

# Methamphetamine Use among Homeless Former Foster Youth: The Mediating Role of Social Networks

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## Abstract

**Objectives:** Social network analysis can provide added causal insight into otherwise confusing epidemiologic findings in public health research. Although foster care and homelessness are risk factors for methamphetamine use, current research has failed to explicate why homeless youth with foster care experience engage in methamphetamine use at higher rates than other homeless young adults. This study examined the mediating effect of network engagement and time spent homeless on the relationship between foster care experience and recent methamphetamine use among homeless youth in Los Angeles.

**Methods:** Egocentric network data from a cross-sectional community-based sample ( $n = 652$ ) of homeless youth aged 13–25 were collected from drop-in centers in Los Angeles. Questions addressed foster care experience, time spent homeless, methamphetamine use, and perceived drug use in social networks. Path analysis was performed in SAS to examine mediation.

**Results:** Controlling for all other variables, results of path analysis regarding recent methamphetamine use indicated a direct effect between foster care experience and recent methamphetamine use ( $B = .269$ ,  $t = 2.73$ ,  $p < .01$ ). However, this direct effect became statistically non-significant when time spent homeless and network methamphetamine use were added to the model, and indirect paths from time spent homeless and network methamphetamine use became statistically significant.

**Conclusions:** Foster care experience influenced recent methamphetamine use indirectly through time spent homeless and methamphetamine use by network members. Efforts to reduce methamphetamine use should focus on securing stable housing and addressing network interactions among homeless former foster youth.

**Keywords:** Social network analysis; Mediation; Substance use; Homeless youth; Former foster youth.

**Abbreviations:** RAAM (Risk Amplification and Abatement Model)

## Introduction

Social network analysis can be a powerful tool for understanding the motivations behind health behaviors among vulnerable populations. Homeless former foster youth constitute a vulnerable population that has received relatively little attention in the scientific literature compared to homeless youth or former foster care youth. However, 30% of all homeless adults report a foster care history, compared to 4% of the general public [1,2]. Recent research has demonstrated high rates of poor physical and behavioral health outcomes among homeless former foster youth [3-5]. In particular, methamphetamine use is more prevalent among homeless former foster youth relative to other homeless youth [4-7]. Because social networks have been implicated in behavioral health problems for both homeless youth and former foster youth [8-16], this study explored whether engagement with substance-using peers and time spent on the streets mediate the relationship between former foster care experiences and frequency of methamphetamine use among homeless youth sampled from drop-in day service centers in Los Angeles. As such, we employed social network analysis to examine this previously observed yet unexplained difference between former foster and non-former foster homeless youth with respect to their levels of methamphetamine use.

Among young adults who have transitioned out of foster care, risk and occurrence of homelessness, substance use, health problems, mental health problems, and criminal behavior are high compared to other young adults who have not experienced foster care [3,17-20].

Foster youth are not only at risk of poor outcomes while under state care but also after emancipation and well into adulthood [21].

Similarly, homeless youth face various risk factors and poor outcomes. Homelessness is a risk factor for a variety of negative health outcomes for young people and time spent homeless is associated with increased rates of substance use in this population [6]. Rates of drug use are particularly high for homeless youth and are associated with high rates of sexual risk-taking behaviors such as participation in exchange sex, i.e., exchanging sex for goods or services [22-26].

For foster and former foster youth, connectedness is particularly impactful for well-being, whereby engagement in positive relationships is associated with fewer disruptive behaviors [11]. Family contact and family support have been shown to be associated with resilience [27,28]. Furthermore, these youth face additional risk factors because they have fewer ties and experience more network disruption compared to other young adult populations [29]. Although networks are particularly important for youth during transition, these same young adults tend

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**Received:** March 04, 2015; **Accepted:** April 03, 2015; **Published:** April 06, 2015

**Citation:** Yoshioka-Maxwell A, Rice E, Rhoades H, Winetrobe H (2015) Methamphetamine Use among Homeless Former Foster Youth: The Mediating Role of Social Networks. J Alcohol Drug Depend 3: 197. doi:10.4172/23296488.1000197

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to struggle with maintaining relationships with their birth families and have a difficult time adjusting to the often abrupt changes that come with transition and discharge from foster care [17,30,31]. Furthermore, former foster homeless youth tend to lack support during transition out of foster care and to be isolated from family, friends, and other support networks, increasing their risk of poor health outcomes [32]. Thus, the role and importance of network factors emerge as determinants of the physical and behavioral health of homeless youth. Studies examining the social networks of homeless young adults have indicated that social networks strongly influence the negative effects of homelessness on mental and behavioral health; negative network ties increase substance use, antisocial behavior, depression, risk-taking behaviors, perceptions of negative social support, and engagement in sex and drug risk behaviors [8–10,12–16].

