23)	−2.49 - 2.35	1.12 (1.17)	−2.18 to 2.41	0.92 (0.69)	−1.42 to 1.27	-	-
LGBQ	1.01 (0.35)	−0.68 to 0.70	0.73 (0.37)	−1.04 to 0.42	0.71 (0.34)	−1.02 to 0.32	0.48 (0.34)*	−1.39 to −0.07
Literal homelessness	0.43 (0.32)**	−1.49 to −0.22	0.34 (0.31)***	−1.68 to −0.49	0.20 (0.27)***	−2.15 to −1.08	0.18 (0.27)***	−2.25 to −1.18
Former foster care experience	1.97 (0.31)*	0.07 - 1.29	0.82 (0.31)	−0.80 to 0.40	0.86 (0.27)	−0.68 to 0.38	0.74 (0.29)	−0.87 to 0.26
Depression	2.01 (1.11)	−1.47 - 2.87	0.52 (0.56)	−1.74 to 0.44	0.26 (0.47)**	−2.24 to −0.41	0.41 (0.47)	−1.81 to 0.04
Injection drug use	1.29 (0.48)	−0.68 - 1.19	2.10 (0.48)	−0.20 to 1.69	1.50 (0.43)	−0.44 to 1.26	0.80 (0.50)	−1.20 to 0.77
Substance use								
Prescription drug use	1.40 (0.33)	−0.31 to 0.98	1.34 (0.44)	−0.57 to 1.16	1.28 (0.34)	−0.41 to 0.91	1.73 (0.36)	−0.15 to 1.25
Heroin use	0.24 (0.66)*	−2.70 to −0.13	1.64 (0.51)	−50 to 1.49	0.63 (0.48)	−1.41 (0.49)	0.93 (0.53)	−1.10 to 0.96
Methamphetamine use	1.87 (0.35)	−0.05 - 1.30	0.83 (0.41)	−0.99 to 0.61	1.49 (0.32)	−0.23 to 1.02	1.24 (0.35)	−0.47 to 0.90
Ecstasy use	1.40 (0.40)	−0.45 - 1.13	1.11 (0.43)	−0.73 to 0.93	1.18 (0.34)	−0.49 to 0.82	0.58 (0.50)	−1.53 to 0.44
Cocaine use	1.36 (0.40)	−0.48 - 1.09	0.48 (0.49)	−1.70 to 0.22	0.88 (0.37)	−0.85 to 0.61	0.60 (0.43)	−1.36 to 0.33
Alcohol use	1.45 (0.33)	−0.28 - 1.03	0.56 (0.31)	−1.19 to 0.04	1.01 (0.28)	−0.54 to 0.56	0.64 (0.27)	−0.99 to 0.09
Marijuana use	0.51 (0.33)*	−1.32 to −0.02	1.13 (0.31)	−0.48 to 0.73	1.04 (0.29)	−0.52 to 0.60	2.56 (0.27)**	0.41 to 1.47

Abbreviations: ( ), reference category; CI, 95% confidence interval; LGBQ, lesbian, gay, bisexual, or queer sexual orientation status; OR, odds ratio; SE, standard error.

[a]Given the small number of transgender participants, we could not include them as a separate variable in our model comparing Class 4 to Class 5 and had to drop them from this analysis.

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

social support network typologies and composition were found among this sample of youth experiencing homelessness. Consistent with prior research (Barman-Adhikari et al., 2015; Ennett et al., 1999; Yoshioka-Maxwell & Rice, 2017), youth experiencing homelessness were predominantly characterised by low or no social supports. For youth with a social support network, the networks were small and primarily comprised of peers, followed by family and staff. Because there was a relatively large percentage of youth, almost 70% of the sample, who reported low or no social support networks, this may be problematic and these youths may face unique challenges while experiencing homelessness. Since positive social support is vital for the well-being of people of all ages and especially for young people on the streets, it is critical that interventions help connect them to formal community supports or mentoring relationships that can be sources of strength and affirmation.

Across all classes with support provided, youth experiencing homelessness tended to cluster based on reports of emotional support. Indeed, experiencing emotional support was highly prevalent in these classes ranging from 59% (class 3) to 100% (class 5). In addition, emotional support tended to co-occur with other types of support, including instrumental and service support. Although the majority of youth experiencing homelessness reported higher rates of low or no support, youth connected to home-based peers also remained connected to family. Therefore, it is likely that subgroups of youth maintain robust relationships with the social support networks they had prior to their experience of homelessness. Because previous research suggests that youth who maintain these non-street relationships are more likely to have positive outcomes, it might be prudent to prioritise them for housing and other tangible supports that can help expedite their transition out of homelessness and prevent them from becoming entrenched in the street environment.

