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The Role of Neighborhood in Urban Black Adolescent Marijuana Use*

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Abstract

Background—The present study examined the influence of neighborhood factors on transitions in marijuana involvement during adolescence in a sample of primarily low-income, urban Black youth.

Methods—556 Black adolescents were interviewed annually beginning in first grade as part of a longitudinal study. Latent class analysis (LCA) was used to examine stages of marijuana involvement from 6th to 9th grades. The influence of neighborhood disorder, drug activity, violent crime, safety and disadvantage on transitions in marijuana involvement was tested using latent transition analysis (LTA).

Results—There was evidence for three stages of involvement: no involvement, offered, and use and problems. Involvement increased steadily during adolescence with a slightly greater risk to transition from offers to use between 6th and 7th grades. Neighborhood disorder (AOR=1.04, CI=1.00, 1.08), drug activity (AOR=1.12, CI=1.02, 1.22) and disadvantage (AOR=1.44, CI=1.10, 1.92) were associated with the transition from marijuana offers to use and problems.

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Author Disclosures

Conflict of Interest

All authors declare they have no conflicts of interest.

Contributors

Drs. Reboussin, Green and Ialongo conceptualized and drafted the manuscript. Dr. Reboussin conducted the statistical analysis. Drs. Furr-Holden, Milam and Johnson conducted the literature review. All authors contributed to and have approved the final manuscript.

Neighborhood disorder (AOR=1.07, CI=1.02, 1.11), drug activity (AOR=1.19, CI=1.10, 1.29) and violent crime (AOR=1.17, CI=1.03, 1.32) were associated with transitioning rapidly from no involvement to use and problems.

Conclusions—Understanding how neighborhoods could be organized and provided with supports to discourage marijuana use and promote non-drug using behaviors should be an important goal of any prevention program in low-income, urban Black neighborhoods. Enhancing citizen participation and mobilization to address the social processes of neighborhood disorder has the potential to reduce marijuana involvement in these neighborhoods.

Keywords

adolescents; Blacks; latent class; latent transition; marijuana; neighborhood; urban

1. INTRODUCTION

National data show that marijuana use now exceeds the rate of cigarette smoking among adolescents. In 2014, rates of past 30 day marijuana use were 6.5%, 16.6% and 21.2% among 8th, 10th and 12th graders compared to 4.0%, 7.2% and 13.6%, respectively for cigarettes (Johnston et al., 2015). Perceptions of harm are also shifting; only 36% of high school seniors think regular marijuana use places the user at great risk compared to 52% in 2009 and a high of 78% in the early 1990s (Johnston et al., 2015). Adolescent marijuana use is concerning not only because of the increased acute risk for motor vehicle crashes, engagement in risky sexual behaviors, and deficits in attention and memory but because of the long-term psychosocial effects associated with early use (Volkow et al., 2014). Although 9% of those that use marijuana will develop a cannabis use disorder, this risk increases to 1 in 6 for those who initiate in adolescence (Hall and Degenhardt, 2009). In addition, several researchers have demonstrated an association between adolescent marijuana use and poor school performance, unemployment, arrest and incarceration, and diminished lifetime satisfaction and achievement (Brook et al., 2013; Fergusson and Boden, 2008; Lynskey and Hall, 2000; Bray et al, 2000).

The negative impact of adolescent marijuana use is particularly concerning for low-income, urban Black youth; many of whom face other vulnerabilities that may hinder their ability to successfully transition to adulthood. Historically, rates of marijuana use have been higher in Whites than Blacks. However, this difference began to narrow in the 1990s and Black 8th, 10th and 12th graders now have higher rates of past 30 day marijuana use than Whites (Johnston et al., 2014). Despite these trends, limited research exists on the epidemiology of marijuana use among low-income, urban Black adolescents and even less on neighborhood factors that may be particularly salient for this community (Copeland-Linder et al., 2011).