Time spent homeless has also been shown to encompass a range of risk factors. This may be due to increased engagement with street peers [7,32] or the erosive effect of other non-network-related street experiences, such as victimization. Longer time spent homeless has been associated with poorer health status, higher rates of substance use and substance use disorders, and higher levels of alcohol use compared to homeless peers who have spent less time homeless [6,33,34]. Research has shown that among homeless adults in Los Angeles, individuals who spend more time homeless are more likely to have had a foster care experience [35]. The risk amplification and abatement model (RAAM) [32], an extension of the risk amplification model [7], posits that much of this association is likely an effect of peer engagement over time, such that as time spent homeless increases, youth will become increasingly embedded in social networks of other street youth who are likely to encourage risk taking.

This study examined why homeless former foster youth are more involved in methamphetamine use than homeless youth without foster care experiences. In an attempt to disentangle network engagement from non-network-related street exposure, we examined whether engagement with substance-using networks and time spent homeless may independently mediate the previously observed relationship between methamphetamine use and foster care experiences in a sample of homeless youth using services at drop-in centers in Los Angeles County, CA. Given the aforementioned impact of the foster care experience on behavioral health outcomes for homeless former foster youth, the domain of inquiry for the present study was not only homeless former foster youth but homeless youth in general; we attempted to understand differences between youth with or without any foster care experience. As a result, we did not explore how different types of foster care experiences (e.g., type of placement, age at first placement, number of placements) affected methamphetamine use, because these experiences are irrelevant to 59% of individuals in our sample, who had never been placed in foster care. This does not disregard the need for and importance of understanding the impact of specific foster care experiences on health outcomes, but the present study concerned the impact of a history foster care experience in general, with the understanding that there is a diversity of experiences in the population of former foster youth that our domain of inquiry precluded us from exploring more fully in the present analyses.

## Methods

### Sample

This analysis used data from the Youth Net study [36]. During Wave 1, a sample of 398 unique homeless youth (aged 13–25 years) was recruited from two drop-in centers, one in Santa Monica (October 10

to November 8, 2011) and one in Hollywood (January 17 to February 10, 2012). All youth accessing services at these agencies during the data collection period were invited to participate. In Wave 1, 362 youth completed both parts of the survey, 386 completed the self-interview, and 374 completed the social network interview. Between Wave 1 and Wave 2, the Santa Monica drop-in center closed and did not reopen to homeless youth. As a result, a drop-in center in Venice replaced the Santa Monica site. During Wave 2, 396 unique homeless youth were interviewed. At the drop-in center in Venice (May 1 to June 8, 2012), 116 new participants completed baseline interviews, whereas 152 new respondents completed a baseline interview in Hollywood (July 10 to August 6, 2012). During Wave 3, 452 unique homeless youth were interviewed. At the drop-in center in Venice (November 6 to December 14, 2012), 90 new youth completed baseline interviews, whereas in Hollywood (January 23 to February 22, 2013), 152 new youth completed baseline interviews. Although some youth completed follow-up interviews during subsequent waves, for the purpose of this analysis, only baseline interviews were used.

### Procedures

Any client receiving services at a participating agency during the data collection periods was eligible to participate. Recruitment was conducted for approximately 1 month at each site; during that time period, recruiters were present at the agency to approach youth for the duration of service provision hours. Youth new to the agency first completed the agency's intake process before beginning the study to ensure they met the eligibility requirements for the agency (and thus the study). Two research staff members were responsible for all recruitment to ensure youth did not complete the survey multiple times during each data collection period per site.

Signed voluntary informed consent was obtained from each participant, with the caveat that child abuse and suicidal and homicidal intentions would be reported. Informed consent was obtained from youth 18 years of age or older and informed assent was obtained from youth 13 to 17 years old. The affiliated institutional review board waived parental consent because homeless youth younger than 18 were unaccompanied minors who may not have had a parent or adult guardian from whom to obtain consent. Interviewers received approximately 40 hours of training, including lectures, role-playing, mock surveys, ethics training, and emergency procedures.

