



## Young adolescents' perceived activity space risk, peer networks, and substance use



Michael Mason<sup>a,\*</sup>, Jeremy Mennis<sup>b</sup>, Thomas Way<sup>c</sup>, John Light<sup>d</sup>, Julie Rusby<sup>d</sup>, Erika Westling<sup>d</sup>, Stephanie Crewe<sup>e</sup>, Brian Flay<sup>f</sup>, Leah Campbell<sup>a</sup>, Nikola Zaharakis<sup>g</sup>, Chantal McHenry<sup>g</sup>

<sup>a</sup> Department of Psychiatry, Commonwealth Institute for Child & Family Studies, Virginia Commonwealth University, 515 N 10th Street, PO Box 980489, Richmond, VA 23298-0489, United States

<sup>b</sup> Temple University, Department of Geography & Urban Studies, Philadelphia, PA, USA

<sup>c</sup> Villanova University, Department of Computing Sciences, Villanova, PA, USA

<sup>d</sup> Oregon Research Institute, Eugene, OR, USA

<sup>e</sup> Virginia Commonwealth University, Department of Pediatrics, Richmond, VA, USA

<sup>f</sup> Oregon State University, Department of Health Promotion and Health Behavior, Corvallis, OR, USA

<sup>g</sup> Virginia Commonwealth University, Department of Psychiatry, Richmond, VA, USA

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### ABSTRACT

Adolescent substance use is a developmentally contingent social practice that is constituted within the routine social–environment of adolescents' lives. Few studies have examined peer networks, perceived activity space risk (risk of substance use at routine locations), and substance use. We examined the moderating influence of peer network characteristics on the relationship between perceived activity space risk and substance use among a sample of 250 urban adolescents. Significant interactions were found between peer networks and perceived activity space risk on tobacco and marijuana use, such that protective peer networks reduced the effect of activity place risk on substance use. A significant 3-way interaction was found on marijuana use indicating that gender moderated peer network's effect on activity space risk. Conditional effect analysis found that boys' peer networks moderated the effect of perceived activity space risk on marijuana use, whereas for girls, the effect of perceived activity space risk on marijuana use was not moderated by their peer networks. These findings could advance theoretical models to inform social–environmental research among adolescents.

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### 1. Introduction

Adolescent substance use persists as a health issue of national concern, with illicit drug use steadily increasing over the last two years among a national sample of high school students (Johnston et al., 2013a). Urban youth are particularly vulnerable to early use and future problematic use of alcohol and illicit drugs (Martino et al., 2008; Wright, 2004), as many of these youth are disproportionately exposed to trauma (e.g., violence, crime) which increases vulnerability to substance use (e.g., Lee, 2012; Zinzow et al., 2009). The present study aims to extend the literature by examining the moderating influence of peer networks (peers with

whom one affiliates) on the relationship between perceived activity space risk (risk of substance use at routine locations) and substance use among urban youth. Based on ecological theories, contextual models that examine the influence of social and environmental factors on an individual have been used to study criminality, health, and behaviors (Winkel et al., 2009). To adequately understand individual development and change, the interplay of social and geographical niches in which the individual is embedded must be considered. Ecological models can be applied to investigate the social, intrapersonal, and environmental influences on risky health behaviors of adolescents, such as substance use (Flay, 1999; Flay et al., 2009).

#### 1.1. Substance use among urban youth

In the United States substance use among adolescents occurs across all race/ethnicities. Recent data from the Monitoring the

\* Correspondence to: Department of Psychiatry, Commonwealth Institute for Child & Family Studies, Virginia Commonwealth University, PO Box 980489, Richmond, VA 23298-0489, United States.

E-mail address: [Mjmason@vcu.edu](mailto:Mjmason@vcu.edu) (M. Mason).

Future study indicate 30-day prevalence of daily cigarette use is 1.6% for African American 8th grade students compared to 2.4% among White students (Johnston et al., 2013b). Almost 3% of 8th grade African American students reported being drunk in the last 30 days compared to 4% of White students. Thirty-day prevalence for marijuana use is 7.6% for African Americans compared to 5.3% for White 8th grade students (Johnston et al., 2013b). However, while African American adolescent substance use patterns may be comparable to White youth, tremendous disparities in adverse outcomes associated with substance use exist. African Americans are more likely to lack access to substance abuse treatment, and suffer adverse outcomes associated with drug use such as criminal punishment and health problems (Alegria et al., 2011; Green et al., 2010; Rovner, 2014; Zapolski et al., 2013).

