Drug and Alcohol Dependence 180 (2017) 76–85

Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

Full length article

Individual, peer, and family factor modification of neighborhood-level effects on adolescent alcohol, cigarette, e-cigarette, and marijuana use

Regina A. Shih*, Layla Parast, Eric R. Pedersen, Wendy M. Troxel, Joan S. Tucker, Jeremy N.V. Miles, Lisa Kraus, Elizabeth J. D'Amico

RAND Corporation, 1776 Main Street, PO Box 2138, Santa Monica, CA 90407-2138, United States

ARTICLE INFO

Keywords:
Neighborhoods
Youth
Alcohol
Cigarette
E-cigarette
Marijuana
Effect modification

ABSTRACT

Background: Neighborhood factors reported subjectively by residents and measured objectively at the census tract are both associated with adolescent alcohol, tobacco (cigarette and electronic cigarette), and other drug (marijuana) (ATOD) use. Less clear is how these neighborhood factors are longitudinally associated with each substance. Equivocal findings may be due to lack of consideration of individual, peer, and family effect modifiers, which could help adolescents overcome exposure to stressful neighborhood environments.

Methods: We used multivariate logistic regressions with interaction terms to test whether parental monitoring, resistance self-efficacy (RSE) and being around peers who use ATOD modified the association between four subjective and objective neighborhood measures and odds of using each substance measured one year later among 2539 high school students and college freshmen originally recruited from middle schools in Southern California.

Results: Census tract-level disadvantage was not longitudinally associated with ATOD use. However, perceptions of higher neighborhood disorganization, less social cohesion, and more neighborhood problems with alcohol and drug use were associated with higher odds of ATOD use. Higher RSE and weaker affiliations with peers who use ATOD consistently buffered negative effects of neighborhood disorganization and neighborhood problems with alcohol and drugs on past year ATOD use.

Conclusions: Community-level programs that increase social cohesion among neighbors, neighborhood monitoring of deviant behaviors, and better policing of open drug selling may prevent ATOD use. Programs should also target RSE and minimize affiliations with peers who use ATOD, which could reduce the magnitude of the association with ATOD, even for adolescents living in the most at-risk neighborhoods.

1. Introduction

Alcohol, cigarettes, and marijuana are the most widely used substances in the U.S. with 38.3%, 17.5%, 29.0%, and 23.9% of 10th graders reporting past year alcohol, lifetime cigarette, lifetime electronic vaporizer such as electronic cigarette, and past year marijuana use, respectively (Johnston et al., 2016). Although a robust body of literature has identified individual, peer, and family risk and protective factors for alcohol, tobacco, and other drug (ATOD) use, the most effective prevention programs also include community-level influences (Griffin and Botvin, 2010). Thus, there has been increased attention on neighborhood factors that may influence adolescent ATOD use. Bronfenbrenner's ecological systems theory (1979) purports that the entire ecological system, including neighborhood characteristics, interact with individual, peer, and family factors to influence adolescent behaviors such as ATOD use. Not including all of these levels of influence, and their potential interactive effects, may result in over or underestimating the effects of each of these factors. This is especially critical for the adolescent period when peers have an increasingly influential role in the risk of ATOD use (Connell et al., 2010; Creemers et al., 2010; D'Amico and McCarthy, 2006; Duan et al., 2009). In addition, adolescence is a time of rising independence and mobility (University of Minnesota, 2015), which affords greater exposure to their neighborhood environments. Social disorganization theory (Sampson, 1993) postulates that neighborhood environments matter when it comes to deviant behaviors such as ATOD use. For example, disorganized neighborhoods that are characterized by more crime, instability, and abandoned buildings tend to lack the resources to offer adolescents an alternative to deviancy. Examining how the magnitude of neighborhood effects vary by individual, peer, and family factors is

* Corresponding author.
E-mail address: rshih@rand.org (R.A. Shih).

http://dx.doi.org/10.1016/j.drugalcdep.2017.07.014
Received 28 October 2016; Received in revised form 6 July 2017; Accepted 12 July 2017
Available online 08 August 2017

critical to further clarifying the complex etiology of ATOD use and to inform the development of more efficient public health interventions and policies that can focus on multiple factors that represent the combination of greatest risk.

1.1. Associations between neighborhood socioeconomic disadvantage (Objective measures) and ATOD use

To date, the majority of studies on neighborhoods and adolescent substance use focus on alcohol use only and census tract-level measures of family income, proportion of single-headed families, unemployment rates, education level, or residential stability. In a comprehensive review (Jackson et al., 2014), most studies did not find significant associations between neighborhood socioeconomic disadvantage and alcohol use that may be partly attributable to lack of consideration of effect modifiers and the use of different definitions of neighborhood disadvantage. Many studies lack generalizability by focusing on samples with limited racial/ethnic diversity, or high-risk youth (Buu et al., 2009; Fite et al., 2009; Fuller et al., 2005; Jones-Webb and Karriker-Jaffe, 2013), and are older studies (Crum et al., 1996) that may not accurately reflect current neighborhood socioeconomic conditions or current ATOD use patterns.

