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Exposure to Hazardous Neighborhood Environments in Late Childhood and Anxiety

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Abstract

This investigation examined the relationship between living in disordered neighborhoods during childhood and anxiety 1 year later. Objective measures of neighborhood environment and individual data from a study of mental health in suburban children were utilized. Linear regression models were used to assess relationships between neighborhood hazard and anxiety. Childhood neighborhood disorder was inversely associated with generalized anxiety ($\beta = 0.037$, $p < 0.01$) and social phobia ($\beta = -0.33$, $p = 0.03$), but not other forms of anxiety including separation anxiety or panic disorder. We suspect that children with early exposure to disordered neighborhoods are either desensitized to toxic environments or that anxiety is not well specified for this population.

Large epidemiological studies estimate that 10%–20% of youth meet criteria for anxiety disorder (Kendall et al., 2010). Anxiety disorders and internalizing problems during childhood are associated with later anxiety during adolescence, internalizing problems in adulthood, and physical health in adulthood (Anderson, Cohen, Naumova, & Must, 2006; Bittner et al., 2007; Woodward & Fergusson, 2001). Gabarino (1997) suggests that mental health problems among youth may be the by-product of socially toxic environments (e.g., residential neighborhood) that lack developmental assets for youth. General strain theory (Agnew, 1992) may also explain the relationship between socially toxic environments and mental health in youth. The constant strain and stress because of fear of one's environment and lack of resources may lead to maladaptive coping and mental health problems.

Increasingly, researchers have examined the impact of hazardous neighborhood environments (i.e., graffiti, intoxicated people, and gang activity) on youth and adolescent mental health (Aneshensel & Sucoff, 1996; Furr-Holden, Milam, Reynolds, MacPherson, & Lejuez, in press; Milam et al., in press; Schaefer-McDaniel, 2009; Xue, Leventhal, Brooks-Gunn, & Earls, 2005). The studies indicate that hazardous neighborhood environments are related to increased rates of mental disorders including depression and internalizing behaviors. Aneshensel and Sucoff (1996) examined neighborhood socioeconomic factors, adolescents' perception of their neighborhood environment, and mental health outcomes; they found that children perceived greater neighborhood danger in more disadvantaged neighborhoods and the increase in perceived danger was related to increased anxiety and

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depression. Similarly, Xue et al. (2005) examined the relationship between neighborhood disadvantage, measured using U.S. Census data, and internalizing problems (e.g., depression, anxiety, and withdrawal) in a sample of youth aged 5 to 11 years. The authors also examined collective efficacy as a potential mediator. They found that neighborhood disadvantage was positively related to internalizing problems and collective efficacy mediated the relationship. Milam et al. (in press) extended the line of research and used objective measures of neighborhood environment in addition to children's perception of the neighborhood environment using a sample of third-grade to fifth-grade students. Girls who felt safe in their neighborhood were less likely to have internalizing behavior problems (anxiety, depression, etc.) than girls who did not feel safe in their neighborhood. There was also positive association between objectively measured neighborhood indicators of alcohol and drug use (e.g., people were selling or using drugs, people were drinking and/or drunk/intoxicated people) and depressive symptoms among girls. Self-reported neighborhood safety mediated the relationship between neighborhood indicators of alcohol and drug use and internalizing behavior problems. Self-reported and objective measures of the neighborhood environment were not related to internalizing behavior problems among boys.

This current study explores the relationship between neighborhood disorder and anxiety disorders symptoms among a sample of primarily suburban school children. The investigation uses a novel observational instrument to characterize the physical and social aspects of the neighborhood environment (Furr-Holden et al., 2010). Based on previous research (Furr-Holden et al., in press; Milam et al., in press) and theoretical foundations, we expect to find a positive relationship between neighborhood disorder and anxiety in children.