The study consisted of two parts: a computerized self-administered survey and a social network interview. The former included an audio-assisted version for participants with low literacy, and both parts of the survey could be completed in English or Spanish. All participants received \$20 in cash or gift cards as compensation for their time. The institutional review board approved all survey items and procedures.

The face-to-face social-network-mapping interview was conducted by trained research staff members. Interviewers first explained to each participant that they were collecting information about everyone in the youth's social network during the previous month. Participants were asked to name every person they interacted with, either face-to-face, on the phone or via written forms of communication including text messages, emails or a social networking website. Alters (i.e., individuals whom youth nominated to include in their social network) were entered into an iPad application designed by the research team [37,38]. After each participant finished nominating alters, the interviewer asked questions regarding the different attributes of each alter. Interviewers asked for each alter's name, age, race, gender, length known, and whether the alter was a relative. After entering the attributes in the iPad app, the

interviewer collected more information about each alter (for the initial 169 participants, responses were entered into a Google spreadsheet on a netbook computer). Questions addressed each participant's perception of their alters' behaviors, including drug and sex behaviors.

### Measures

For this analysis and as part of the self-administered questionnaire, a single item assessing participants' recent methamphetamine use was operationalized as frequency of monthly use ("During the past 30 days, how many times have you used methamphetamine [also called meth, speed, crystal, crank, or ice]?"). This item was adapted from the Youth Risk Behavior Survey, which has been shown to be a reliable and valid measure of adolescent substance use behavior [35,39,40]. Foster care experience was operationalized as any experience in foster care or child protective services placement. Time spent homeless was operationalized as years spent homeless ("In thinking about your whole life, how long [in years] have you been homeless or not had a regular place to stay?"). During the social network interview, participants were asked, "Who has used meth in the past 30 days?" Similar questions were asked regarding use of heroin and injection of illegal drugs with a needle. Control variables frequently used in the child welfare and homelessness literature were included, i.e., age, race, gender, and sexual orientation.

### Analysis

The overall analysis plan included a path model using network drug risk behaviors and time spent homeless as mediating variables. All paths were estimated simultaneously. The analysis took place in stages using SAS 9.3. During the first stage, foster care experience, variables related to network drug use, and time spent homeless were assessed to determine if the variables were significantly correlated with one another. Foster care experience served as the model's exogenous variable. Time spent homeless, alter methamphetamine, heroin, injection drug use and participants' recent methamphetamine use were the endogenous variables. Time spent homeless and network drug use variables served as the mediating variables. In the model, a direct path was created between foster care and methamphetamine use. Control variables were added to determine if statistically significant associations existed between control variables and methamphetamine use. Baron and Kenny's approach was used to determine if a statistically significant relationship existed between foster care experience and recent methamphetamine use [41]. Once this relationship was established, mediating relationships were independently tested between: (a) foster care experience and time spent homeless; (b) network methamphetamine, heroin, and injection drug

use; and (c) time spent homeless, network methamphetamine, heroin, and injection drug use with individual methamphetamine use. Once relationships with statistically significant associations were established, the direct path between foster care and methamphetamine use was tested again, using a path model measuring indirect effects.

## Results

### Demographic information

Descriptive statistics provided useful information about the sample and subgroups, as exhibited in Table 1. Overall, the sample of homeless youth was predominately male, heterosexual, and White. A large percentage of participants reported high levels of methamphetamine use (more than 20 times in their lifetime). Additionally, although the percentage of recent methamphetamine use was much lower than lifetime use, nearly 5% of this population reported high recent use (more than 20 times during the previous 30 days). Among former foster youth, the sample was still predominately male and heterosexual but largely composed of African Americans, who spent more time homeless and reported higher rates of lifetime and recent methamphetamine use than the full sample. Examining homeless youth with no foster care history revealed that this segment of the sample was similar to the overall sample, i.e., predominately male, heterosexual, and White. These youth also reported less lifetime and recent methamphetamine use than former foster youth or the full sample. This suggests that former foster youth are different than their peers with no foster care history, with more individuals having a non-White background and using methamphetamine at a higher rate. The full sample and two subgroups had a similar average age of approximately 21 years.