Several studies have examined objectively measured neighborhood characteristics with cigarette and marijuana use. For example, three studies that examined neighborhood disorder measured by abandoned buildings (Furr-Holden et al., 2015; Furr-Holden et al., 2011; Tarter et al., 2009), found positive associations with marijuana use up to nine years later among a sample of approximately 200 19-year old predominantly White boys (Tarter et al., 2009), and approximately 400 predominantly Black youth followed 1–2 years after high school (Furr-Holden, 2011, 2015). Another study of 6th-9th grade Black adolescents found that neighborhood socioeconomic disadvantage was associated with an increased risk of transitioning from being offered marijuana to having marijuana use and problems (Reboussin et al., 2015). Diez-Roux et al. (2003) have shown that living in an area with higher neighborhood socioeconomic disadvantage is associated with higher odds of current cigarette use among adults aged 18–30 years. Other studies that have examined initiation of ATOD or injection drug use in relation to objective measures of neighborhood quality showing that neighborhood minority racial composition and education interacted with race to predict injection drug use initiation (Fuller et al., 2005) and that higher neighborhood disadvantage was associated with increased risk of ATOD initiation (Fite et al., 2009). However, these studies have limited generalizability because data came from small samples (approximately 100) of at-risk adolescents.

Overall, the existing literature on objective neighborhood measures that examine alcohol use as an outcome are mixed, and studies that examine cigarette or marijuana use have samples that are either relatively small or comprised of either predominantly Black or White adolescents. Some research suggests that neighborhood disadvantage has different effects depending on the substance (e.g., Crum et al., 1996), although more recent studies do not examine multiple substances. Moreover, no studies to date have examined neighborhood influences on e-cigarette use, a product which has increased rapidly in popularity in recently years (Singh et al., 2016) and has been associated with increased risk of subsequent cigarette use among adolescents (Leventhal et al., 2016; Wills et al., 2017). To address these limitations, we examine the longitudinal association with objective socioeconomic disadvantage on four different types of substances (alcohol, cigarettes, e-cigarettes, marijuana) in a diverse cohort of adolescents followed for one year using an index of neighborhood disadvantage.

1.2. Associations between self-Reported neighborhood factors (Subjective measures) and ATOD use

Examining perceived and objective neighborhood factors may provide different depictions of neighborhood environments in terms of risk for adolescent ATOD use (Hadley-Ives et al., 2000). Objective data can inform public health efforts by identifying populations living in high-risk areas using publically-available Census data. In contrast, self-reported perceptions of neighborhood quality may reflect more proximal effects on adolescents' behaviors, thereby increasing the efficiency of prevention programs.

Similar to the literature on objective neighborhood measures, longitudinal studies on perceived neighborhood characteristics and ATOD use focus mainly on alcohol use and report equivocal findings on perceptions of neighborhood quality including social control, social capital, and collective efficacy. Some studies found no associations with alcohol use (Aslund and Nilsson, 2013; De Haan and Boljevac, 2010; Ennett et al., 2008; Fulkerson et al., 2008; Maimon and Browning, 2012), whereas others found greater perceived neighborhood disorganization was longitudinally associated with a composite measure of ATOD use among 521 African American youth (Lambert et al., 2004).

Two studies have examined both objective and perceived neighborhood characteristics. Reboussin et al. (2015) found that self-reported perceptions of neighborhood disorder and drug activity and objectively measured socioeconomic disadvantage were associated with the transition from marijuana offers to subsequent marijuana use and problems. Tucker et al. (2013) found that living in an area with higher unemployment rates was longitudinally associated with marijuana initiation, whereas unexpectedly, higher perceived neighborhood safety was associated with initiation of heavy drinking. Yet, this study used 1990 Census data in the National Longitudinal Study of Adolescent Health, which is a mostly-white sample. Although many studies have reported significant associations with self-reported neighborhood quality and substance use, those studies typically report a composite measure of substance use, or combine delinquency outcomes with substance use (Byrnes et al., 2011; Burlew et al., 2009; Choi et al., 2006; Hadley-Ives et al., 2000; Lambert et al., 2004; Joon Jang and Johnson, 2001). It is important to examine substances separately instead of a composite measure because of potentially different mechanisms by which neighborhood quality may influence ATOD use. For example, Tucker et al. (2013) hypothesized that lack of employment opportunities in the neighborhood was related to drug selling whereas the measure of perceived neighborhood safety may have reflected low parental supervision in the neighborhood increasing the likelihood of heavy drinking. We build on this study and others to also examine cigarette and e-cigarette use, and multiple subjective and objective neighborhood characteristics to test which aspects of neighborhoods are longitudinally associated with ATOD use in a racially/ethnically diverse sample.

1.3. Interactions of neighborhood effects by individual, peer, and family factors

Whereas some studies have examined effect modification by race/ethnicity (Browning, 2012; Choi et al., 2006; Fuller et al., 2005), we focus on modifiable factors that may serve an important role in helping adolescents overcome exposure to stressful environments. To our knowledge, only three longitudinal studies have examined interactions with modifiable factors. These studies have been limited by small samples, select populations with limited generalizability, or an inability to determine whether modifiable factors interacted with neighborhood factors for certain substances because of the use of a composite measure of substance use (Burlew et al., 2009; Xue et al., 2007; Tucker et al., 2013). Together, these studies suggest it may be important to distinguish between individual, peer, and family risk factors because they may modify neighborhood effects differently, depending on substance. Thus, we build on this previous work by longitudinally examining both subjective and objective measures of neighborhoods on risk of using four different types of substances (alcohol, cigarettes, e-cigarettes, and marijuana) in a diverse adolescent sample, and identifying individual