



Full length article

Neighborhood disorder, peer network health, and substance use among young urban adolescents



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ABSTRACT

Background: The current study investigated the moderating effect of peer networks on neighborhood disorder's association with substance use in a sample of primarily African American urban adolescents.

Methods: A convenience sample of 248 adolescents was recruited from urban health care settings and followed for two years, assessing psychological, social, and geographic risk and protective characteristics. A subset of 106 substance using participants were used for the analyses. A moderation model was tested to determine if the influence of neighborhood disorder (percent vacant housing, assault index, percent single parent headed households, percent home owner occupied, percent below poverty line) on substance use was moderated by peer network health (sum of peer risk and protective behaviors).

Results: Evidence for hypothesized peer network moderation was supported. A latent growth model found that peer network health is most strongly associated with lower baseline substance use for young adolescents residing in more disordered neighborhoods. Over the course of two years (ages approximately 14–16) this protective effect declines, and the decline is stronger for more disordered neighborhoods.

Conclusions: Understanding the longitudinal moderating effects of peer networks within high-risk urban settings is important to the development and testing of contextually sensitive peer-based interventions.

Results: suggest that targeting the potential protective qualities of peer networks may be a promising approach for interventions seeking to reduce substance use, particularly among younger urban adolescents living in high-risk neighborhoods.

1. Introduction

Substance use in adolescence remains a significant public health issue, as alcohol, marijuana, and illegal drug use can result in changes in the developing brain (Squeglia et al., 2009), and can impact academic and social functioning, even at low rates of use (e.g., Pardini et al., 2015). Substance use also places adolescents at risk of immediate health issues (e.g., driving while intoxicated) and increasing the risk of future problems with substance dependence (Andrews and Westling, 2016). Patterns of infrequent binge drinking and comorbid marijuana use are common in adolescent populations; research has shown that this pattern, as well as more frequent use, impacts neurocognitive functioning, especially in areas of memory, attention, and decreased brain

health (see Bava and Tapert, 2010 for a review). Alcohol and marijuana use is common during adolescence, and although alcohol and illegal drug use appears to have recently declined, and marijuana use declined in earlier high school grades, use of these substances has remained steady for 12th graders (Monitoring the Future survey; Johnston et al., 2016a,b). Differences in substance use prevalence rates among racial/ethnic groups have essentially disappeared, with Hispanic and African American high school students using marijuana and alcohol at about the same rate as Whites. However, of note, compared to White and Hispanic 12th grade adolescents, the average rate of daily use of marijuana among African American 12th grade students increased between 2012 (6.0%) and 2015 (6.3%) (Johnston et al., 2016a,b).

The present study is informed by two related theoretical

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frameworks: (1) social ecological theory (Bronfenbrenner, 1979), which posits that human development is a consequence of interactive and multilevel social and environmental systems in which individuals are embedded; and (2), social disorganization theory (Shaw and McKay, 1969) which suggests that neighborhoods characterized by a high proportion of poverty, crime, and residential mobility weaken attachment, trust, social control, and collective efficacy, thereby increasing risk for negative behavioral health outcomes. We integrate these two theories, specifically testing the effects of Bronfenbrenner's meso-level ecological structure (interaction between peers and neighborhood) on substance use among a sample of urban adolescents. Healthful adolescent development may be compromised as risk-enhancing neighborhoods influence health behaviors such as substance use. In particular, the stress associated with living in neighborhoods characterized by high levels of disorder (vacant homes, violent crime, unemployment, poverty) confers risk for binge drinking, marijuana use and disorders (Copeland-Linder et al., 2011; Furr-Holden et al., 2011; Mennis et al., 2016; Reboussin et al., 2015; Tucker et al., 2013).

Cumulative stress that incorporates living in public housing, lack of positive parental relations, school problems, violence, neighborhood dissatisfaction, and financial stress is associated with increased alcohol, marijuana, and cocaine use among male and female adolescents (Stogner and Gibson, 2013; Taylor, 2015). Adolescents who have experienced trauma, such as witnessing violence, are more likely to consume alcohol and use marijuana (Pabayo et al., 2014). Adolescents also experience stress within the social context of their peer networks (Creemers et al., 2010; Nelemans et al., 2016). For example, African American adolescents with elevated levels of stress experience greater peer deviance and thus greater likelihood of having a cannabis use disorder diagnosis, highlighting the interactive role of peers and stress on marijuana use (Cornelius et al., 2010).