Black youth disproportionately reside in neighborhoods with high levels of neighborhood disorder; neighborhoods characterized by crime, drug use, and violence. Research shows that illicit drugs are more prevalent in Black neighborhoods (LaVeist and Wallace, 2000), Black youth are more likely to witness drug sales and drug activity in their neighborhoods, and Black youth are more likely to be offered drugs (Wallace and Muroff, 2002). Black youth also rate their communities as more threatening than youth of other racial groups

(Aneshensel and Sucoff, 1996). Disordered neighborhoods in which Black youth reside are often characterized by weakened social cohesion and controls that invite a wide-array of illegal behavior, like drug selling and use, and incivilities (Sampson et al., 1997). Black youth also disproportionately reside in neighborhoods with high levels of poverty (USDHHS, 2001). Concentrated disadvantage can isolate residents from key resources supporting collective social control leading to perceived powerlessness to intervene on behalf of the community (Williams and Collins, 1995; Brooks-Gunn et al., 1993). Neighborhoods with high concentrations of poverty are also often characterized by high levels of neighborhood disorder (Gephart, 1997). Hence, neighborhood disorder and the concentrated disadvantage that often accompanies it may increase the risk for the initiation and continued use of marijuana, because it is widely available and because it may weaken beliefs about the potential harm of drug use and strengthen positive expectancies of use. Living in disordered neighborhoods with high rates of crime and violence can also bring with it a constant feeling of threat and danger (Ross and Jang, 2002). This chronic stress can result in feelings of hopelessness and helplessness that can lead to adverse psychological outcomes such as depressed mood. According to the stress reduction hypothesis, marijuana use may be a means of coping with or alleviating the depressed mood that accompanies the stress of living in a violent neighborhood (Conger, 2005).

Limited research has found that perceptions of neighborhood disorder are associated with 10th grade drug use (defined as alcohol, tobacco or marijuana use) among low-income, urban Blacks (Lambert et al., 2004). In one of the few studies specific to marijuana use, young adult Black men in Chicago reporting high levels of neighborhood disorder and violence were more likely to report a history of marijuana use (Seth et al., 2013). In a sample of primarily Black youth in Baltimore, neighborhood physical, but not social disorder, was associated with marijuana use after high school (Furr-Holden et al., 2011, 2014). Using data from the same study but restricted to Blacks, Reboussin et al. (2014) found that perceptions of neighborhood disorder, increased drug activity and exposure to violence in 8th grade were associated with initiation and progression to more frequent marijuana use between 9th and 12th grades.

A comprehensive understanding of how neighborhood impacts marijuana use among low-income, urban Blacks is critical to the development of effective prevention programs and policy initiatives. This study addresses multiple gaps in the literature by expanding the measures of neighborhood beyond those that are typically considered, and examining their association with early adolescent marijuana use, which has not been studied in any depth and has been shown to be particularly detrimental in the long-term. Specifically, this investigation will (1) identify stages of marijuana involvement during 6th through 9th grades in a longitudinal, community sample of primarily low-income Blacks living in Baltimore, Maryland, (2) estimate the probability of progressing between these stages, and (3) examine the influence of neighborhood disorder, drug activity, violent crime, safety and disadvantage on these progressions.

2. METHODS

2.1 Participants

Data are from a community-based longitudinal study conducted at the Johns Hopkins University Baltimore Prevention Research Center (BPRC; Ialongo et al., 1999). In 1993, 798 children and families representative of students entering 1st grade in nine Baltimore City schools were recruited to participate. Three 1st grade classrooms in each of 9 elementary schools were randomly assigned to one of two intervention conditions or to a control condition. Teachers and students were then randomly assigned to 1 of 3 classrooms within each school. Classroom and family-centered interventions were limited to 1st grade and targeted early learning and aggression. Prior work has examined the impact of these interventions on other risk behaviors (Ialongo et al., 1999; Storr et al., 2002; Bradshaw et al., 2009; Wang et al., 2012). One publication examined onset of marijuana use between 6th and 8th grades and found no intervention effects (Furr-Holden et al., 2004). This research was reviewed and approved by the Institutional Review Board of the Johns Hopkins Bloomberg School of Public Health. Written parental consent was obtained for youth to participate in middle and high school assessments. Youth verbal assent was also obtained in middle school and written assent in high school.

