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Neighborhood Environment and Marijuana Use in Urban Young Adults

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Abstract

Risk factors for marijuana use in older adolescents and young adults have focused primarily on family environment and peer affiliation. A growing body of work has examined the relationship between environmental context and young adult substance use. This study builds on previous research linking neighborhood environment to young adult marijuana use by exploring two distinct features of neighborhoods, namely the physical (e.g. broken windows) and social environment (e.g. adults watching youth). Data were obtained from a longitudinal sample of 398 predominately African American young adults living in an urban environment. The data also included observational measures of physical and social order and disorder collected on the young adult's residential block. Exploratory structural equation modeling (ESEM) was utilized to test hypothesized relationships between these two features of the neighborhood environment and past year young adult marijuana use. A two-factor model of neighborhood environment with good fit indices was selected (CFI=0.97, RMSEA=0.037). There was a positive and significant direct effect from neighborhood physical disorder to marijuana use (0.219, $p<0.05$) controlling for gender, race, and free and reduced meals status. The direct effect from neighborhood social environment to marijuana use was not significant. These results converge with previous research linking vacant housing with young adult marijuana use but do not provide empirical support for the neighborhood social environment as a determinant of drug taking. Better explication of the social environment is needed to understand it's relationship to drug use.

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Keywords

Marijuana; African American; neighborhood environment; young adult

Neighborhood Environment and Marijuana Use in Urban Young Adults There is a growing body of research linking neighborhood-level factors to youth antisocial and deviant behaviors (Snedker, Herting & Walton, 2013; Foster & Brooks-Gunn, 2013), young adult substance use (Burlew et al., 2009; Crum et al., 1996; Furr-Holden et al., 2011; Lambert et al., 2004; Reboussin et al., 2007; Tarter et al., 2009; Theall et al., 2009; Winstanley et al., 2008) and more specifically to young adult marijuana use (Tucker et al., 2013; Snedker, Herting & Walton, 2009). Studies also suggest that factors such as neighborhood unemployment (Tucker et al., 2013), neighborhoods with high residential turnover (Buu et al., 2009), and parental drug use and mental health histories (Buu et al., 2009) are early social and environmental influences that possibly explain how neighborhood and social risks, irrespective of early behavioral characteristics, translate to individual risk behaviors. This relationship between neighborhood environment and substance use during adolescence may be explained in part by increased exposure and opportunities to use drugs (Crum, Lillie-Blanton, & Anthony, 1996). Additionally, the relationship between neighborhood environment and substance use may also be mediated by individual risk behaviors including antisocial behavior (McAdams, et al., 2012; Tarter et al., 2008) and deviant peer associations (Mauricio et al., 2009).

Focusing specifically on the neighborhood physical environment, Tarter et al. (2009) prospectively examined the relationship between boarded-up structures and marijuana use in males. This research found that the proportion of boarded-up structures in a youth male's neighborhood during late childhood was associated with elevated testosterone levels during early adolescence, which in turn was predictive of assaultive behavior and later marijuana use (Tarter et al., 2009). Furr-Holden et al. (2011) conducted similar research examining the relationship between the growth of neighborhood disorder, measured by the presence of abandoned buildings, and marijuana use in young adult males and females living in an urban locale. Growth mixture modeling identified four classes of neighborhood growth: rapidly improving, slightly improving, always-good, and deteriorating. Young adults living in neighborhoods that deteriorated over time (measured via increases in abandoned housing) were more likely to use marijuana two years later compared to young adults living in more stable neighborhoods. Both of these studies relied on one salient, modifiable aspect of the neighborhood environment to measure neighborhood disorder, boarded-up structures and abandoned buildings. The purpose of this current investigation is to understand broader constructs related to the neighborhood environment that impact young adult substance use, specifically more diverse aspects of not only the physical environment but also the social environment.