Research on adolescents' peer networks and close friendships has yielded evidence of the importance influence of these relationships on adolescent substance use (e.g., Barry and Wentzel, 2006; Cruz et al., 2012; Mennis and Mason, 2012; Pollard et al., 2014; Washburn and Capaldi, 2014). In particular, close and more "high intensity" friendships are a more robust predictor of adolescent substance use than the larger peer network with which an adolescent has more casual relationships, which is only modestly influential (Cruz et al., 2012; Li et al., 2017; Simons-Morton and Farhat, 2010). For example, alcohol use is greater and more persistent among close, or "high-intensity", friendships (Cruz et al., 2012) than with other peers. A recent review of the literature found that best friends' have greater influence on adolescent substance use than close friends and affiliations (Simons-Morton and Farhat, 2010). Close friends provide an independent influence on use, yet this interacts with the influence of best friends in such a way that having non-using close friends actually buffers the impact of a best friend's substance use (Simons-Morton and Farhat, 2010). These findings appear to hold even for quite highly deviant adolescents; for example, van Dommelen-Gonzalez et al. (2015) found that close friends protected gang-affiliated urban Latino youth from frequent marijuana and alcohol use.

The present study contributes to the literature by incorporating peer network health into longitudinal models of neighborhood effects on young urban adolescent substance use. While a handful of previous studies have shown that neighborhood disorder engenders adolescent substance use, we contend that peer network health (sum of peer risk and protective behaviors) can intervene in this process of environmental influence, such that protective peer networks will lessen the deleterious effects of residential exposure to neighborhood disorder on substance use. We tested two primary hypotheses. First, we hypothesized that disorder in the home neighborhood is associated with increasing substance use in early adolescence. Second, we hypothesized that the effect of residing in a disordered neighborhood on increasing substance use differs among youth according to the quality of their peer networks. Here, we expected that effect of neighborhood disorder on

increasing substance use would be significantly stronger among adolescents with risky, as compared to protective, peer networks.

2. Methods

2.1. Participants

This study utilizes data from the Social-Spatial Adolescent Study, a two-year longitudinal investigation of the interacting effects of peer networks, urban environment, and substance use. Participants were recruited between November 2012 and February 2014. The majority of participants (72%) were recruited from an urban adolescent medicine primary care clinic at Virginia Commonwealth University Medical Center, in Richmond Virginia. Age-eligible (age 13 or 14) adolescents presenting to the clinic for routine or acute care were approached and invited to participate in this study by a research assistant while in the clinic's waiting room. Other participants were recruited from a city health district satellite clinic, located within a subsidized housing development. These participants were recruited by referral to the study team from the primary Patient Advocate at the satellite clinic. Over 400 adolescents and parents were either approached at the outpatient hospital clinic or referred from the satellite clinics, of these, 57% enrolled in the study ($N = 248$). Enrollment and data collection procedures were the same across sites. Written informed consent was obtained from all parents and adolescent participants prior to conducting any research activities. The first author's university and the Richmond City Health Department's institutional review boards approved the research protocol, and the study received a federal Certificate of Confidentiality from the National Institutes of Health.

All initial procedures (consent/assent, and baseline survey) were completed in one visit; all participants completed the 30-min baseline survey on a study laptop in a private room separate from parents and any clinic staff. Participants completed follow-up surveys upon receiving a text message and email, with an imbedded URL link to complete a web-based follow-up survey. The majority of participants (84%) completed the 24-month survey. Subsequent independent *t*-tests revealed no significant differences between completers and non-completers on key variables such as substance use, peer network health, neighborhood disorder, age, race, and gender ($p > 0.05$). Participants were provided a study phone with service at enrollment and received up to \$140 for completing baseline, 6, 12, 18, and 24-month follow-up surveys. At follow-up, participants completed the same measures as at baseline, including providing their current address. Chi-square tests revealed no significant differences in age, sex, or race of participants between the two recruitment sites.

For purposes of the present study, we included only participants with at least one non-zero value on the Adolescent Alcohol and Drug Involvement Scale (AADIS; Moberg and Hahn, 1991; –see Measures section for details). In the course of preliminary data analysis, it became clear that a substantial subset of participants was not involved in substance use over the course of the two year study. A total of 106 participants had at least one non-zero score on the AADIS. Results thus apply only to participants with some substance use in one or more waves.

2.2. Measures

2.2.1. Demographics

Age was coded in months, to better account for the rapid physiological and social-emotional changes that occur from early to middle adolescence. Gender was coded as girls = 0, boys = 1. Race was recoded as dichotomous (not black = 0, black = 1) because the sample was 87% African American.

2.2.2. Family history and attitudes towards substance use

Family substance use history and family attitudes toward substance use were assessed using the 7-item scale from the Communities that

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