Of the 798 original adolescents, we restrict our analyses to the 678 adolescents who were Black. This resulted in a final sample size of 556 which represented Black adolescents with at least one assessment between 6th and 9th grades. At the 6th grade assessment, 55% were male, 70% received free or reduced price meals and the mean age was 11.8 years (range 10.4 to 13.1 years). Black adolescents in the analytic sample did not differ from the Black adolescents not included in terms of sex, free or reduced-price meal eligibility, intervention status, or emotional or behavioral problems in first grade (i.e., aggression, oppositional-defiant behaviors, concentration problems, anxiety or depression).

2.2 Measures

2.2.1 Marijuana Involvement—We considered responses to five questions about marijuana involvement gathered in the spring of sixth, seventh, eighth and ninth grades. Opportunity to use marijuana involved asking whether a youth had “ever been offered” marijuana. Adolescent reports of marijuana use were based on asking “Have you ever used marijuana?” Frequency of marijuana use was measured based on questions from the Monitoring the Future survey (Johnston et al., 1995) and was defined as having used marijuana on three or more occasions. Health and social problems were assessed by asking if they ever experienced any health problems (e.g., felt panicky) or social problems (e.g., got into trouble with parents or teachers) from using marijuana. The specific problems comprising the health and social problems can be found in supplementary material¹.

2.2.2 Neighborhood Disorder—Perceived neighborhood disorder was assessed using 10 items from the Neighborhood Environment Scale (NES; Elliott et al., 1985). These items were assessed at each of the annual assessments. Items are rated on a 4-point Likert scale

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(1=not at all true; 4=very true) with higher scores representing higher levels of perceived disorder. The Cronbach alpha coefficient for this scale was estimated for each annual assessment and ranged from 0.81 to 0.84. In addition to using the overall scale of neighborhood disorder, a factor analysis of this scale yielded three factors measuring neighborhood drug activity, violence and crime, and safety. Items on these factors were summed to create subscale scores. Each scale consisted of three items with a total subscale score range of 3–12. Individual items comprising each scale are described.

2.2.3 Neighborhood Drug Activity—Three items from the NES were used to measure neighborhood drug activity. They included: (1) I have seen people using or selling drugs in my neighborhood, (2) In the morning or later in the day I often see drunk people on the street in my neighborhood, and (3) In my neighborhood, the people with the most money are the drug dealers. The Cronbach alpha coefficients for this subscale across the annual assessments ranged from 0.74 to 0.76.

2.2.4 Neighborhood Violent Crime—Three items from the NES were used to measure neighborhood violent crime. They included: (1) Every few weeks, some kid gets beat up or mugged in my neighborhood, (2) Every few weeks, some adult gets beat up or mugged in my neighborhood, and (3) The people who live in my neighborhood often damage or steal each other's property. The Cronbach alpha coefficient for this subscale across the annual assessments ranged from 0.63 to 0.78.

2.2.5 Neighborhood Safety—Three items from the NES were used to measure neighborhood safety. They included: (1) There are plenty of safe places to walk or spend time outdoors in my neighborhood, (2) I feel safe when I walk around my neighborhood by myself during the day, and (3) I feel safe when I walk around in my neighborhood by myself at night. These items were reverse coded so that higher scores represented feeling less safe. The Cronbach alpha coefficient for this subscale across the annual assessments ranged from 0.69 to 0.73.

