

## Neighborhood Environment and Internalizing Problems in African American Children

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**Abstract** This study examines gender differences in the association between environment and internalizing problems in a sample of predominately African American schoolchildren. Internalizing problems was assessed using the Youth Self Report. Violence and alcohol and other drug (AOD) exposure subscales were created using observational assessments of neighborhood blocks. Logistic regression models were used to assess the relationship between neighborhood environment and internalizing problems. For each AOD item present on the block the odds of internalizing problems among girls increased by

17% (OR = 1.17, CI: 1.01, 1.35,  $P = 0.039$ ). The relationship was not significant among boys. Violence exposure did not predict internalizing problems in boys or girls. These preliminary findings suggest that primary school-aged girls' emotional well-being is more negatively impacted by deleterious environments. Future investigations will examine the relationship between deleterious neighborhood environments and internalizing problems as the children age into adolescence.

**Keywords** Mental health · Urban health · Gender · Youth · African American

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### Background

Rates of internalizing problems among children range between 6 and 11% (Jensen et al. 1999; Ackerman et al. 2007). Most studies find no gender differences in rates of internalizing problems among prepubescent children (Wade et al. 2002; Cyranowski et al. 2000; Xue et al. 2005), while some find higher rates among boys (Anderson et al. 1987; Cohen and Brooks 1987; Kashani et al. 1982). Rates of internalizing problems increase more rapidly among females during early adolescence (Angold and Rutter 1992; Angold et al. 1998; Cohen et al. 1993; Cyranowski et al. 2000; McGee et al. 1992; Wade et al. 2002). By age 15, females are more than twice as likely to be depressed; this gender difference continues throughout the lifespan (Galmabos et al. 2004; Hankin et al. 1998; Kessler et al. 1993; Nolen-Hoeksema 1987; Wade et al. 2002; Weissman et al. 1991). Hormonal changes (Hankin and Abramson, 1999), coping skills (Hänninen and Aro 1996; Zahn-Waxler et al. 2008), stress response, and social roles (Aneshensel et al. 1981; Hankin and Abramson 2001;

Kessler and McLeod 1984; Piccinelli and Wilkinson 2000) partially explain gender differences in internalizing problems among adolescents.

Research has increasingly focused on the role of the built and social environment on mental health among adults (Evans 2003; Repetti et al. 2002; Weich et al. 2002). Neighborhood physical and social disorder is associated with increased rates of depression and other mental illnesses among adults (Curry et al. 2008; Evans 2003; Matheson et al. 2006; Perkins et al. 1992; Repetti et al. 2002; Truong and Ma 2006; Weich et al. 2002). Few studies have focused on the relationship between mental health and environmental factors among youth. The extant studies show that disordered communities are associated with increased rates of adverse mental health outcomes in children and adolescents (Aneshensel and Sucoff 1996; Jones et al. 2005; Urban et al. 2009; Xue et al. 2005).

This study seeks to add to the current literature by examining gender differences in the relationship between neighborhood environment and internalizing problems. Observational methods were used to obtain objective environmental measures of physical and social disorder including indicators of violence, alcohol and other drugs (VAOD; Furr-Holden et al. 2008). The observational raters went to the residential neighborhood blocks of a community-based sample of predominantly urban African American school children. This study is one of the first to focus on environmental factors related to gender differences in internalizing behaviors among at-risk urban children.

## Methods

### Data Source

Four hundred twenty-five third through fifth grade children in six Baltimore City, Maryland public schools were recruited and completed interviews for a community-based epidemiologic study, The Multiple Opportunities to Reach Excellence (MORE) Project. The six schools were selected from the 55 Baltimore Community Statistical Areas (CSAs). CSAs were ranked into three violence strata based on the number of homicides per 100,000 residents (Cooley-Strickland et al. 2009). Within each stratum, the two schools with the largest 3rd–5th grade enrollment were recruited for participation. Participating schools, their principals, teachers, students and their parents/guardians were consented and incentivized to participate in the study. The participation rate of students was 87.1% (with a 67% consent rate of all eligible students).

The MORE Project investigated the impact of exposure to community violence on urban children's emotional, behavioral, and physical health (Cooley-Strickland et al.

2009). A battery of measures, including self-reported mental health and exposure to community violence, was administered individually using computer-assisted personal interview (CAPI, see Cooley-Strickland et al. 2009 for method details). Observational measures of environmental indicators of physical and social disorder were conducted on the residential block faces of 346 (81% of children who completed interviews) MORE participants after the self-report survey and proximal to the time of the self-report interview using the Neighborhood Inventory for Environmental Typology (NifETy; Furr-Holden et al. 2008) during the Spring and Summer, 2006. There were no statistically significant differences in demographics, the exposure, or outcome variables for the entire sample of children who completed the MORE interview ( $n = 425$ ) and the sample of children with MORE interviews and neighborhood assessments ( $n = 346$ ). The MORE Project was approved by the Institutional Review Board at Johns Hopkins University.