Our theoretical basis for the current research is consistent with the Crime Prevention Through Environmental Design (CPTED) Model that links four key concepts, namely natural surveillance (providing opportunities for residents' to monitor their neighborhood, e.g. good lighting), natural access and control (preventing and controlling access, e.g. fenced

yards), territorial reinforcement (sense of community ownership, e.g. community signs) and maintenance (maintaining aesthetics of neighborhood, e.g. removing graffiti) to neighborhood crime and incivility (Jeffery, 1971; Mair and Mair, 2003). Jeffery (1971) argues that the design of the built physical environment influences crime and quality of life. The CPTED was later expanded (Jeffery, 1977; 1990; Jeffery and Zahm, 1993) to acknowledge that there is an interactive effect between the internal environment (the individual) and the physical environment. The individuals' perception of the environment shapes individual behavior as well as group behavior, and influences crime. We offer that the constructs proposed by CPTED can be conceptualized into two distinct domains of physical and social environment and directly measured using a validated instrument, the Neighborhood Inventory for Environmental Typology (NIfETy) Instrument (Furr-Holden et al., 2008, 2010). The NIfETY expands on CPTED concepts to incorporate more aspects of residents' social interactions and physical observations of the neighborhood to measure physical and social activity and disorder.

To our knowledge, the environmental assessment used in the current investigation, the NIfETy Instrument (Furr-Holden et al., 2008, 2010) is the only objective assessment of neighborhood environment that is both valid and reliable. The items included in the instrument were based on previous empirical work examining the neighborhood environment and several neighborhood theories [e.g. CPTED Model (Mair and Mair, 2003), Broken Windows Theory (Cerdá, et al., 2009); Opportunity Theory (Wasserman and Stack, 2008)]. The NIfETy indicators of violence, alcohol, and other drugs (VAOD) are strongly correlated with crime data and youth reports of VAOD exposure (Furr-Holden et al., 2010). The NIfETy Instrument addresses some of the major concerns raised in a review of neighborhood effects (Leventhal and Brooks-Gunn, 2000) research including how to determine neighborhood boundaries, the source of the data, mechanisms by which neighborhood environment influence outcomes, and the variables used to assess the neighborhood characteristics (e.g. single variables, factor analysis, composite scores).

The United States Census is the data source for many US-based quantitative large-scale neighborhood research studies (Leventhal and Brooks-Gunn, 2000; Roosa et al., 2003). The majority of Census data are collected every ten years so the data are often not current, the geographic area (e.g. census tract) may not represent residents' perceptions or experiences of neighborhood boundaries, and the variables to choose from are limited to economic and structural factors. Researchers have also assessed residents' perceptions of the neighborhood environment (e.g. Neighborhood Environment Scale [NES, Crum et al., 1996]). While this method addresses many of the concerns associated with using Census data, it raises concerns about shared method variance and reporter bias (Roosa et al., 2003). The review also described observer ratings of the neighborhood environment by trained raters; again, this method (observer ratings) addresses the limitations of Census data and avoids shared method variance and reporter bias. However, these ratings have traditionally focused on crime and fear with little attention to behavioral or substance use outcomes during childhood and adolescence (Perkins et al., 1992; Roosa et al., 2003; Taylor et al., 1984).

To address concerns raised in prior neighborhood research, this exploratory investigation will 1) utilize a valid, reliable, and objective assessment of the neighborhood environment,

and 2) capitalize on methodological strengths of structural equation modeling (SEM) to understand the potential interrelationship between neighborhood activity and disorder and marijuana use. This investigation builds on previous studies of neighborhood and substance use by using a broad measure of neighborhood environment that includes both physical and social aspects of neighborhood environment. Marijuana use was selected as the outcome of interest because it is the most prevalent illicit drug used among young adults (SAMHSA, 2010), and is associated with several adverse outcomes during young adulthood (Fergusson et al., 2002; Windle & Wiesner, 2004) including progression to other drug use (Lessem et al., 2006).