### Correlations and bivariate and multivariate results

The final path models were tested to determine whether foster care experience directly or indirectly affected participants' recent methamphetamine use. Figure 1 illustrates the relationship between variables for both direct and indirect paths. When the model was simplified to measure the direct effect of foster care on participants' recent methamphetamine use, it had a statistically significant effect ( $B=0.269, p<.001$ ). When the full path model was applied (Table 2), the direct path from foster care experience to methamphetamine use was no longer statistically significant, but indirect paths from foster care experience to network methamphetamine use ( $B=0.684, p<.001$ ) and time spent homeless ( $B=0.197, p<.001$ ) were statistically significant, as were paths from network methamphetamine use ( $B=0.230, p<.001$ ) and time spent homeless ( $B = 1.100, p<.001$ ) to participants'

	All youth N=652 n (%)	Foster n=230 n (%)	Non-foster n=382 n (%)
<b>Age<sup>a</sup></b>			
Gender			
Male	21.29 (2.13)	21.13 (2.06)	21.36 (2.16)
Female	469 (71.93)	150 (65.22)	288 (75.39)
Transgender MTF	172 (26.38)	74 (32.17)	91 (23.82)
Transgender FTM	8 (1.23)	4 (1.74)	2 (0.52)
	4 (0.46)	2 (0.87)	1 (0.26)

Sexual orientation				
Homosexual	50 (7.79)	24 (10.57)	24 (6.35)	
Queer	4 (0.62)	1 (0.44)	3 (0.79)	
Bisexual	96 (14.95)	38 (16.74)	55 (14.55)	
Heterosexual	476 (74.14)	157 (69.16)	288 (76.19)	
Questioning	16 (2.49)	7 (3.08)	8 (2.12)	
Race and ethnicity				
American Indian or Alaskan Native	14 (2.15)	4 (1.74)	8 (2.10)	
Asian	3 (0.46)	0	3 (0.79)	
African American	170 (26.11)	75 (32.61)	88 (23.10)	
Hawaiian or Pacific Islander	4 (0.61)	3 (1.30)	1 (0.26)	
White	226 (34.72)	64 (27.83)	147 (38.58)	
Latino or Hispanic	106 (16.28)	33 (14.35)	64 (16.80)	
Mixed	128 (19.66)	51 (22.17)	70 (18.37)	
Years spent homeless <sup>a</sup>	3.54 (3.09)	3.90 (3.13)	3.57 (3.04)	
High recent meth use	139 (21.76)	58 (25.43)	75 (19.95)	
High lifetime meth use	29 (4.55)	15 (6.58)	12 (3.18)	

<sup>a</sup>Figures represent mean and standard deviation.

FTM = female-to-male

MTF = male-to-female

**Table 1:** Sample demographics of foster and non-foster homeless youth

Variable	Direct	SE	Indirect	SE	Total	SE
Time spent homeless	1.10 <sup>***</sup>	.007				
Alter injection drug use	.048 <sup>***</sup>	.016				
Alter heroin use	.015	.016				
Alter meth use	.230 <sup>***</sup>	.017				
Foster care experience	.025	.017	.083 <sup>*</sup>	.038	.110 <sup>**</sup>	.042

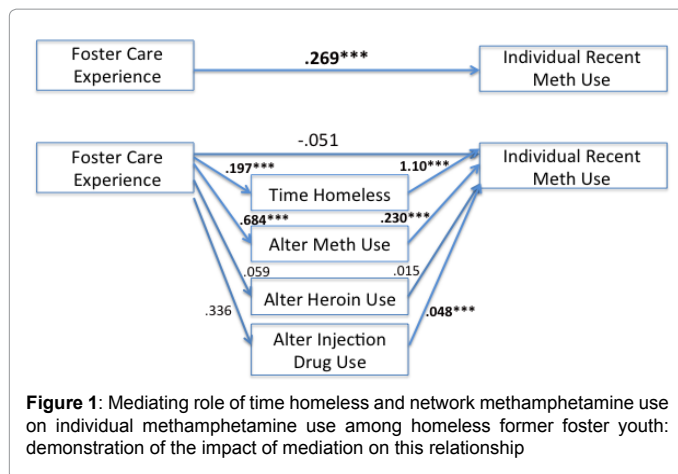
P-values are the result of one-tailed tests.