2.2.6 Neighborhood Disadvantage—Level of neighborhood disadvantage was assessed using the Objective Neighborhood Disadvantage Score, which was calculated using items from the 2000 US Census. The items include the percentage of: a) adults >24 years with a college degree, b) owner-occupied housing, c) households with incomes below the federal poverty threshold, and d) female-headed households with children. We used Ross and Mirkowsky's formula to generate the index: $\{[(c/10+d/10)-(a/10+b/10)]/4\}$ (Ross and Mirowsky, 2001). Higher values of the index indicate increased disadvantage.

2.2.7 Demographic Information—The school district provided information on the students' sex, race and free and reduced-price meal status. Parents reported ethnicity when they registered their child for school in kindergarten or first grade. To qualify for free meals household income had to be at 100% the federal poverty level or below and between 100–185% for reduced price meals. Free and reduced-price meal status was collapsed into a dichotomous variable that served as a proxy of student socioeconomic status. Intervention status was coded as 1 for youth who were in a first grade intervention classroom and 0 otherwise.

2.3 Statistical Analyses

Latent class analysis (LCA) was applied to examine the structure underlying the five behaviors comprising the marijuana involvement profile in 6th to 9th grades using full information maximum likelihood. This approach allows for missing data under the missing at random (MAR) assumption where youth with data on at least one variable are included in the analysis, unless they are missing data on covariates. Analyses were conducted in Mplus Version 7.1 (Muthen and Muthen, 2012). The goal of LCA is to identify the smallest number of classes that adequately describes the association among marijuana involvement behaviors. The result is a classification of adolescents into subgroups with similar marijuana involvement profiles. We started with the most parsimonious one class model (“all marijuana involvement the same”) with progression to a less parsimonious model with four classes of marijuana involvement. Goodness of fit was evaluated using global fit indices that combine goodness of fit and parsimony such as Akaike’s information criterion (AIC), the Bayesian information criterion (BIC) and the sample size adjusted Bayesian information criteria (a-BIC) as well as the Lo-Mendell-Rubin and parametric bootstrapped likelihood ratio tests of fit (Nylund et al., 2007). Entropy was used as a measure of classification accuracy with values approaching one indicating a clear distinction of classes. Not only did we consider the distinguishability of the classes based on the measure of entropy, but we compared the interpretability and meaningfulness of the latent classes for the competing solutions.

As a first step, we fit latent class models for each grade. Next, we examined the number of classes in a combined analysis so that the additional information from other time points might increase our power to detect classes with fewer respondents. In the combined longitudinal latent class analysis, measurement invariance was imposed on the item probabilities but the latent class prevalences were allowed to vary over time. After deciding on the number of classes, we examined the assumption of measurement invariance over time by comparing the fit of models with and without measurement invariance imposed.

Next, we estimated the probability of transitioning between the latent classes of marijuana involvement from 6th through 9th grades and the influence of neighborhood factors on transition rates using latent transition analysis (LTA). LTA expresses change over time in terms of transition probabilities and models the impact of covariates on transitions using a multinomial logistic regression formulation (Lanza et al., 2010). Time-varying covariates were included in the model so that neighborhood context in 6th grade, for example, predicted transitions from 6th to 7th grade, neighborhood context in 7th grade predicted transitions from 7th to 8th grade and so forth. We controlled for student-level covariates of sex and free or reduced-price meal status, as well as intervention status in the LTA model. Standard errors were adjusted using a sandwich estimator to account for the clustering within classrooms.

3. RESULTS

Marijuana involvement and neighborhood characteristics from 6th through 9th grades are presented in Table 1. For all five measures, involvement increased from 6th through 9th grade. By ninth grade, 61.0% were offered marijuana, 34.7% had used marijuana, 16.8%

had used it at least three times, and 30.5% experienced social and 12.9% health problems related to marijuana use. Although we incorporate time-varying covariates into the models, there is relative stability in the neighborhood characteristics over time for the overall sample as seen in Table 1. Table 2 contains the fit indices for the cross-sectional and longitudinal latent class models. The fit indices for the cross-sectional models suggest a two class model in 6th and 7th grades and a three class model in 8th and 9th grades. Entropy was close to 1 for the three class model in 6th and 7th grades suggesting a good separation of classes but the prevalences for the additional class were small. The fit indices for the longitudinal model, which increases our power to detect smaller classes, favored a three class model.