Method

Data Sources

Mental Health Outcomes: The Child Mental Health Study—The Child Mental Health Study examined the utility of a laboratory measure of risk-taking propensity. The study included measures of risk-taking propensity, mental health, risk behaviors, and delinquent behaviors (Furr-Holden et al., in press; Lejuez et al., 2002). Participants were recruited from rural, suburban, and urban neighborhoods in the greater Washington, DC metro area. Targeted advertisement was used to increase the geographic, racial, and economic diversity of the sample. This investigation will use the six subscales from the Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umenoto, & Francis, 2000): generalized anxiety disorder (GAD; 6 items), social phobia (SP; 9 items), panic disorder (PD; 9 items), separation anxiety disorder (SAD; 7 items), obsessive-compulsive disorder (OCD; 6 items), and major depression (MDD; 10 items). The RCADS is 47-item self-report questionnaire. The questionnaire is answered using a 4-point Likert scale, ranging from 0 (never) to 3 (always). The range of possible scores for the total scale is 0 to 141. Possible scores on the subscales range from 0 to 3 times the number of items in the subscale (e.g., MDD: 30 items; range is from 0 to 30). The psychometric properties of the instrument are sound (Chorpita et al., 2000; Chorpita, Moffitt, & Gray, 2005; de Ross, Gullone, & Chorpita, 2002). Alpha coefficients were used to test for internal consistency for the RCAD subscales, the coefficients ranged from 0.73–0.82. Validity was assessed using two established instruments—the Children's Depression Inventory (CDI; Kovacs, 1980) and the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978)—and were also good ($r=0.59-0.72$). This tool builds on the Spence Children's Anxiety Scale (SCAS; Spence, 1997) and was constructed to better assess the Diagnostic and Statistical Manual disorders (e.g., depression and anxiety).

Neighborhood disorder: The Neighborhood Inventory for Environmental Typology Instrument—Neighborhood disorder was measured using the Neighborhood Inventory for Environmental Typology (NifETy) Instrument (Furr-Holden et al., 2008). NifETy assessments were conducted by a pair of trained field raters on the residential blockfaces of participants upon completing year 1 Child Mental Health assessments. Metric properties, i.e., the validity and reliability, of the NifETy are sound. The NifETy has high reliability for the total scale (internal consistency reliability [ICC] is 0.84), the violence, alcohol, and other drugs (VAOD) subscale (ICC = 0.71), and across raters (ICC = 0.67–0.79). Validity metrics are also good. NifETy indicators of VAOD exposure (e.g., alcohol bottles, drug baggies, and shell casings) correlated strongly with self-reported VAOD exposure (e.g., self-reported use, seeing people using drugs in the neighborhood) among a sample of slightly older adolescents and with local crime data in prior study (Furr-Holden et al., 2010). The NifETy includes seven domains: physical layout, dwellings, adult and youth activity, physical and social (dis)order, and VAOD indicators. An exploratory factor analysis was conducted using 21 items theoretically related to neighborhood disorder (Cohen, Farley, & Mason, 2003; Perkins, Brown, & Taylor, 1996). Eleven items had prevalence above 5% and consistently loaded together (items listed in footnote to Table 1, loadings: 0.51–0.90). A disorder score was created by multiplying the factor loadings by one if the indicator was present and summing the score for each participant's block face. Because factor loadings were used to create the disorder score, some items were weighted more heavily than others (e.g., drug paraphernalia 0.855; trash, 0.506). The resulting disorder score ranged from zero to 7.4.

Supplemental funding for the current project allowed a sample of 196 youth to have neighborhood assessments conducted after the completion of year 1 Child Mental Health assessments. One hundred seventy-two (87.8%) youth who completed the RCADS in year 1 and year 2 had neighborhood assessments at year 1 and are included in this research. The NifETy and Child Mental Health Study data collections were approved by grantee Institutional Review Boards.

Data Analysis

Descriptive statistics were computed for all participants. Multivariable linear regression models were used to assess the relationship between neighborhood disorder and the anxiety disorder subscales. Model 1 included the predictor of interest, the neighborhood disorder score, and the anxiety subscale score at year 2 as the dependent variable. This model also included statistical adjustment for the respective anxiety subscale at year 1 to constrain the potential confounding effect of prior anxiety symptoms. Model 2 extended Model 1 and controlled for demographic characteristics including, age, race, gender, and annual family income.