Methods

Data Source

Young Adult data—In 1993, 678 children and their families were recruited into the second-generation Baltimore Prevention Project (BPP) trial. Written parental consent was obtained for 97% of the children; the remaining 3% refused to allow their children to participate in the assessments or failed to respond to the consent request and were not included in the BPP trial. The trial evaluated classroom and family-based interventions directed at improving school achievement, and reducing attention/concentration problems and aggressive and shy behaviors (Furr-Holden et al., 2004; Furr-Holden et al., 2008; Lambert et al., 2004).

Children were recruited from nine Baltimore City Public Schools. Three first grade classrooms in each of nine schools were randomly assigned to one of the intervention conditions (family-based or classroom-based) or the standard educational setting (control condition). At entrance into first grade, the sample was predominately African American (86.8%) and 47% was male. The children ranged in age from 5.3 years to 7.7 years, with a mean age of 6.2 years (SD = 0.34). Sixty-two percent of the children received free or reduced-price lunch, a proxy for low socioeconomic status. Eligibility for the free and reduced-price lunch is based on family income, with students qualifying if the family is at or below the federal poverty level. There were no statistically significant differences in sociodemographic characteristics (ethnicity, age, sex, and free-lunch status) between the group with consent and the 3% who did not participate.

Approximately 84% of the sample (n = 566) was retained for follow-up assessments five to nine years after the participants were initially recruited in first grade. Participants who were lost to follow-up did not differ from participants continuing in the study with respect to baseline teacher ratings, academic achievement, ethnicity, sex, or free-lunch status. Of the 566 youth retained in the study, 398 continued to reside in Baltimore City one year after high school. The current study sample was restricted to these 398 young adults (Mean Age = 19.0 years old) living in Baltimore City because the environmental data described below was only collected in Baltimore City. The youth that continued to reside in Baltimore City were more likely to be African American ($p < 0.01$) and to have received free or reduced priced meals in 12^{th} grade ($p<0.01$). There were no differences in gender ($p=0.63$) or marijuana use ($p=0.43$) among students who continued to live in Baltimore City.

BPP participants were assessed on a battery of measures annually. These measures included academic achievement, mental health, drug use, and neighborhood perceptions. In addition to the evaluation battery, environmental assessments (described in detail below) were conducted on the participant's residential block beginning in year 12 (Furr-Holden et al., 2008).

To increase truthful reporting at the annual follow-up assessments, each participant sat with individualized headphones and a response keyboard connected to a laptop computer, which was pre-programmed to present each standardized item in sequence, using both visual and audio format, along with standardized answer choices. The assessment was self-paced, and the participants marked their responses under private conditions that were maintained by a member of the assessment staff, who took care not to observe the respondent and to prevent observation by others in the vicinity (Furr-Holden et al., 2004).

Neighborhood environment data—Environmental data was obtained using the Neighborhood Inventory for Environmental Typology (NIfETy) Instrument (Furr-Holden et al., 2008, 2010). The 172-item instrument assesses neighborhood environmental characteristics shown to be related to violence, alcohol, and other drug (VAOD) exposure. This tool is operationalized into seven domains: physical layout of the block, types of structures, adult activity, youth activity, physical disorder and order, social disorder and order, and VAOD indicators. Field raters underwent 2 days of in-office and 2 days of field training on observational methods and item specificity. A team of two trained field raters then traveled to specified blocks and manually entered NIfETy data into handheld electronic devices loaded with the NIfETy Instrument (Furr-Holden et al., 2008). NIfETy ratings were conducted from February 2006 to May 2006 (one year-post high school) on the block face where young adults lived during the time of their twelfth-grade BPP assessment. The block face includes both sides of the street along an entire block (e.g. 600-600 North Broadway). Assessments were conducted between 11 am and dusk and found to be reliable and consistent during that time period (Furr-Holden, et al., 2010). The NIfETy Instrument has good psychometric properties (Furr-Holden et al., 2010). Inter-rater reliability of the NIfETy instrument was evaluated using intraclass correlation coefficients (ICC). The NIfETy has high reliability for the total scale (ICC = .84), the VAOD subscale (ICC = .71), and across raters (ICC = .67 – .79). The ICCs for individual items can be found in another published report (see Furr-Holden et al., 2010). The NIfETy is also valid and items from the VAOD subscale correlate strongly (at or above 0.7) with self-reported VAOD exposure from the BPP sample and also local crime data on drug- and violence-involved arrests (Furr-Holden et al., 2010).