In Figure 1, we examined the three class model for interpretability. The most prevalent class in 6th grade is a class we refer to as “*No Marijuana Involvement*” because respondents have not used or been offered marijuana. The estimated class prevalence was 83.9% in 6th grade and decreases to 38.9% by 9th grade. The next most prevalent class in 6th grade is a class in which adolescents have been offered marijuana but less than 10% have used it. We refer to this as the “*Offered Marijuana*” class. In 6th grade, 12.1% of adolescents are in the *Offered Marijuana* class and by 9th grade 28.4% are in this class. The smallest class in 6th grade is a class of adolescents that have used marijuana, more than 90% have had social problems associated with marijuana use, almost half have used it three or more times, and 40% have had health problems associated with use. We refer to this as the “*Use and Problems*” class. While only 3.9% of adolescents are in this class in 6th grade, almost a third are in it by 9th grade (32.7%). Based on the indicators of fit for the more powerful longitudinal model and interpretability of the solution, we selected the three class model as the optimal solution. Before fitting the LTA model, we examined the assumption of measurement invariance for the three class longitudinal model. The fit statistics for a three class model that does not impose measurement invariance provided a poorer fit to the data (AIC=5078, BIC=5371, a-BIC=5156, entropy=0.733) suggesting the three class model with measurement invariance is appropriate (AIC=5001, BIC=5100, a-BIC=5027, entropy=0.946).

Table 3 shows the probabilities of transitioning across stages (or classes) of marijuana involvement from 6th through 9th grades estimated using LTA. Overall, the probability of transitioning from *No Marijuana Involvement* to *Offered Marijuana* and from *No Marijuana Involvement* directly to *Use and Problems* over the course of one year increased over time. Fifteen percent of youth who had no involvement with marijuana in 6th grade will transition to some type of involvement by 7th grade. Among those still not involved in 7th grade, 23% will become involved by 8th grade, and 27% of those not involved by 8th grade will transition to some type of involvement by 9th grade. Among those who have been offered marijuana, 18–27% will transition to use or problems before the end of the next school year. This risk was greatest between 6th and 7th grades (27%), decreased between 7th and 8th (18%) and increased again between 8th and 9th grades (23%).

Table 4 reports the adjusted odds ratios (AOR) for neighborhood factors predicting transitions between stages of marijuana involvement from 6th through 9th grades relative to remaining in the same stage after adjustment for sex, intervention status and receipt of free or reduced-price meals in 6th grade. Higher levels of neighborhood disorder (AOR=1.07; 95%CI=1.02, 1.11), neighborhood drug activity (AOR=1.19; 95%CI=1.10, 1.29) and

neighborhood violent crime (AOR=1.17; 95%CI=1.03, 1.32) were significantly associated with rapidly transitioning from *No Marijuana Involvement* to *Use and Problems* over the course of a school year. Neighborhood disorder (AOR=1.04; 95% CI=1.00, 1.08), neighborhood drug activity (AOR=1.12; 95%CI=1.02, 1.22) and neighborhood disadvantage (AOR=1.44; 95%CI=1.10, 1.92) were significantly associated with transitioning from being *Offered Marijuana* to *Use and Problems*.

4. DISCUSSION

We found evidence that marijuana involvement increases steadily during adolescence with a slightly higher probability of transitioning from offers to use between 6th and 7th grades compared to later years. Our findings highlight several significant predictors of transitions in marijuana involvement during adolescence. Neighborhood disorder and neighborhood drug activity were both associated with an increased risk of transitioning to marijuana use and problems; either directly from no involvement or among those already offered marijuana. Neighborhood disadvantage was associated with an increased risk of transitioning from being offered marijuana to marijuana use and problems. Neighborhood violent crime was associated with transitioning directly to use and problems from no involvement. Neighborhood safety did not predict transitions in marijuana involvement. Neighborhood factors were not associated with the transition from no involvement to being offered marijuana.