Several sociodemographic characteristics that were associated with youths' social support networks are consistent with findings from prior research (Auerswald & Puddefoot, 2012; Johnson et al., 2005; Wenzel et al., 2012). For example, African American youth reported significantly more family and friends in their social support networks than their white counterparts. One study (Auerswald & Puddefoot, 2012) found that African American youth who are homeless are more likely to maintain relationships with a network of immediate and extended family members and receive shelter from them even when these relationships are compromised. On the other hand, white youth in the same study reported that their relationship with their family did not consist of more than an occasional phone contact and their family issues was the primary reason for them becoming homeless. Since African American youth maintain contact with family and also report spending nights with them, helping these youths' families with resources can be the most effective approach to keeping these youths stably housed (Auerswald & Puddefoot, 2012). On the other hand, interventions for white youth might need to address family dysfunction that contributed to them becoming homeless (Auerswald & Puddefoot, 2012).

It is not surprising that youth who reported literal homelessness or sexual minority status had greater odds of low or no social support

networks. In fact, literal homelessness was a consistent predictor of youths' odds of being classified into the low or no support group relative to a class with staff, street- and home-based peers, and family support. It is likely that these young people are experiencing literal homelessness because of their lack of social support systems and vice versa. Similarly, youth reporting a minority sexual orientation are also likely to experience homelessness. Prior research indicates that youths' greater likelihood of being homeless is driven by their increased risk of living separately from their parents or guardians (Corliss, Goodenow, Nichols, & Austin, 2011). Street outreach services should be utilised to target these groups of youth so that they can be connected to formal systems and reduce the isolation associated with living on the streets.

A somewhat surprising finding is that former foster youth experiencing homelessness had greater odds of being characterised by the high staff emotional and service support class when compared to the low or no support class. Although prior research suggests that former foster youth experiencing homelessness report significantly fewer people in their networks than youth without a history of foster care (Negriff, James, & Trickett, 2015; Yoshioka-Maxwell & Rice, 2017), it is possible that a subgroup of youth remain connected to past caseworkers or involved with other service systems. Additionally, youth who have been connected to the child welfare system may have learned how to navigate the web of social services and supports. Indeed, former foster youth experiencing homelessness may need continued support when transitioning to independent living (Hudson & Nandy, 2012).

In regard to psychological characteristics, depression was associated with being in the low to no support group. This is expected as previous research has demonstrated that depression is often associated with experiencing social isolation among youth who are housed (Hall-Lande, Eisenberg, Christenson, & Neumark-Sztainer, 2007) and homeless (Rice, Kurzban, & Ray, 2012). Therefore, it is important that interventions addressing mental health also address issues of social isolation and shoring up social support for this group of young people who have mental health needs, which might be going unaddressed.

Our findings diverge from prior research with regard to gender. For example, previous research (Rice, Barman-Adhikari, Milburn, & Monro, 2012; Valente & Auerswald, 2013) has found that females are more likely to be embedded in street relationships and experience greater isolation from their family and home-based peers. However, our findings indicate that females were characterised by higher home-based peer and family social support networks compared to males experiencing homelessness. Given that only 20% of our sample identified as female, it is possible that this smaller subgroup of females is not representative of the larger homeless youth population.

Regarding the relationships between substance use characteristics and youths' social support networks, only heroin and marijuana were significant correlates. Consistent with prior research (Martino et al., 2011), the majority of youth experiencing homelessness reported marijuana use. Youth reported greater odds of marijuana use

even if they remain connected to family and friends from before they became homeless. Because marijuana is an accessible substance and mainstream societal norms have shifted such that it is a substance that is more socially acceptable, it is likely that marijuana is one substance that does not impact how these youths are perceived by their more normative home-based social support networks and therefore less likely to hinder these relationships.

Estimates of heroin use among youth experiencing homelessness range from 17% to 35% (Van Leeuwen et al., 2004), which is slightly more than the percentage of youth reporting heroin use in this sample. Similar to others' findings related to heroin use and youths' social networks (Barman-Adhikari et al., 2015), youth who used heroin in this study reported relatively few social networks. Heroin use has been found to be more prevalent among youth who are less popular and who have fewer connections within their network (Barman-Adhikari et al., 2015). Heroin is also one of the most stigmatising drugs among many populations including youth experiencing homelessness (Harrison & Hughes, 1997), which may further contribute to these youths reporting sparser social support networks. Since these youths are stigmatised, it is highly likely they might only be associating with other heroin users. Evidence suggests that these problematic social ties can detract from engaging in interventions and recovery. Therefore, the focus might need to be on helping these young people exit these dysfunctional social relationships.