<sup>\*</sup>p < .10

<sup>\*\*</sup>p < .05

<sup>\*\*\*</sup>p < .01

**Table 2:** Full model results



methamphetamine use. Although the direct effect became statistically non-significant once the full model was analyzed, the indirect effect ( $B=0.083, p < .05$ ) and total effect ( $B = 0.038, p < .01$ ) became statistically significant in the final model. Therefore, the overall model indicated that foster care experience was only statistically significantly associated with recent methamphetamine use when mediated by time spent homeless and network methamphetamine use.

## Discussion

The present study was conducted to contribute to the literature on drug risk factors among homeless young adults with a history of foster care. Guided by the RAAM [7,32], we sought to understand whether network engagement and time spent homeless mediate the previously observed association between foster care experience and methamphetamine use among homeless youth. Several significant findings emerged after examining factors associated with methamphetamine use. When time spent homeless and network drug use behaviors were added as mediating variables between foster care experience and frequency of methamphetamine use, statistically significant associations surfaced between foster care experiences, time spent homeless, and network methamphetamine use variables, and between time spent homeless, network drug use variables, and participants' methamphetamine use. The direct effect between foster care experience and methamphetamine use became statistically non-significant when network drug use and time spent homeless were added to the path model, indicating that partial mediation occurred. The analysis demonstrated that although full mediation did not occur, 36.1% of the total effect was mediated by time spent homeless, signifying that a rather large percentage of the total effect could be explained by the effect of time spent homeless and network methamphetamine use on the relationship between foster care experience and participants' methamphetamine use. This suggests that the previously observed relationship between foster care history and increased reports of methamphetamine use is largely a function of two key mediating constructs: methamphetamine-using peers and time spent homeless. Homeless former foster youth, relative to homeless youth without foster care histories, engage with more methamphetamine-using peers and spend more time homeless. This engagement with risky peers and longer street tenure is likely responsible for the differences in methamphetamine use reported in prior studies [4,5]. Although this mediation analysis could not establish temporal ordering among these variables (e.g., foster care may not cause engagement with methamphetamine-using peers), it established that time spent homeless and network drug use mediate the relationship

between foster care experience and recent methamphetamine use among homeless youth.

Revealing this novel mediating effect is an important contribution to our understanding of homeless former foster youth, and the model also confirmed the findings of prior research. A significant association existed between foster care experience and time spent homeless, supporting previous findings that longer periods of homelessness are associated with foster care experience among adults [7,42]. Findings from this study and others indicate that not only do former foster youth experience longer durations of homelessness, but that the cumulative risk outlined in the RAAM [7,32] may negatively affect the length of time that a former foster youth is likely to spend homeless. Results also indicate that significant independent associations exist between both time spent homeless and alter methamphetamine use and participants' methamphetamine use, supporting previous studies that established time spent homeless as a predictor of elevated substance use and indicated that negative contact with socializing agents affects individual risk-taking behaviors [6].

## Limitations and implications

Limitations of this analysis include the use of cross-sectional data, which limited our ability to infer causality between foster care experience and variables related to methamphetamine use. Furthermore, sampling from drop-in centers limited the generalizability of our findings to service-seeking homeless youth. Prior studies have shown that homeless youth who do not use services may be at elevated risk of substance use and we could not explore the experiences of those youth with these data [15]. It is important to note, however, that this sample of youth included individuals in emergency shelters, in independent-living programs, and who were sleeping on the streets, and as such findings are generalizable to a wide spectrum of homeless youth. Additionally, social desirability bias is possible with self-reported data because participants may not accurately or completely report substance use behaviors or feel comfortable sharing certain information with interviewers. Our ability to specify whether number of foster care placements, type of foster care placement, and age at first placement affected the relationship between methamphetamine use and time spent homeless among this population was limited because data on number and type of placements were unavailable for youth who never entered the foster system. Future studies should examine the subset of youth with foster care experiences and explore to what extent the heterogeneity of foster care experiences are associated with behavioral health outcomes among homeless youth with a history of foster care.

These findings have significant applicability to interventions addressing substance abuse treatment for homeless former foster youth. Because a large percentage of homeless youth in our sample had foster care experiences, it is important to understand their needs and the effect of their network interactions on behavioral health. The results of this analysis revealed that among homeless former foster youth with high rates of methamphetamine use, interventions should not only target the use of methamphetamines in their larger social network but also focus on the effects of peer drug use and time spent homeless on this vulnerable population.

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