Although we did not find a significant association between neighborhood factors and being offered marijuana, youth living in more disordered neighborhoods and youth living in neighborhoods with more drug activity had an increased risk of transitioning directly to use. This may reflect the rapid transition between opportunities to use marijuana and subsequent use evidenced by Van Etten and Anthony (1997). Using data from the 1979–1994 National Household Surveys on Drug Abuse, they found that roughly two-thirds of those who reported having had a chance to try marijuana have gone on to use marijuana at least once and most made this progression within a one-year period. The one-year window between our survey waves may therefore fail to catch the intermediate transition from no involvement to being offered marijuana for some youth. Our finding may also be reflective of our hypothesis that youth living in disordered neighborhoods with higher levels of drug activity and lower levels of social control have more opportunities to use marijuana and as a result the transition to marijuana use may occur more rapidly. Van Etten and Anthony (1997) also found that youth offered marijuana at a younger age are more likely to eventually transition to use which may explain our finding that the risk of transitioning from offers to use is greatest between 6th and 7th grades compared to later grades. In terms of the transition from offers to use, neighborhood disorder and neighborhood drug activity in particular may reinforce positive drug using norms and reduce perceptions of harm (LaVeist and Wallace, 2000) such that youth in these neighborhoods may perceive that they will not be held accountable for marijuana use and therefore may choose to take advantage of offers to use marijuana.

Our finding that youth who reported living in neighborhoods with higher levels of violent crime are at an increased risk of transitioning rapidly to use may be using marijuana as a

means of coping with the chronic stress of living in violent neighborhoods as we hypothesized.

Because they may seek out marijuana as a form of self-medication rather than waiting for offers to use marijuana (Conger, 2005), their progression in marijuana involvement may not occur in a stage-wise manner (no involvement to offers and then use). Interestingly, youth who feel unsafe walking around in their neighborhood are not at an increased risk of marijuana involvement. This may suggest that it is not the fear for one's personal safety but the stress of living in the presence of violence and crime on a daily basis that is stressful and increases the risk for marijuana involvement.

Finally, the finding that youth living in more disadvantaged neighborhoods are at increased risk of transitioning to marijuana use and problems among those offered marijuana provides support for the hypothesis that these youth may not have the supports needed to resist marijuana opportunities (Brooks-Gunn et al., 1993; Williams and Collins, 1995). Concentrated disadvantage has also been shown to be associated with low levels of perceived self-efficacy even after controlling for individual level SES (Sampson et al., 1997; Boardman and Robert 2000). Youth living in more disadvantaged neighborhoods may not believe they have control over their behavior which may hinder their ability to say no to offers to use drugs.

Limitations of the study should be noted. We relied on a single method (participant report) and reporter (child report) for the data used in this study. Multiple methods (e.g., biological assays of drug use) and reporters (peer reports), would have strengthened this study. Due to the nature of the marijuana survey items, in particular the lifetime nature of the "ever offered marijuana" question and our inability to measure current opportunities, our analyses are restricted to modeling progression or stability in lifetime marijuana involvement and does not model recovery or decreased involvement. Because youth reported on perceived neighborhood disorder as well as on their drug use, results are subject to "same-source bias," meaning that youth engaged in marijuana use may view neighborhoods differently. Moving forward, it will be important to include alternative strategies to assess neighborhood disorder. Systematic social observation (SSO) represents a promising strategy for addressing same-source bias, and may be particularly useful in assessing how neighborhood context impacts marijuana use. SSO is defined as a standardized approach for directly observing the physical, social, and economic characteristics of neighborhoods (Sampson and Raudenbush, 1999). Finally, we should note that 39% of the sample still had no involvement with marijuana in 9th grade; either offers or use. As seen in Table 3, the risk of transition to marijuana use is greater for those that have previously been offered marijuana rather than directly from no involvement to use. An important focus of future work should be on factors that may prove protective against the risks associated with marijuana offers and in particular factors that are protective against marijuana offers for youth living in disordered neighborhoods.