Measures

Neighborhood characteristics—Nineteen binary items from the NIfETy instrument were used to classify the neighborhood physical environment and social environment (items listed in Table 1). The items were selected because 1) they had been used in prior investigations examining neighborhood environment (Cohen et al., 2003; Perkins et al., 1996; Sampson, 1997) and 2) the items were present on at least 5% of the blocks included in this investigation. The prevalence of the items (Table 1) ranged from 5.5% (presence of

vacant houses) to 54.5% (presence of broken bottles). The bivariate correlations among the NIfETy items are all positive (results not shown) and the Cronbach's alpha was 0.82.

Marijuana use—The BPP participants report marijuana use during the past year at each annual assessment. The outcome of interest is past year marijuana use one year after high school (used in the past year vs. no use in the past year), which is the same calendar year as the neighborhood assessment. Nearly eighteen percent (17.6%) of the BPP respondents used marijuana in the past year and 16.8% did not answer the question.

Control Variables—Three self-reported demographic variables were included: race (African American and Caucasian), gender (male versus female), and free and reduced lunch status (proxy for low income status). The 398 Baltimore City residing BPP participants included in the current study were predominantly African American (94.5%) and 52% were male. Reduced-price or free lunch at grade 12 was used to indicate low socioeconomic status of the respondents; 28.9% were enrolled in the free or reduced lunch program in grade twelve, 26.9% of respondents did not answer.

Data Analyses

Missing Data—There were only two variables with missing data: past year marijuana use at one year post high school and free/reduced price lunch at grade 12 (16.8% and 26.9%, respectively). We used multiple imputation of missing values because complete case analysis (i.e. list-wise deletion) can produce biased estimates unless data are missing completely at random and less than 5% (Azur et al., 2011; Graham 2009; Little and Rubin, 1987). Multiple imputation is a powerful alternative to a complete case analysis for making valid inferences and maximizing power (Rubin, 1987).

Missing values were imputed using the “chained equations” method. Each variable was imputed with a prediction model containing all of the variables to be used in the primary analysis model. Twenty imputations were performed. Imputations were performed in STATA version 10 (StataCorp LP, College Station, TX) using the user-written program ice for imputations. After multiple imputation, the prevalence of marijuana use at one year was estimated to be 22.1% compared to 17.6% using complete cases only. Similarly, the prevalence of students receiving a free/reduced price lunch was 39.2% compared to 28.9% using complete cases only. Primary analyses of the imputed datasets was performed in Mplus 6.1 (Muthén and Muthén, 1998–2010; Rubin, 1987).

Statistical Analysis—Exploratory Structural Equation Modeling (ESEM) was used to investigate the relationships between neighborhood environment and marijuana use among young adults. ESEM integrates an exploratory factor analysis (EFA) into structural equation modeling (SEM). SEM models have traditionally included only confirmatory factor analysis (CFA) measurement models, but some have argued that CFA is often too restrictive to fit the observed data well. CFA only allows indicators to be affected by one factor ([i.e. requires cross-loadings of the factor indicators to be set to zero] Asparouhov and Muthén, 2009; Browne, 2001; Marsh et al., 2009). Specifying cross-loadings at zero usually results in more restrictions than required for model-identification, thus CFA could distort factors and/or

structural relations (Asparouhov and Muthén, 2009; Marsh et al., 2009). Conversely, EFA models with *m* factors require only m^2 restrictions on the factor loading matrix and the factor covariance matrix so that they can provide a *better-fit* than CFA models (Asparouhov and Muthén, 2009). All models were estimated in Mplus version 6.1 using a robust weighted least squares approach with mean and variance adjustment (WLSMV). WLSMV is a more suitable estimation than maximum likelihood (ML) when using binary variables (Beauducel and Herzberg, 2006). Geomin rotation was selected because it is recommended when variables have fewer than three nonzero loadings (Asparouhov and Muthén, 2009). Geomin rotation estimates correlations among factors.