### Internalizing Problems

Internalizing problems, defined as depression, anxiety and/or withdrawal were assessed using the internalizing problems scale of the Youth Self-Report (YSR) of the Achenbach System of Empirically Based Assessment (AESBA; Achenbach 1991). The YSR is a widely used (Achenbach and Rescorla 2001; Achenbach et al. 2002) valid and reliable instrument that provides self-ratings of competencies and problems related to internalizing and externalizing behaviors (Achenbach and Rescorla 2001). Children in this study were read the YSR by an interviewer in a private location. Based on the Achenbach scoring system T-scores 60–63 are consistent with borderline clinical range for internalizing problems and T-scores >63 are consistent with clinical range for internalizing problems (Achenbach et al. 2002). Several studies have found significant associations between the internalizing problems scale and current depression (Achenbach and Rescorla 2001; Dingle et al. 2010). This investigation used the most inclusive measure of internalizing problems (i.e., T-scores >60), which is within the clinically validated range. Ratings within the borderline clinical range for internalizing problems scale of the YSR will be herein referred to as internalizing problems.

### Environmental Variables

The Neighborhood Inventory of Environmental Typology (NifETy) instrument provides neighborhood-level observations of violence, alcohol, and other drug (VAOD) activity. The NifETy instrument includes 172 items operationalized within seven domains: physical layout,

structures on the block, dwelling type, youth and adult activity, physical order and disorder, social order and disorder, and the presence of VAOD indicators. The NifETY assessments were conducted independently by trained two-person team field raters who entered the environmental observations into handheld electronic devices.

Studies have linked depression to violence and drug activity through fear (Perkins and Taylor 1996; White et al. 1987). Accordingly, two environmental exposure subscales were created to measure neighborhood indications of violence or alcohol and other drug activity ( $\alpha = 0.74$ ). These two environmental exposure variables will herein be referred to as the alcohol and other drug (AOD) score and the violence score. Items in the AOD score included presence of drug paraphernalia, presence of specific drug items (e.g. syringes, baggies, vials/vial caps, blunt guns/wrappers, pot roaches, crack pipes, other drug paraphernalia), obvious signs of drug selling, alcohol bottles, broken bottles, people consuming alcohol, and intoxicated people. The range for the AOD score was 0 to 7. The violence score ranged from 0 to 3 and included presence of blood in the street, shell casings, memorials, police tape, people yelling, people swearing, and people in physical fights (Furr-Holden et al. 2008; Milam et al. 2010). Each item contributed equally to the respective score regardless of frequency. The NifETY has high reliability for the total scale [Internal Consistency Reliability (ICC) is 0.84], the VAOD subscale (ICC = 0.71), and across raters (ICC = 0.67–0.79). Validity metrics are also good. NifETY indicators of VAOD exposure correlated strongly with youth self-reported VAOD exposure in a slightly older sample of urban adolescents and also with local crime data (Furr-Holden et al. 2008; Furr-Holden et al. 2010).

Self-reported neighborhood safety (“I feel safe in my neighborhood”) was also assessed as a predictor; this variable was reverse coded as a risk factor (i.e., I do not feel safe in my neighborhood).

### Statistical Analyses

Stata 10.1 was used for all statistical analyses. Logistic regression models were used to estimate the relationship between neighborhood environment and mental health problems as assessed by the internalizing problems scale of the YSR. Generalized estimating equations (GEE) were used to adjust for correlations among students living in the same neighborhood. The analyses were stratified by gender. Odds ratios were calculated to convey the strength of association and significant findings were reported for alpha levels below 0.05. Grade-level, race, and safety were included as control variables in the adjusted regression models.

### Results

One hundred eighty-eight (54%) of the sample was female. Demographics were similar by gender: the mean age was 9.6 years ( $\pm 1.0$  SD) and 86% ( $n = 299$ ) of participants were African American. Approximately 35% of females and 29% of males did not feel safe in their neighborhood. The prevalence of internalizing problems among males was 37 and 29% among females, this difference was marginally significant ( $\chi^2$ ,  $P = 0.089$ ). Neighborhood indicators of violence, alcohol and other drugs and self-reported neighborhood safety were not statistically significantly different by gender.

The independent effect of youth’s self-reported neighborhood safety was significant among girls; girls who felt unsafe in their neighborhood were about two times more likely to have internalizing problems (OR = 2.10, CI: 1.08, 4.08,  $P = 0.029$ ). Self-reported neighborhood safety did not predict mental health problems among boys (OR = 1.72, CI: 0.77, 3.85,  $P = 0.182$ ). Girls living on blocks with one AOD indicator present were 17% more likely to have internalizing problems than girls without an AOD indicator present (OR = 1.17 CI: 1.01, 1.35,  $P = 0.039$ ). The relationship between AOD score and internalizing problems was not significant among boys (OR = 1.00, CI: 0.85, 1.17,  $P = 0.972$ ). The violence score did not predict internalizing problems in either girls or boys.

The multivariable model adjusted for race and age. The results were similar; girls were two times more likely to be in the range for internalizing problems if they felt unsafe in their neighborhood (OR = 2.13, CI: 1.09, 4.18,  $P = 0.027$ ) and males were 1.6 times more likely poorer mental health if they reported feeling unsafe in their neighborhood, however this result was statistically insignificant (OR = 1.61, CI: 0.72, 3.61,  $P = 0.245$ ). The effect of AOD score were also similar to the unadjusted models for girls and boys (OR = 1.16, CI: 1.01, 1.35,  $P = 0.034$  & OR = 1.01, CI: 0.87, 1.19,  $P = 0.862$ ).