4.1 | Limitations

The present study has certain limitations. Although three drop-in centres in Los Angeles, CA were used to recruit youth experiencing homelessness, findings may not generalise to youth in other cities or regions. The cross-sectional data used in study analyses are also a limitation. Given the findings of the present study as well as prior research on social networks and health risk behaviours among youth experiencing homelessness, there is a clear bidirectional relationship. However, more research is needed to examine how these relationships may change over time. Specifically, it might be helpful to compare the cohorts in the four waves of data and analyse whether network typologies remain consistently associated with demographic and substance use behaviours. Finally, this study is based on self-reported data, which could lend itself to bias especially with regard to sensitive items. Youth were assured that their data were confidential. Additionally, they were able to complete their surveys on their own electronically, which has also been known to reduce bias in reporting (Schroder, Carey, & Vanable, 2003).

4.2 | Conclusion

Study findings highlight some of the challenges that youth experiencing homelessness may face while living on the streets. A significant proportion of these youths experience low or no social support networks that may be affected by certain sociodemographic and substance use characteristics. Classification of

these youths into groups based on their social support networks and understanding the relationship to risk characteristics not only offers insight into the diverse composition and type of support provided to these youths but also may inform improvements in practices and policies that address the unique needs of this vulnerable population.

CONFLICTS OF INTEREST

None.

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REFERENCES

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*, 317–332. https://doi.org/10.1007/BF02294359

Al-Tayyib, A. A., Rice, E., Rhoades, H., & Riggs, P. (2014). Association between prescription drug misuse and injection among runaway and homeless youth. *Drug and Alcohol Dependence*, *134*, 406–409. https://doi.org/10.1016/j.drugalcdep.2013.10.027

Auerswald, C., & Puddefoot, G. (2012). *Comparing White and African American homeless youth in San Francisco: Research findings and policy implications*. Retrieved from http://cahomelessyouth.library.ca.gov/docs/pdf/76146-Compare-WA-Brief-Report.pdf

Barman-Adhikari, A., Al Tayyib, A., Begun, S., Bowen, E., & Rice, E. (2017). Descriptive and injunctive network norms associated with nonmedical use of prescription drugs among homeless youth. *Addictive Behaviors*, *64*, 70–77. https://doi.org/10.1016/j.addbeh.2016.08.015

Barman-Adhikari, A., Rice, E., Winetrobe, H., & Petering, R. (2015). Social network correlates of methamphetamine, heroin, and cocaine use in a sociometric network of homeless youth. *Journal of the Society for Social Work and Research*, *6*(3), 433–457. https://doi.org/10.1086/682709

Bender, K., Yang, J., Ferguson, K., & Thompson, S. (2015). Experiences and needs of homeless youth with a history of foster care. *Children and Youth Services Review*, *55*, 222–231. https://doi.org/10.1016/j.childyouth.2015.06.007

Bousman, C. A., Blumberg, E. J., Shillington, A. M., Hovell, M. F., Ji, M., Lehman, S., & Clapp, J. (2005). Predictors of substance use among homeless youth in San Diego. *Addictive Behaviors*, *30*(6), 1100–1110. https://doi.org/10.1016/j.addbeh.2004.10.006

Corliss, H. L., Goodenow, C. S., Nichols, L., & Austin, S. B. (2011). High burden of homelessness among sexual-minority adolescents: Findings from a representative Massachusetts high school sample. *American Journal of Public Health*, *101*(9), 1683–1689. https://doi.org/10.2105/AJPH.2011.300155

Dworsky, A., & Courtney, M. E. (2009). Homelessness and the transition from foster care to adulthood. *Child Welfare*, *88*(4).

Ennett, S. T., Bailey, S. L., & Federman, E. B. (1999). Social network characteristics associated with risky behaviors among runaway and homeless youth. *Journal of Health and Social Behavior*, *40*, 63–78. https://doi.org/10.2307/2676379

Fisher, M., Florsheim, P., & Sheetz, J. (2005). That's not my problem: Convergence and divergence between self-and other-identified problems among homeless adolescents. *Child and Youth Care Forum*, *34*(6), 393–403. https://doi.org/10.1007/s10566-005-7753-9

Greene, J. M., Ennett, S. T., & Ringwalt, C. L. (1999). Prevalence and correlates of survival sex among runaway and homeless youth. *American*

Journal of Public Health, 89(9), 1406–1409. https://doi.org/10.2105/ajph.89.9.1406

Hagan, J., & McCarthy, B. (2005). *Homeless youth and the perilous passage to adulthood*. Retrieved from https://www.nhchc.org/wp-content/uploads/2011/10/homelessyouthperilouspassage.pdf

Hall-Lande, J. A., Eisenberg, M. E., Christenson, S. L., & Neumark-Sztainer, D. (2007). Social isolation, psychological health, and protective factors in adolescence. *Adolescence*, 42(166).