Several model-fit indices, including the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Weighted Root Mean Square Residual (WRMR) were used to evaluate model-fit. RMSEA values ≤ .05, CFI values ≥ .95, and TLI values ≥ .90 generally represent an excellent fit to the observed data (Marsh et al., 2009). WRMR values < 1 reflect a good fit, and smaller values indicate a better-fit (Yu, 2002). Although we used all these indexes, it should be noted that there is no sufficient research to confirm that these indexes can be used for ESEM studies because they are typically used for conventional CFA-based SEM models (Marsh et al., 2009).

Conceptual Model

We assumed that the nineteen NIfETy items could be represented by two factors: neighborhood physical environment and social environment. Unlike CFA/SEM, our ESEM model allowed cross-loadings for all NIfETy items as Figure 1 illustrates. To investigate the relationship between neighborhood characteristics and past year marijuana use, we estimated the relationship between the two neighborhood factors and marijuana use at one year after high school. This analysis controlled for lunch status, race, and gender. We did not estimate the direct effect from gender to the factors because the gender information of one respondent from a block does not necessarily indicate which gender is dominant on the block. In contrast, the race information of one respondent can represent the racial characteristic of the block because people are likely to live closely with others of the same race (Fischer et al., 2004; Glaeser and Vigdor, 2001). Free/reduced meal status of one respondent also can indicate the socioeconomic status of his/her neighborhood because people tend to cluster geographically according to their income level (Fischer et al., 2004).

Results

Measurement Model

The fit indices for the one-factor solution were not acceptable (RMSEA=0.066; CFI=0.89; TLI=0.88; WRMR=1.57), however the fit indices for the two-factor solution provided acceptable model fit (RMSEA=0.037; CFI=0.97; TLI=0.955; WRMR=0.964). Among the nineteen NIfETy variables in Table 2, the first six observed variables (from adults sitting on steps to youth sitting in a group) have significant, positive high loadings on the neighborhood social disorder factor. Conversely, the loadings for these items on neighborhood physical disorder are low, and only two loadings, youth playing (loading: -0.295) and youth in transit (loading: 0.202) are statistically significant. The remaining

thirteen variables (from broken windows to alcohol bottles) had no statistically significant loadings on the neighborhood-activity factor but very high and significant positive loadings on the neighborhood physical environment factor.

The factor correlation between neighborhood social environment and neighborhood physical environment is low and nonsignificant (0.076, p=0.546).

Structural Model

As shown in Table 2, the direct effect from race to neighborhood social activity is statistically significant and positive (0.604, p=0.039). Caucasian respondents are more likely to live in neighborhoods with adult and youth activity than African American respondents. The direct path from race to marijuana use is marginally significant and positive (0.567, p=0.05). The estimated probability of past year marijuana use was 46% for Caucasians and 25% for African Americans. These probabilities were calculated from the estimated probit regression coefficient (0.567). Thus, Caucasian respondents are 1.84 times more likely to use marijuana than African American respondents. Free/reduced meal status and gender did not predict marijuana use.

The direct effect from neighborhood social environment to marijuana use is nonsignificant (-0.098, p=0.375) while the direct effect from neighborhood physical environment to marijuana use is statistically significant and positive (0.219, p=0.023). Based on the probit regression coefficient (0.219), the estimated probability of marijuana use increased 8% for each unit increase in neighborhood disorder.