### 1.2. Gender differences and substance use

Historically, adolescent boys have used substances at higher rates than adolescent girls. The difference in use, however has recently grown more narrow. For example, while boys overall substance use is higher for older adolescents than girls (Johnston et al., 2013b), there are minimal differences in marijuana prevalence in 8th grade between boys and girls (16.5% to 13.6% respectively). However, 8th grade girls have reported more alcohol use than boys since 2002, and higher rates of cigarette smoking in the past two years (Johnston et al., 2014). Essentially, young adolescent girls and boys use these three substances at similar rates, yet the timing and strength of risk factors appear to differ by gender. The literature on peer effects on substance use suggest that socialization and peer selection contribute to alcohol initiation (Light et al., 2013) and to marijuana use (Haye et al., 2013) in both adolescent girls and boys, though some study results suggest that selection and socialization effects vary for boys and girls. For example, the selection of peers with similar alcohol use was stronger for boys during early adolescence and for girls during late adolescence (Burk et al., 2012). Moreover, evidence shows that girls and boys may be differentially affected by their peers and social situations (Crick and Zahn-Waxler, 2003; Rudolph and Hammen, 1999), which has implications for the strength of peer influence on substance use. Research has shown that although peers had an influence on adolescent substance use, the influence was stronger for girls than boys (Kung and Farrell, 2000) and that boys derive differing benefits from their peer networks (Mennis and Mason, 2011). Given the equivocal findings on gender differences in adolescent substance use, as well as possible gender differences in the impact of peer socialization and selection on substance use, further study is needed in this area.

### 1.3. Peer networks

Social networks have been identified in the literature as a robust predictor of substance use (e.g., Valente et al., 2005). We will use the term peer networks to identify close friends that represent meaningful relationships. Extensive research has shown that peer context predicts tobacco, alcohol, and drug use (Bauman and Ennett, 1996; Knecht et al., 2010; Light et al., 2013; Valente et al., 2005). Much less evidence is available for prosocial effects of peer networks. Supportive friendship has been studied as a moderator or protective influence against psychological and behavioral problems often associated with peer rejection (Lansford et al., 2007) or with negative experiences within families (Bolger et al., 1998), both of which are linked to substance use uptake.

Peer networks establish group norms that define peer culture, for both prosocial as well as antisocial behavior. The two primary mechanisms that are used to understand the behavioral relationship between individuals and peer groups are selection and

influence or socialization. Selection refers to the tendency of people with similar characteristics and behaviors to form social bonds. Influence or socialization refers to the extent to which a person's behavior is influenced to some degree by that person's social contacts (Mason, 2014). Research has established that both of these mechanisms are salient and may be more prominent with varying substances (Cruz et al., 2012). For example, Pearson et al. (2006) found that selection effects were more prominent among drinkers and tobacco smokers and influence effects were more prominent among cannabis users. Even when controlling for genetic and shared environmental differences, peer network substance use predicts future individual substance use, with stronger effects occurring within high-intensity/best friendships (Cruz, et al., 2012). Thus, the need exists to study peer networks across risk and protective dimensions.

### 1.4. Activity space

An important construct that provides methodological guidance for addressing the interaction of the social and spatial dimensions of adolescents' lives is activity space. Activity space can be defined as comprising all the locations that an individual has direct contact with as a result of his or her daily activities (Miller, 1991). More broadly, activity spaces are the manifestation of our spatial lives, serving as an index representing routine locations and all the accompanying psychological, social, and health-related experiences of these places (Golledge and Stimson, 1997; Sherman et al., 2005). Multiple approaches to measuring activity space have been used to capture location data within a given time-frame such as travel diaries (Goodchild and Janelle, 1984), structured interviews (Mason et al., 2004), and using Geographic Information System (Kwan, 2013).

Research has shown that youth, and urban adolescents in particular, spend their time in a variety of geographically dispersed activity spaces that are not delimited by conventional geographic boundaries, such as census tracts, zip codes, political wards, or even home neighborhood (Browning and Soller, 2014). Neighborhood characteristics are known to influence adolescents' perceptions of safety and risk and are associated with substance use and mental health outcomes (Mason and Korpela, 2009a), underscoring the importance of this construct for understanding urban youth. Research on activity spaces has also suggested that the places a person frequents outside the home may expose him or her to a variety of psychological, social, and geographic factors that likely influence substance use, but that may not be observed within the home (Wong and Shaw, 2011; Zenk et al., 2011). Hence, there remains a need to capture activity space data, particularly among urban youth, to better understand the important influence of context on substance use.

Based on this review and on our previous work (Mason et al., 2009b; Mennis and Mason, 2011), we hypothesize that the effect of an adolescent's perceived place-based risk on substance use is moderated by that subject's peer network, such that adolescents with greater peer network protective characteristics (support, encouragement for pro-social behavior) will be affected to a lesser degree by the perceived riskiness associated with the places they frequent for school, leisure, and other activities. Further, we hypothesize that this peer network moderating effect will differ between girls and boys, where girls will be more prone to the peer network moderating effect than boys.

## 2. Method

This study examined baseline data from the Social-Spatial Adolescent Study, a longitudinal study of the interacting effects of

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