Harrison, I., & Hughes, A. (1997). *The validity of self-reported drug use: Improving the accuracy of survey estimates (NIH Publication No. 97–4147)*. Rockville: MDL National Institute on Drug Abuse.

Hudson, A. L., & Nandy, K. (2012). Comparisons of substance abuse, high-risk sexual behavior and depressive symptoms among homeless youth with and without a history of foster care placement. *Contemporary Nurse*, 42(2), 178–186. https://doi.org/10.5172/conu.2012.42.2.178

Johnson, K. D., Whitbeck, L. B., & Hoyt, D. R. (2005). Predictors of social network composition among homeless and runaway adolescents. *Journal of Adolescence*, 28(2), 231–248. https://doi.org/10.1016/j.adolescence.2005.02.005

Keeshin, B. R., & Campbell, K. (2011). Screening homeless youth for histories of abuse: Prevalence, enduring effects, and interest in treatment. *Child Abuse & Neglect*, 35(6), 401–407. https://doi.org/10.1016/j.chiabu.2011.01.015

Kohout, F. J., Berkman, L. F., Evans, D. A., & Cornoni-Huntley, J. (1993). Two shorter forms of the CES-D depression symptoms index. *Journal of Aging and Health*, 5(2), 179–193. https://doi.org/10.1177/089826439300500202

Lo, Y., Mendell, N., & Rubin, D. (2001). Testing the number of components in a normal mixture. *Biometrika*, 88, 767–778. https://doi.org/10.1093/biomet/88.3.767

Martino, S. C., Tucker, J. S., Ryan, G., Wenzel, S. L., Golinelli, D., & Munjas, B. (2011). Increased substance use and risky sexual behavior among migratory homeless youth: Exploring the role of social network composition. *Journal of Youth and Adolescence*, 40(12), 1634–1648. https://doi.org/10.1007/s10964-011-9646-6

Morton, M. H., Dworsky, A., Matjasko, J. L., Curry, S. R., Schlueter, D., Chávez, R., & Farrell, A. F. (2018). Prevalence and correlates of youth homelessness in the United States. *Journal of Adolescent Health*, 62(1), 14–21. https://doi.org/10.1016/j.hadolhealth.2017.10.006

Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.) Los Angeles, CA: Author.

Negriff, S., James, A., & Penelope, K. (2015). Characteristics of the social support networks of maltreated youth: Exploring the effects of maltreatment experience and foster placement. *Social Development*, 24(3), 483–500. https://doi.org/10.1111/sode.12102

Nyamathi, A., Hudson, A., Greengold, B., & Leake, B. (2012). Characteristics of homeless youth who use cocaine and methamphetamine. *The American Journal on Addictions*, 21(3), 243–249. https://doi.org/10.1111/j.1521-0391.2012.00233.x

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling*, 14(4), 535–569. https://doi.org/10.1080/10705510701575396

Parriott, A. M., & Auerswald, C. L. (2009). Incidence and predictors of onset of injection drug use in a San Francisco cohort of homeless youth. *Substance Use & Misuse*, 44(13), 1958–1970. https://doi.org/10.3109/10826080902865271

Register, F. (2011). *Homeless emergency assistance and rapid transition to housing: Defining "homeless"*. Retrieved from https://www.govinfo.gov/content/pkg/FR-2011-12-05/pdf/2011-30942.pdf

Rice, E., Barman-Adhikari, A., Milburn, N. G., & Monro, W. (2012). Position-specific HIV risk in a large network of homeless youths. *American Journal of Public Health*, 102(1), 141–147. https://doi.org/10.2105/AJPH.2011.300295

Rice, E., Kurzban, S., & Ray, D. (2012). Homeless but connected: The role of heterogeneous social network ties and social networking technology in the mental health outcomes of street-living adolescents. *Community Mental Health Journal*, 48(6), 692–698. https://doi.org/10.1007/s10597-011-9462-1