Results

The study sample included 104 males (60.4%) and was 51.5% Caucasian (Table 1). The median age of the sample was 11 years of age. The mean parental self-reported income was \$86,000 (\$50,000 SD). Income was transformed into a binary variable because it was not normally distributed (swilk, $p < 0.01$).

Neighborhood disorder during childhood predicted a lower score on the generalized anxiety disorder scale at year 2 after controlling for the GAD during the previous year (Table 2; $\beta = -0.33$, $p < 0.01$). No demographic variables predicted GAD in year 2. Neighborhood disorder continued to predict a lower score on the GAD scale after controlling for demographic characteristics and past year GAD ($\beta = -0.37$, $p < 0.01$). Similar findings were found for the social phobia subscale (Table 3); increased disorder was associated with a decrease in social

phobia subscale in model 1 ($\beta = -0.33$, $p = 0.03$), adjusting for the social phobia in year 1. The relationship was not statistically significant after adjusting for demographics ($\beta = -0.26$, $p = 0.11$). The other anxiety subscales were not significantly associated neighborhood disorder in the unadjusted or adjusted models.

Given the inverse relationship between neighborhood disorder and anxiety two alternative analytic approaches were explored. First, we examined the relationship between neighborhood disorder and GAD using GAD as a dichotomous variable (cutting GAD at the top 10%; Muris, Meesters, & Schouten, 2002), constricting the GAD outcome to the highly anxious children. The results were similar; neighborhood disorder predicted GAD at year 2 (odds ratio [OR]=0.41, $p = 0.04$) after controlling for past year anxiety and demographic characteristics. Second, we extended the analytic model to account for potential confounding variables. We expanded the final adjusted model and controlled for depression and stress. The stress measure included an item related to coping (“found that you could cope with all the things you had to do”), a potentially important mediator between neighborhood disorder and GAD. Depression was measured using the depression scale of the RCADS. Stress and coping were measured using the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983). All measures were continuous and there was a moderate correlation between year 2 anxiety and depression (Spearman's correlation coefficient = 0.70, $p < 0.01$) and a weaker correlation to stress (Spearman's correlation coefficient = 0.53, $p < 0.01$). There was no change in the relationship between anxiety and neighborhood disorder after adjustment stress and depression ($\beta = -0.38$, $p < 0.01$) and the inverse relationship between anxiety and neighborhood persisted. There was a positive but statistically insignificant relationship between depression and neighborhood ($\beta = 0.02$, $p = 0.91$), and stress and neighborhood disorder ($\beta = 0.17$, $p = 0.56$; i.e., as neighborhood disorder increased, stress and depression 1 year later also increased).

Discussion

This investigation detected a negative relationship between neighborhood disorder and generalized anxiety in sample of urban and suburban youth, namely, as neighborhood disorder increased, the score on the generalized anxiety disorder scale decreased. This relationship was independent of current depression and stress and did not vary as a function of using continuous or dichotomous measures of anxiety with a high-threshold for classifying anxiety. There was no association between neighborhood disorder and other subscales of anxiety, including social phobia and obsessive-compulsive disorder. These findings are not consistent with other studies examining the relationship between neighborhood environment and internalizing problems among children and adolescents (Aneshensel & Sucoff, 1996; Milam et al., 2011; Xue et al., 2005). Schaefer-McDaniel (2009), however, used objective measures of neighborhood environment in addition to children's perception of the neighborhood environment and also found a negative association between objectively measured neighborhood indicators of alcohol and drug use (people were selling or using drugs, people were drinking and/or drunk/intoxicated people) and depressive symptoms. Other measures of the neighborhood environment (e.g., neighborhood decay) were unrelated to depressive symptoms. The authors suggest several possible explanations for the negative relationship between alcohol and drug indicators and depressive symptoms: (a) children may not perceive indicators of alcohol and drug use as stressors, (b) children in disordered neighborhoods may be desensitized to these stressors, or (c) the indicators that researchers define as neighborhood stressors may actually seem like positive attributes due to more people present on the block (i.e., natural surveillance).