Discussion

This investigation builds on our previous work that found a significant association between abandoned buildings and past year marijuana use in a sample of young adults (Furr-Holden, et al., 2011). That work was used to inform policy decisions specifically focused on vacant housing as the target for intervention. In the current study, a broader measure of neighborhood disorder was utilized to contextualize the neighborhood environment and included a multi-faceted measure of the physical environment (e.g. presence of broken windows, vandalism), as well as social environmental factors (e.g. youth in transit, youth playing) hypothesized to correlate with young adult substance use. Exploratory structural equation modeling was used to examine the relationship between neighborhood environment and marijuana use among young adults living in an urban area. Two environmental factors, neighborhood social environment and neighborhood physical environment, were identified. Neighborhood physical environment was significantly associated with marijuana use – namely for each unit increase in the neighborhood-disorder factor, the probability of marijuana use increased by 8%. Conversely, there was not a statistically significant association between neighborhood social environment and marijuana use. However, the loadings for youth in transit were positively associated with neighborhood physical disorder and the loadings for youth activity were negatively associated with neighborhood physical disorder indicating that youth are more likely to be in transit passing through disordered neighborhoods and more likely to ‘hang out’ or engage in recreational activity in more ordered neighborhoods.

The study findings are consistent with other investigations examining neighborhood physical environment and young adult substance use (Burlew et al., 2009; Crum et al., 1996; Furr-Holden et al., 2011; Lambert et al., 2005; Reboussin et al., 2007). In line with our theoretical framework, the presence of physical indicators of disorder (e.g., discarded drug paraphernalia, vandalism, unmaintained houses), often a signal for weakened community control and some degree of social acceptability of associated behaviors linked with the malaise, emerged as a correlate of young adult marijuana use. Similarly, physical disorder may also indicate increased opportunities for drug use, a component of drug use propensity and consistent with the findings from Crum et al. (1996) and Tarter et al (2009). There is much less literature available that attributes social disorder with young adult drug use, but consistent with our theoretical framework we tested the hypothesis that neighborhood social environment, a potential proxy for increased neighborhood surveillance and pro-social neighborhood-level norms, might be related to decreased drug taking. Despite null findings in this area, we offer that a more comprehensive investigation of the social environment and the interaction between social and physical indicators is warranted. It is plausible that increased neighborhood social disorder includes negative activity associated with drug use that we simply did not capture (e.g., people in physical fights, dangerous youth activities) due to low prevalence and conceptual framing. Negative or anti- social activity however may provide a more useful construct to explain substance use and will be explored in future investigations.

This study also found that African Americans were less likely to report past year marijuana use. It should be noted that the sample was 94.5% African American. This finding is not consistent with national statistics; data from the Youth Risk Behavior Surveillance (YRBS) System consistently find higher rates of marijuana use among African American high school students compared to Caucasians (Eaton et al., 2012). This finding may be confounded by the other risk factors such as living in disadvantaged neighborhoods. African Americans are more likely to live in disadvantaged neighborhoods with greater opportunities to use illicit substances (Crum, Lillie-Blaton, & Anthony, 1996). While there is a gap in research examining differences in behavior and health outcomes among African Americans and Caucasians in the same community context (Gary, Stark, & LaVeist, 2007), Bolland and colleagues examined differences in substance among African Americans and Caucasians living in the similar urban communities. They found higher rates of substance use in Caucasian compared to African Americans (Bolland et al., 2007) suggesting further research is needed to disentangle the race-drug use relationship.

Before further discussion of these results, a few limitations should be noted. First, the data are cross-sectional and causality cannot be determined. Similarly, the environmental assessments were only conducted once and as such only represent a snapshot of the neighborhood. The outcome measure, marijuana use, was based on self-report and future studies could be strengthened by biological confirmation of substance use (e.g., hair analysis of historical marijuana use). Also, there were no family or parental measures (Roosa et al., 2003). Parents with substance use problems could drift into neighborhoods more accepting of drugs and raise children in these communities. Another limitation is that the neighborhood social environment factor only included pro-social behaviors and the neighborhood physical environment factor only included negative indicators (i.e. indicators

of disorder). Future studies should examine both pro-social (e.g. adults exercising) and negative activity (e.g. youth involved in dangerous activities) indicators as well as physical order (e.g. landscaping) and disorder (e.g. vandalism). Lastly, our measures are entirely quantitative. It is possible that we have codified a complex structure process, namely the social environment and that our null findings are an artifact of our single methods approach. Future research will employ qualitative methods to better understand the social environment.

