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Sociometric network structure and its association with methamphetamine use norms among homeless youth



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ABSTRACT

Homeless youths' social networks are consistently linked with their substance use. Social networks influence behavior through several mechanisms, especially social norms. This study used sociometric analyses to understand whether social norms of drug use behaviors are clustered in network structures and whether these perceived norms (descriptive and injunctive) influence youths' drug use behaviors. An event-based approach was used to delineate boundaries of the two sociometric networks of homeless youth, one in Los Angeles, CA ($n = 160$) and the other in Santa Monica, CA ($n = 130$). Network characteristics included centrality (i.e., popularity) and cohesiveness (location in dense subnetworks). The primary outcome was recent methamphetamine use. Results revealed that both descriptive and injunctive norms influenced methamphetamine use. Network cohesion was found to be associated with perception of *both descriptive and injunctive* norms in both networks, however in opposite directions. Network interventions therefore might be effective if designed to capitalize on social influence that naturally occurs in cohesive parts of networks.

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1. Introduction

1.1. Methamphetamine use among homeless youth

Research has suggested that as many as 1.6 million youth are homeless or run away from home at some point each year (Ringwalt et al., 1998; Toro et al., 2011). Many youth report using alcohol and other drugs both before and after becoming homeless (Whitbeck, 2009). Although alcohol, cigarettes, and marijuana have been the most frequently used substances on the street, the use of hard drugs, such as methamphetamine (meth), is steadily increasing (Wenzel et al., 2010). In particular, meth use is 3–4 times higher among homeless youth compared to their housed counterparts (Greene et al., 1997), with an alarmingly high percentage (50%–70%) of homeless youth indicating prior meth use (Marshall et al., 2011; Nyamathi et al., 2012). Notably, meth use has been widely linked to a greater likelihood of HIV transmission, particularly through meth's associations with high-risk sexual behaviors, such as unprotected sex, sex with an injection drug user, sex with an HIV-

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positive partner, and sex work (Clements et al., 1997; Huba et al., 2000; Kipke et al., 1997; Martinez et al., 1998; Whitbeck et al., 2001).

1.2. A social network approach to understanding meth use behaviors

The social networks of homeless youth are key to understanding their drug use behaviors. A social network is a set of people or groups of people with some pattern of connections or interactions between them (Wasserman and Faust, 1994). A given network can be analyzed based on its structure and function (Latkin et al., 2003). The structural aspects of social networks measure characteristics of social networks, such as size of network, centralization vs. isolation, and density (Valente et al., 2004). Functional characteristics, on the other hand, refer to the roles that network members play. Furthermore, norms fulfill a very important function in social networks by acting as a source of social influence and regulation (Horne, 2001). Norms are perceived rules or properties of a group that outline specific beliefs regarding what behaviors are considered acceptable or common within that group (Kincaid, 2004). Although researchers have studied the associations among social network structural characteristics and engagement in risk behaviors, few empirical research efforts have attempted to understand how social networks influence health behaviors through their impact on social norms.

More importantly, although several theories suggest that targeting perceived social norms within key network structures may offer a powerful means of behavioral change (Fisher and Fisher, 1992; Latkin et al., 2003), intervention efforts have been impeded due to a lack of understanding of how norms cluster in specific risk-taking social network structures (Latkin et al., 2010). Understanding the structural network mechanisms that influence perception of norms would elucidate important information regarding how network interventions should be tailored and, more importantly, guide the selection of peer change agents in these networks (Barrington et al., 2009; Schneider et al., 2015).

This study therefore sought to expand on extant research regarding homeless youth and substance use by exploring how social network norms regarding meth use are clustered in specific sociometric networks. Furthermore, the current study aimed to determine whether homeless youths' meth use is influenced by their perceived social norms of meth use among their peers (i.e., how common and acceptable meth use is among their peers). Drug use-prevention interventions have tended to have limited impact on drug risk behaviors, in part, because social and contextual influences are often minimally addressed. These investigations can therefore identify opportunities for improvements to substance use prevention and intervention efforts with homeless youth.

1.3. Social network structural characteristics and drug-use behaviors

Structural network theory is primarily concerned with characterizing network structures (e.g. small worldness) and node positions (e.g. core/periphery) and associating it with a multitude of outcomes (Borgatti & Halgin, 2011). Network analyses can be conducted in two ways: egocentric (the direct ties of an index person with all network members) and sociometric (the complete set of relations among people in a population, including both direct and indirect ties; Neaigus, 1998). One of the significant and unique aspects of sociometric network analyses is its ability to characterize people in terms of their position in the larger network (Valente et al., 2004). The prominence of a network member's position in their network is measured by the member's centrality (Scott, 2012). Actors at the center of a network have more linkages within that network and consequently are more active, in comparison to peripheral actors.

Both techniques have been used to understand drug use among both housed and homeless youth. However, to the best of our knowledge, there has been only one sociometric study so far that assessed how structural network characteristics (such as network position and cohesion) are associated with drug-use behaviors (Authors, blinded for review). This particular study found that network cohesion was associated with heroin use behaviors among this population. Sociometric analysis with homeless youth has been conceptualized as a way of measuring homeless youths' emersion into street culture (Whitbeck et al., 2009) and sociometric data helps us assess precisely how a youth is positioned vis-à-vis others in a network of other homeless youth. Placement in these social positions reflects varying levels of interaction with their street-peers (Ennett and Bauman, 1993). Therefore, one can hypothesize that youth who are in the core or center of their street networks might adhere more closely to the norms of their street-peer group and engage in greater substance use. Conversely, youth who are in the periphery might instead have access to diverse opportunities for obtaining information, ideas, and resources from many different sources and be less constrained by the influence of their street-peers (Ennett and Bauman, 1993).

1.4. Social network norm perceptions and engagement in risk behaviors

The structural network perspective emphasizes the constraining influence of structural network characteristics on behavior. However, it fails to account for normative forces that facilitate adaptation to these shared social environments (Lakon, 2004). Norms influence behavior through modeling (Bandura, 1977), comparison of attitudes behaviors with one's referent groups (Marsden and Friedkin, 1994), and through social feedback (Fisher and Misovich, 1990). Social norms are defined as beliefs regarding what behaviors are considered acceptable or common in a group (Kincaid, 2004). Perceived norms have been generally categorized as descriptive or injunctive. Descriptive norms indicate the perceived prevalence of a behavior in a group, whereas injunctive norms refer to perceived approval or disapproval of a behavior (Davey-Rothwell and Latkin, 2007). Empirical examination of these two constructs has also revealed that their significance in determining a

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