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Neighborhood characteristics and the initiation of marijuana use and binge drinking

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ABSTRACT

Background: This study examines whether residential neighborhood characteristics influence the initiation of marijuana use and binge drinking, and if these neighborhood factors heighten or dampen peer influences on substance use.
Methods: Predictors of marijuana ($N = 6516$) and binge drinking ($N = 6630$) initiation over a 1-year period were identified using data from the National Longitudinal Study of Adolescent Health. Participants were of ages 12–19 years at baseline. The main predictor variables were neighborhood characteristics, using both objective (proportion of households below the poverty line and female-headed, unemployment rate, residential stability) and subjective (perceived cohesion and safety) measures. Binge drinking was defined as 5 or more drinks in a row.
Results: Initiation occurred for 12.9% of adolescents in the case of marijuana and 16.4% for binge drinking. Marijuana initiation was more likely among adolescents who lived in neighborhoods with a higher unemployment rate, and binge drinking initiation was more likely among those who perceived greater safety in their neighborhood, after adjusting for other neighborhood characteristics, demographics, friend characteristics, and behavioral and family risk factors. There was no evidence that neighborhood context moderates the associations of peer factors on initiation.
Conclusions: Select neighborhood characteristics appear relevant to the initiation of marijuana use and binge drinking, although the mechanisms appear to be distinct for each substance. If these results are found to be robust, future research should aim to better understand how neighborhood context influences the initiation of adolescent substance use in order to inform prevention efforts.

1. Introduction

1.1. The potential influence of neighborhoods on adolescent substance use

Alcohol and drug use are largely recognized as being influenced by multiple social contexts and processes during adolescence, including neighborhoods, family and peers. However, research has focused more heavily on family and peer influences than more distal contextual influences such as neighborhoods. Greater attention to neighborhood context is warranted given that adolescence is a time of increasing independence from family and more time spent in new and broader environments. Much of the research on neighborhoods is informed by social disorganization theory (Shaw and McKay, 1942), which posits that neighborhood features such as low socioeconomic status and residential instability influence individual behavior through their impact on neighborhood-level social processes such as increased exposure to deviant individuals and activities, environmentally induced stress, and fewer forms of social control and monitoring.

Studies assess neighborhood context using either objective or subjective measures, although rarely examining both types simultaneously. Objective neighborhood measures are most often based on aggregations of individual data (e.g., socioeconomic status) within a geographic area (e.g., census tract) derived from census data. The few studies examining their associations with adolescent drinking or marijuana use have yielded mixed results. A study of 114 9th–10th grade students in the northeastern U.S., for example, reported no association between neighborhood disadvantage and a composite measure of adolescent substance use (e.g., Allison et al., 1999). However, a study in Ontario, Canada found greater adolescent alcohol and drug use in areas with the lowest SES characteristics (Smart et al., 1994) and another of over 4000 students in Chicago found a positive association between area deprivation and alcohol use among African American students (but not Hispanics; Tobler et al., 2011). A recent study examining the growth of neighborhood disorder found that young adults residing in deteriorating neighborhoods in Baltimore were 30% more likely to use

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marijuana 2 years after high school compared to those living in always-good neighborhoods (Furr-Holden et al., 2011). Still other work has yielded results contrary to what might be expected from social disorganization theory. In a sample of 2006 at-risk high school students in Seattle, those residing in more disadvantaged neighborhoods reported *lower* rates of alcohol and marijuana use (Snedker et al., 2009).

Studies using subjective neighborhood measures, which are based on residents' perceptions of their neighborhood such as disorder, cohesion and safety, have tended to yield more consistent associations between adolescents' reports of their neighborhood and their involvement in alcohol or drug use. In one of the few studies to specifically examine initiation, 95 6th graders from a school in the Midwest were more likely to initiate substance use by 8th grade if they had witnessed neighborhood events such as drinking on the streets, robbery, drug use, arrests, and fighting (Burlew et al., 2009; see similar cross-sectional findings by Wilson et al., 2005; Winstanley et al., 2008). Other studies of middle school students (Choi et al., 2006) and young adults (Theall et al., 2009) have found greater substance use among youth who report feeling less safe and more fearful in their neighborhoods.

Although the existing literature suggests that neighborhood context may in some way be influential in adolescent alcohol and marijuana use, it has often been based on studies using cross-sectional designs, composite substance use measures (sometimes aggregated with other risk behaviors), and small regional samples. In particular, there is a lack of information on whether subjective and objective neighborhood characteristics play a role in the initiation of marijuana use and binge drinking during adolescence.

1.2. The role of peers

Based on social disorganization theory and its focus on neighborhood-level social processes, one might expect that the negative impact of a disorganized neighborhood on substance use may be accounted for, to some extent, by exposure to deviant or substance using peers in these neighborhoods. Longitudinal studies have provided some support for this idea, with peer characteristics found to mediate associations of neighborhood disadvantage with adolescent substance use using both subjective (Brook et al., 1989) and objective (Chuang et al., 2005) neighborhood measures. Less studied is whether the neighborhood context may serve as an accelerating or de-accelerating agent, as some have suggested (Snedker et al., 2009), that allows peer factors to have a greater impact in some contexts than in others. To the best of our knowledge, studies have not examined whether neighborhood disadvantage moderates the risk of marijuana and binge drinking initiation that is associated with exposure to deviant peers.