Despite these limitations, these findings represent an important next step in the field. We found a more comprehensive measure for the physical environment that was associated with young adult marijuana use and offer new avenues for research related to the social environment. This line of research is important for two reasons. First, a great deal of weight is given to the impact of economics and SES on drug use and often, neighborhoods are homogeneous with respect to SES. It is important however to disentangle the environmental context in mostly homogenous, poor communities. Secondly, our NIfETy data provide resolute, namely block-by-block, measures of the neighborhood environment that offer reasonable explanations for variations in neighborhood outcomes and viable targets for future preventive interventions. They offer an advantage over currently used macro-level data (e.g., the Census) that are often too large to disaggregate or give the false impression based on primarily economic indicators that neighborhoods are comparable. Alcohol bottles, broken bottles, syringes, vandalism and graffiti had the strongest loadings on the physical disorder factor. These characteristics are all modifiable thru municipal intervention including street cleaning and calls for service. If in fact, these features of the environment signal weakened neighborhood control and create increased opportunities for drug taking, they merit further investigation as potential intervention targets.

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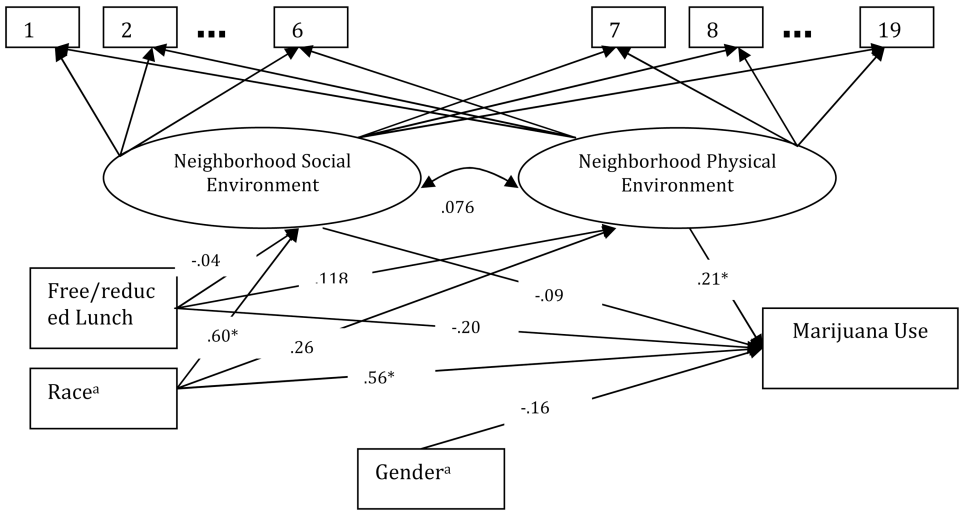

Figure 1. Path Diagram of Neighborhood Physical and Social Environment and Marijuana Use

Model of relationship between neighborhood social and physical environment and marijuana use. The ovals represent latent variables and the boxes indicate observed (measured) variables. The figure includes path coefficients.