Rice, E., Milburn, N. G., & Rotheram-Borus, M. J. (2007). Pro-social and problematic social network influences on HIV/AIDS risk behaviours among newly homeless youth in Los Angeles. *AIDS Care*, 19(5), 697–704. https://doi.org/10.1080/09540120601087038

Rice, E., Stein, J. A., & Milburn, N. (2008). Countervailing social network influences on problem behaviors among homeless youth. *Journal of Adolescence*, 31(5), 625–639. https://doi.org/10.1016/j.adolescence.2007/10.008

Roy, É., Godin, G., Boudreau, J.-F., Côté, P.-B., Denis, V., Haley, N., ... Boivin, J.-F. (2011). Modeling initiation into drug injection among street youth. *Journal of Drug Education*, 41(2), 119–134. https://doi.org/10.2190/DE.41.2.a

Santa Maria, D. M., Narendorf, S. C., & Cross, M. B. (2018). Prevalence and correlates of substance use in homeless youth and young adults. *Journal of Addictions Nursing*, 29(1), 23–31. https://doi.org/10.1097/JAN.000000000000206

Schroder, K. E., Carey, M. P., & Vanable, P. A. (2003). Methodological challenges in research on sexual risk behavior: II. Accuracy of self-reports. *Annals of Behavioral Medicine*, 26(2), 104–123. https://doi.org/10.1207/S15324796ABM2602_03

Sclove, L. (1987). Application of model-selection criteria to some problems in multivariate analysis. *Psychometrika*, 52, 333–343. https://doi.org/10.1007/BF02294360

Stewart, A. J., Steiman, M., Cauce, A. M., Cochran, B. N., Whitbeck, L. B., & Hoyt, D. R. (2004). Victimization and posttraumatic stress disorder among homeless adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 43(3), 325–331. https://doi.org/10.1097/00004583-20040300-00015

Tsemberis, S., McHugo, G., Williams, V., Hanrahan, P., & Stefancic, A. (2007). Measuring homelessness and residential stability: The residential time-line follow-back inventory. *Journal of Community Psychology*, 35(1), 29–42. https://doi.org/10.1002/jcop.20132

Tyler, K. A., & Beal, M. R. (2010). The high-risk environment of homeless young adults: Consequences for physical and sexual victimization. *Violence and Victims*, 25(1), 101. https://doi.org/10.1891/0886-6708.25.1.101

Valente, A. M., & Auerswald, C. L. (2013). Gender differences in sexual risk and sexually transmitted infections correlate with gender differences in social networks among San Francisco homeless youth. *Journal of Adolescent Health*, 53(4), 486–491. https://doi.org/10.1016/j.jadohealth.2013.05.016

Van Leeuwen, J. M., Hopfer, C., Hooks, S., White, R., Petersen, J., & Pirkopf, J. (2004). A snapshot of substance abuse among homeless and runaway youth in Denver, Colorado. *Journal of Community Health*, 29(3), 217–229. https://doi.org/10.1023/B:JOHE.0000022028.50989.aa

Vermunt, J. K. (2010). Latent class modeling with covariates: Tow improved three-step approaches. *Political Analysis*, 18, 450–469. https://doi.org/10.1093/pan/mpq025

Wang, L., Fan, X., & Willson, V. L. (1996). Effects of nonnormal data on parameter estimates and fit indices for a model with latent and manifest variables: An empirical study. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(3), 228–247. https://doi.org/10.1080/10705519609540042

Wenzel, S., Holloway, I., Golinelli, D., Ewing, B., Bowman, R., & Tucker, J. (2012). Social networks of homeless youth in emerging adulthood. *Journal of Youth and Adolescence*, 41(5), 561–571. https://doi.org/10.1007/s10964-011-9709-8

Wenzel, S. L., Tucker, J. S., Golinelli, D., Green, H. D., & Zhou, A. (2010). Personal network correlates of alcohol, cigarette, and marijuana use

among homeless youth. *Drug and Alcohol Dependence*, *112*(1), 140–149. https://doi.org/10.1016/j.drugalcdep.2010.06.004

Yoshioka-Maxwell, A., & Rice, E. (2017). Exploring the impact of network characteristics on substance use outcomes among homeless former foster youth. *International Journal of Public Health*, *62*(3), 371–378. https://doi.org/10.1007/s00038-016-0845-5

Zhao, Q., Kim, B. E., Li, W., Hsiao, H. Y., & Rice, E. (2018). Incarceration history, social network composition, and substance use among homeless youth in Los Angeles. *Journal of Addictive Diseases*, *1–13*, https://doi.org/10.1080/10550887.2018.1545555