The greatest strength of this study is the availability of a large sample of low-income, urban Blacks participating in a longitudinal study designed to be sensitive to ethnic-minority populations with annual data collection. Although national probability studies have provided

critical information on drug use in the U.S. population as a whole, they are less informative in understanding prevalence among low-income, urban Blacks. Our ability to more accurately reflect the true nature of Black drug use in the context of the urban neighborhoods where they live is what makes this a unique contribution to the literature.

This research suggests that interventions aimed at reducing marijuana use in low-income, urban Black neighborhoods should address the drug activity, violence, crime and poverty that characterize disordered neighborhoods. This could involve residents partnering with police to co-identify problems and strategizing to create public safety interventions or programs to reduce drug trafficking. It could involve partnering with municipal leaders on neighborhood economic development initiatives, e.g. mixed-income housing, or zoning decisions that could affect the geographic concentration of poverty and neighborhood stability. Understanding how neighborhoods could be organized and provided with supports to discourage marijuana use and promote non-drug using behaviors should be an important goal of any program. Communities that Care (CTC) is an example of a coalition-based program available to communities that could be a first step in understanding the problems and needs in a neighborhood and facilitating partnerships between residents, police and municipal leaders (Hawkins et al., 2008). CTC facilitates the mobilization of community stakeholders to: (1) assess the needs of their community, (2) collaborate on the selection and development of effective prevention plans tailored to those needs, and (3) implement and evaluate those plans. Because social cohesion and establishment of informal social controls in disordered neighborhoods can take time to foster even with the assistance of a system like CTC, programs could be developed in the short-term to assist parents with monitoring or supervision of youth in the absence of support from residents to monitor activities. Several studies have provided evidence supporting a relationship between higher levels of parental supervision and monitoring and lower risk of adolescent drug use (e.g., Chilcoat and Anthony, 1996; Dishion et al., 1998). One possible mechanism for this relationship is through a reduction in affiliation with deviant or drug using peers in the neighborhood. As shown by Lloyd and Anthony (2003), higher levels of parent monitoring in urban neighborhoods are associated with lower levels of affiliation with deviant peers. Formalized supervised activities in recreation centers or churches could provide not only increased monitoring but alternatives to engaging in activities with deviant peers in their neighborhoods. For example, Chen et al. (2004) found that youth involved in religious or sports activities were less likely to be involved with drugs. The long term goal, however, of any program should be enhancing citizen participation and mobilization to address the underlying social processes of neighborhood disorder which has the potential to reduce marijuana involvement in low-income, urban Black neighborhoods.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- This study included longitudinal data from 556 low-income, urban Black adolescents
- Three stages of marijuana involvement: no involvement, offers, use and problems
- Involvement increased steadily during adolescence
- Disorder, drug activity and disadvantage associated with transitions from offers to use
- Disorder, drug activity, and violent crime associated with rapidly transitioning to use

Figure 1.

Estimated stages of marijuana involvement among 6th to 9th grade adolescents and percentage of adolescents in each stage from 6th to 9th grade in parentheses.

Table 1 Marijuana involvement (%) and neighborhood factors (mean, sd) from 6th to 9th grades