1.3. The present study

This study examines whether census-based indicators of neighborhood disorganization, as well as adolescent's subjective assessments of their neighborhood, predict their initiation of marijuana use and binge drinking over a 1-year period. In general, we hypothesized that the initiation of both types of substance use would be more likely among adolescents residing in neighborhoods that: (a) were more economically disadvantaged (e.g., higher unemployment rate, more female-headed households, more households with incomes below the poverty line); (b) had greater residential instability; (c) were perceived to be less cohesive in terms of neighbors looking out for one another; and (d) and were perceived to be unsafe. This study also explores the role of peers in the initiation of marijuana use and binge drinking, particularly whether residing in a neighborhood with these characteristics might amplify the well-established risk of substance use that is associated with adolescents' exposure to deviant peers.

Our analytic approach addresses a concern that has been raised with regards to analyses of neighborhood-level effects on risk behavior (Haynie et al., 2006): associations may be due to compositional differences among individuals rather than neighborhood characteristics, especially when neighborhood variables (e.g., disadvantage) are constructed based on aggregations of individual traits (e.g., household socioeconomic status). Selection into neighborhoods is a particular concern as well; for example, more conscientious parents (an unmeasured trait) may tend to choose to reside in neighborhoods that are less disordered (and thus observed neighborhood effects would reflect the decision making of conscientious parents rather than a true neighborhood effect). We use the approach adopted by Haynie et al. (2006) to examine whether associations of neighborhood characteristics with substance use initiation change after adjusting for composition and selection variables.

2. Methods

2.1. Data

Analyses are based on data from Waves I–II of the National Longitudinal Study of Adolescent Health, a nationally representative study of adolescents in grades 7–12 in the U.S. in 1995 who have been followed with multiple interview waves. The sampling frame included all high schools in the U.S. Over 90,000 participants from 145 schools were given a basic in-school interview. Data from this in-school interview were used to generate a baseline sample of 20,745 adolescents aged 12–19 to complete in-home interviews between April–December 1995 (Wave I) and April–August 1996 (Wave II). In addition, 17,670 parents of Add Health respondents were interviewed at Wave I. 14,738 Add Health respondents were re-interviewed at Wave II (87.6% response rate among eligible Wave I respondents; adolescents in grade 12 at Wave I were not interviewed at Wave II by design). See Harris et al. (2009) for more details on the Add Health design and longitudinal data.

Adolescents were excluded from the analyses due to: (a) missing the in-school, Wave II in-home, or parent interview (excluding $n = 11{,}348$ of the Wave I in-home sample); (b) reporting any (or missing) lifetime use of marijuana or any (or missing) lifetime binge drinking at Wave I, or missing network measures of substance use (excluding $n = 2763$ for marijuana and 2611 for binge drinking); (c) missing information on use of the substance at Wave II (excluding $n = 24$ for marijuana and 60 for binge drinking); or (d) missing information on perceived safety, selected neighborhood, race/ethnicity, closeness to mother, or availability of drugs or alcohol in the home (excluding $n = 94$ for marijuana and 96 for binge drinking; all other predictor variables were mean imputed). This resulted in a final analytic sample of $N = 6516$ for the marijuana analyses and $N = 6630$ for the binge drinking analyses, with a 76% overlap in these two samples. Table 1 provides unweighted descriptive statistics for the study variables.

2.2. Key measures

2.2.1. Marijuana use and binge drinking. Adolescents were asked how many times in their life they used marijuana, and how many days in the past 12 months they drank five or more drinks in a row (information on lifetime binge drinking is not available). They were considered to have not initiated marijuana if they reported never trying it, and to have not initiated binge drinking if they reported no days in the past 12 months. At Wave II, we derived dichotomous measures of any past year marijuana use and binge drinking to determine whether initiation had occurred since Wave I. This was the only Wave II information used.

2.2.2. Residential neighborhood characteristics. Objective neighborhood characteristics were assessed using 1990 U.S. Census data: proportion with income below the poverty line; proportion of family households that are female-headed with children under 18 years old; the unemployment rate; and the proportion of individuals aged 5 or older who lived in a different household 5 years earlier (an indicator of residential instability). These characteristics were assessed at the block group level. Two subjective neighborhood characteristics were based on adolescent report: neighborhood cohesion (People in this neighborhood look out for each other; 0 = false; 1 = true); and perceived safety (do you usually feel safe in your neighborhood; 0 = no; 1 = yes). Following Haynie et al. (2006), we addressed possible selection effects by controlling for the most important reason provided by parents for living in their neighborhood (out of 10 options, this variable is coded as 1 if it is due to better schools, to be near family/friends, or because of low crime in the neighborhood and coded as 0 for all other reasons). An indicator of whether respondents changed neighborhoods between waves is included to control for the reduction in exposure to the Wave I neighborhood factors among those who moved.