In a separate multivariable analysis self-reported neighborhood safety was included as a mediator for girls. Self-reported neighborhood safety attenuated the effect of the AOD score on internalizing problems, providing some evidence of mediation; the odds ratio decreases to 1.12 and becomes statistically insignificant (OR = 1.12, CI: 0.95, 1.33,  $P = 0.157$ ).

### Discussion

The prevalence of internalizing problems (using the clinical range,  $>63$  on the YSR) among this sample was consistent with the prevalence of internalizing problems in a community-based sample of children in Chicago (21% and 18%, respectively; Xue et al. 2005). The same study found that

neighborhood disadvantage (measured using US Census data) was associated with internalizing problems; however, there were no gender differences. The prevalence of internalizing problems was higher in boys compared to girls in this investigation ( $P = 0.089$ ), which has been found in other studies (Anderson et al. 1987; Cohen and Brooks 1987; Cyranowski et al. 2000; Kashani et al. 1982). Nolen-Hoeksema et al. (1991) attributes the early gender difference in depression to maladaptive explanatory styles in the context of the learned helplessness model of depression (Abramson et al. 1978). This theory suggests that when individuals explain negative events, it influences their emotional and behavioral responses to those events. The individuals who repeatedly explain these events internalize them and react consistent with helplessness depression. The authors tested this theory and their results were consistent with the theory: boys reported more depressive symptoms and were more likely to have maladaptive explanatory styles. Others have suggested that depression in boys may be secondary to conduct problems, which are more prevalent in boys (Anderson et al. 1987).

The results of this current study provide some evidence that gender moderates the relationship between neighborhood exposure to alcohol and other drugs and mental health problems. Females were more adversely impacted by disordered neighborhood environments, namely those with increased indicators of alcohol and other drugs. To assess whether mental health treatment or service use impacted study findings, the effect of mental health services use among the subpopulation of youth with parental reports ( $n = 222$ , 64%) was also examined. Mental Health service utilization did not differ by gender ( $\chi^2$ ,  $P = 0.275$ ). When mental health service use is added as a covariate to the unadjusted model, the effect of the AOD score on internalizing problems in girls becomes marginally significant and the magnitude increases (OR = 1.19,  $P = 0.07$ ).

Previous research shows that males are more likely to report exposure to deleterious environments (Baranowski et al. 1993; Cooley-Quille et al. 2001; Fitzpatrick and Boldizar, 1993; Gladstein et al. 1992; Katz 1993; Rosen and Peterson 1990; Selner-O'Hagan et al. 1989; Svensson, 2003). Our findings extend this research and suggest that females are more impacted by living in chaotic, disorganized, and unsafe neighborhoods. We suspect boys in hazardous environments develop coping strategies over time that include increased externalizing behaviors like aggression and violence. This is supported in other published research (McGee et al. 2001; Salzinger et al. 2008). Conversely, girl's adaptational processes lead to more internalizing symptoms including feelings of hopelessness and depression and as they age will surpass the boys in rates of depression and other internalizing problems (McGee et al. 1992, 2001). To further explore this hypothesis we will

examine this cohort in future investigations as they age. It is also noteworthy that non-African American boys were more likely to have mental health problems than African American boys; however, the relationship between race and depression was independent of AOD score. Additional analyses were conducted stratifying the sample by race; there was not a significant relationship between AOD score and depression among African Americans or non-African Americans.

A few limitations of this research merit mention before further discussion of the results. First, the study sample was restricted to 3rd–5th graders and the students were clustered within six schools so generalizability is limited. Related to this was the selection of schools; schools were not selected randomly, the schools were selected within stratum (i.e. two schools with largest enrollment selected). Larger schools tend to have more disadvantaged students (Lee and Smith 1997; Lee and Loeb 2000), which would also limit generalizability. Second, there was no measure of time spent in the neighborhood; the youth may have varying degrees of exposure to the environmental indicators. Third, given the limitations of self-report, it would have been ideal to use the full array of possible self-reports, including parent reports. This would also have allowed adjustment for other potential confounders not controlled for in this investigation including socio-economic status, parental connectedness, marital status of parents, experience of violence, etc. Future investigations in this population will extend the analyses to include parent data and as well, the sample has been expanded to include more than 600 students at 49 schools.

Despite these limitations, this investigation has two major strengths. First, it identified an early gender difference in both the rates of internalizing problems and the relationship between block-level environmental hazards and depression among urban school children. Second, this investigation uses valid and reliable measure of the neighborhood environment. This objective measure is more resolute than traditional measures of the neighborhood environment (i.e. US census). Lastly, we found no published reports that examined gender differences in the relationship between environmental hazards and mental health among African American children, so this study presents novel findings for this understudied population.

This work is a first step in better understanding how living in disorganized neighborhood environments influences children's mental health and how these processes vary for boys and girls.

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