* $p \leq 0.05$

[a]Gender: Male coded as 0, Female coded as 1; Race: African American coded as 0, Caucasian coded as 1

Table 1

Descriptive Statistics

Variables	%
NIfETy Indicators	
1) Presence of adults sitting on steps	24.9
2) Presence of adults watching youth	16.8
3) Presence of positive adult interactions	19.1
4) Presence of youth playing	18.8
5) Presence of youth in transit	21.9
6) Presence of youth sitting in a group	12.6
7) Presence of broken windows	17.3
8) Presence of abandoned buildings	25.4
9) Presence of vacant houses	22.4
10) Presence of vacant commercial buildings	5.5
11) Presence of unmaintained properties	43.7
12) Presence of vacant lots	11.1
13) Presence of broken bottles	54.5
14) Presence of graffiti	11.3
15) Presence of evidence of vandalism	10.1
16) Presence of intoxicated people, signs of using alcohol/drugs, or signs of drug selling	7.8
17) Presence of syringes or vials	31.9
18) Presence of baggies, blunt guts/wrappers, or pot roaches	40.2
19) Presence of alcohol bottles	53.8
Background and outcome	
Marijuana use at one year post high school	17.6
African American	94.5
Male	52.3
Free and reduced price meals at grade 12	28.9

Table 2
ESEM Results of a Two-Factor Solution

Predictors Dependent variables	Unstandardized Coefficients	S.E.	t
Neighborhood Social Environment			
adults sitting on steps	0.710	0.062	11.531**
adults watching youth	0.888	0.060	14.843**
positive adult interactions	0.597	0.078	7.687**
youth playing	0.975	0.068	14.383**
youth in transit	0.383	0.090	4.243**
youth sitting in a group	0.779	0.073	10.651**
broken windows	0.061	0.113	0.538
abandoned buildings	0.107	0.099	1.088
vacant houses	0.063	0.100	0.632
vacant commercial buildings	0.085	0.138	0.613
unmaintained properties	0.034	0.089	0.389
vacant lots	-0.099	0.107	-0.922
broken bottles	0.012	0.053	0.228
graffiti	-0.113	0.120	-0.938
evidence of vandalism	-0.219	0.120	-1.833
intoxicated people, using alcohol/drugs, or drug selling	0.074	0.129	0.574
syringes or vials	-0.076	0.097	-0.779
baggies, blunt guts/wrappers, or pot roaches	0.040	0.087	0.462
alcohol bottles	-0.005	0.019	-0.281
Neighborhood Physical Environment			
adults sitting on steps	0.006	0.052	0.109
adults watching youth	0.016	0.093	0.172
positive adult interactions	-0.004	0.061	-0.069
youth playing	-0.295	0.098	-3.003**
youth in transit	0.202	0.087	2.314*
youth sitting in a group	0.077	0.091	0.843
broken windows	0.696	0.073	9.537**
abandoned buildings	0.755	0.064	11.866**
vacant houses	0.587	0.070	8.362**
vacant commercial buildings	0.531	0.104	5.081**
unmaintained properties	0.677	0.061	11.129**
vacant lots	0.590	0.085	6.976**
broken bottles	0.911	0.036	25.167**
graffiti	0.755	0.086	8.748**
evidence of vandalism	0.874	0.085	10.287**

Predictors Dependent variables	Unstandardized Coefficients	S.E.	t
intoxicated people, using alcohol/drugs, or drug selling	0.569	0.095	6.012**
syringes or vials	0.859	0.060	14.365**
baggies, blunt guts/wrappers, or pot roaches	0.584	0.064	9.106**
alcohol bottles	0.947	0.023	41.565**
Race (reference: African American)			
neighborhood-activity	0.604	0.293	2.063*
neighborhood-disorder	0.268	0.239	1.121
marijuana use	0.567	0.289	1.964*
Free/Reduced lunch			
neighborhood-activity	-0.044	0.133	-0.334
neighborhood-disorder	0.118	0.114	1.035
marijuana use	-0.209	0.149	-1.402
Gender (reference: Male)			
marijuana use	-0.161	0.145	-1.111
Neighborhood Social Environment			
marijuana use	-0.098	0.110	-0.887
Neighborhood Physical Environment			
marijuana use	0.219	0.096	2.270*
Factor correlation between neighborhood-physical and social environment	0.076	0.139	0.546

Note. Model fit: RMSEA = 0.037; CFI/TLI = 0.97/0.963

** $p \leq .01$;

* $p \leq 0.05$