	6 th grade	7 th grade	8 th grade	9 th grade
Ever offered marijuana	16.0%	29.4%	45.7%	61.0%
Ever used marijuana	5.0%	12.8%	22.6%	34.7%
Used marijuana 3 or more times	1.2%	4.8%	9.3%	16.8%
Social problems from marijuana use	3.4%	10.1%	18.3%	30.5%
Health problems from marijuana use	1.4%	4.4%	7.8%	12.9%
Neighborhood Disorder	18.2 (6.4)	17.3 (6.3)	17.3 (6.4)	17.7 (6.5)
Neighborhood Drug Activity	5.5 (2.9)	5.4 (2.7)	5.4 (2.8)	5.8 (2.9)
Neighborhood Violent Crime	4.4 (2.0)	4.3 (2.0)	4.3 (2.0)	4.4 (2.1)
Neighborhood Safety	6.7 (2.6)	5.9 (2.4)	5.7 (2.4)	5.5 (2.3)
Neighborhood Disadvantage	-1.2 (0.8)	-1.2 (0.8)	-1.3 (0.8)	-1.3 (0.9)

Table 2

Fit statistics for latent class model of marijuana behaviors by grade and overall

	No. of Classes	AIC ^a	BIC ^a	a-BIC ^a	LMR ^b p-value	PB ^c p-value	Entropy ^d
Overall							
	2	6281	6341	6297	.. ^e	.. ^e	0.951
	3	5001	5100	5027	.. ^e	.. ^e	0.946
	4	5018	5157	5055	.. ^e	.. ^e	0.859
6 th grade							
	2	649	696	661	<0.001	<0.001	1.000
	3	659	730	676	0.470	0.500	0.984
	4	670	767	694	0.185	0.600	0.985
7 th grade							
	2	1107	1154	1119	<0.001	<0.001	1.000
	3	1117	1189	1135	0.727	0.667	0.949
	4	1129	1227	1154	0.486	1.000	0.529
8 th grade							
	2	1516	1563	1528	<0.001	<0.001	0.996
	3	1508	1580	1526	<0.001	<0.001	0.951
	4	1518	1617	1544	0.546	0.333	0.943
9 th grade							
	2	1786	1833	1798	<0.001	<0.001	0.973
	3	1734	1807	1753	<0.001	<0.001	0.925
	4	1746	1844	1771	0.038	0.041	0.968

^a Lower values represent better fit.^b Lo-Mendell-Rubin likelihood ratio test^c Parametric bootstrapped likelihood ratio test^d Values closer to 1 indicated better separation of classes

These fit statistics not available for longitudinal latent class analysis.

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Table 3

Estimated probability of transitioning between stages of marijuana involvement from 6th to 9th grades

6 th to 7 th grade	No Involvement	Offered	Use & Problems
No Involvement	0.844	0.103	0.053
Offered	--	0.731	0.269
Use & Problems	--	--	1.000
7 th to 8 th	No Involvement	Offered	Use & Problems
No Involvement	0.772	0.150	0.078
Offered	--	0.819	0.181
Use & Problems	--	--	1.000
8 th to 9 th grade	No Involvement	Offered	Use & Problems
No Involvement	0.728	0.177	0.096
Offered	--	0.767	0.233
Use & Problems	--	--	1.000

Table 4

Adjusted odds ratios and 95% confidence intervals of transitioning between stages of marijuana involvement relative to remaining in the same stage as a function of neighborhood factors

	No Involvement to Offered AOR ^a (95% CI)	No Involvement to Use & Problems AOR (95% CI)	Offered to Use & Problems AOR (95% CI)
Neighborhood Disorder	1.00 (0.97, 1.04)	1.07 (1.02, 1.11)**	1.04 (1.00, 1.08)*
Neighborhood Drug Activity	1.03 (0.96, 1.11)	1.19 (1.10, 1.29)***	1.12 (1.02, 1.22)*
Neighborhood Violent Crime	1.00 (0.90, 1.11)	1.17 (1.03, 1.32)*	1.08 (0.99, 1.19)
Neighborhood Safety	0.98 (0.91, 1.05)	1.05 (0.97, 1.14)	1.04 (0.91, 1.19)
Neighborhood Disadvantage	1.00 (0.82, 1.21)	0.96 (0.77, 1.20)	1.44 (1.10, 1.92)**

^a AOR = adjusted odds ratio

*
p<0.05,

**
p<0.01,

***
p<0.001