There are alternative hypotheses that explain the current findings. First, children in disordered environments may have valid concern for their safety or well-being. In this case,

the GAD measure would not be sensitive enough to discriminate anxiety from normative concern. It could also be the case that children who have lived in chronically disordered neighborhood environments have developed coping mechanisms and, over time, have become desensitized to the effects of living in these environments.

This explanation is consistent with findings from Edlynn, Gaylord-Harden, Richards, and Miller (2008), who found that avoidant coping (avoiding or repressing the stressor) mediated the relationship between community violence exposure and anxiety in a sample of sixth and seventh graders. Alternatively, because GAD is characterized by long-lasting anxiety that is not focused on any one object or situation, it might not be relevant for children who have specific things to worry about in terms of environmental adversity.

Limitations of these data include the small sample size (n5172), reliance on a self-reported measure of anxiety, and lack of longitudinal data beyond the 1-year follow-up. Despite these limitations, this study did identify an inverse relationship between anxiety and neighborhood disorder. Future investigations in this sample will look at current neighborhood environment and other internalizing and externalizing problems as the children age. In addition, subsequent environmental assessments are planned that will include a large sample of children to better explore potentially important mediating and confounding variables, such as co-occurring mental disorders and behavioral problems or assets.

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Table 1
Sample Characteristics of Child Mental Health Study Participants

Characteristic (n=172)	
Mean Neighborhood Disorder ^a (SD)	1.32 (1.63)
Mean Generalized Anxiety Disorder Scale (SD)	
Year 1	5.67 (3.18)
Year 2	4.73 (2.85)
Mean Social Phobia Scale (SD)	
Year 1	8.52 (4.80)
Year 2	8.33 (4.71)
Gender (%)	
Male	104 (60.47)
Female	68 (39.53)
Race ^b (%)	
White	88 (51.46)
Black	63 (36.84)
Other	20 (11.70)
Annual Family Income ^c (%)	
<Median	84 (50.91)
>Median	81 (49.09)

SD = Standard Deviation

^a Items characterizing neighborhood disorder score: structures with broken windows, unboarded abandoned buildings, unmaintained property, trash in open spaces, broken bottles, graffiti, noise, people yelling, public alcohol consumption, drug paraphernalia and discarded alcohol bottles.

^b
n = 171

^c
n = 165

Table 2
Results from Linear Regression Models of Neighborhood Disorder and Generalized Anxiety Disorder

	Model 1 ^c (n =172)		Model 2 ^d (n =164)	
	β	p	β	p
Neighborhood Disorder	-0.33	<0.01	-0.37	<0.01
Generalized anxiety, year 1	0.44	<0.01	0.43	<0.01
Male	0.34	0.39	0.27	0.49
Race ^a				
White (reference)	-	-	-	-
Black	-0.36	0.39	0.15	0.74
Other	0.39	0.53	0.28	0.67
Annual Family Income ^b	0.59	0.13	0.71	0.10
Age	-0.20	0.40	-0.33	0.18

^an = 171

^bn = 165

^cAdjusted for year 1 anxiety

^dAdjusted for race, gender, income, age, year 1 anxiety

Table 3
Results from Linear Regression Models of Neighborhood Disorder and Social Phobia

	Model 1 ^c (n =172)		Model 2 ^d (n =164)	
	β	p	β	p
Neighborhood Disorder	-0.33	0.03	-0.26	0.11
Social phobia, year 1	0.54	<0.01	0.51	<0.01
Male	0.17	0.73	0.15	0.78
Race ^a				
White (reference)	-	-	-	-
Black	-1.46	<0.01	-1.34	0.02
Other	0.97	0.22	1.10	0.85
Annual Family Income ^b	0.55	0.28	0.34	0.55
Age	-0.39	0.22	-0.39	0.22

^an = 171

^bn = 165

^cAdjusted for year 1 social phobia

^dAdjusted for race, gender, income, age, year 1 social phobia