IMPACT OF ENVIRONMENT ON ADOLESCENT MENTAL HEALTH AND BEHAVIOR: Structural Equation Modeling

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This study uses structural equation models to describe how objective neighborhood, perceived neighborhood, and environmental support predict mental health; 792 adolescents responded to highly structured interviews. The effect of objective environment on mental health was mediated through its influence on perceived neighborhood. Environmental support mitigated negative perceptions of environment and the effect of perceived environment on mental health, while exposure to violence augmented the negative effect of perceived environment.

Researchers interested in adolescent behavior and mental health have long recognized the importance of the environment. Studies on the effects of family environment have dominated the field, exploring divorce, parental problems such as alcoholism, social and economic status of families, and other family variables (Amerikaner, Monk, Wolfe, & Thomas, 1994; Escailler-Nicola, Batwin, & Tarter, 1994; Friedemann & Webb, 1995; Kazdin, 1992). Research on social environment has emphasized the importance of peer group values and behavior (Crane, 1991; Farrington, 1992; Garrett, 1995), and research on the impact of neighborhood and community environments has shown their influence on behavior (Green, 1993; Rutter, 1993; Sampson, Raudenbush, & Earls, 1997) and mental health (Stiffman, Doré, & Cunningham, 1996).

Children and adolescents living in urban communities marked by poverty, crime, and drug-related activities are likely not only to witness significant numbers of homicides, assaults, robberies, and physical fights, but to become victims themselves (Bell & Jenkins, 1993; Fitzpatrick & Boldizar, 1993; Hausman, Spivak, & Prothrow-Stith, 1994; Richters & Martinez, 1993; Schubiner, Scott, & Tzelepis, 1993). Their chronic exposure is linked with a range of childhood distress symptoms, e.g., depression, anxiety, intrusive thoughts, and sleep disturbances (Bell & Jenkins, 1993; Fitzpatrick & Boldizar, 1993; Martinez & Richters, 1993). However, beyond distress symptoms, little is known about the effects of chronically violent community environments on the mental health and behavior of adolescents.

Two major theoretical approaches—psychological and sociological—have focused on the interrelationship of environment and

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behavior, although much of the published literature is descriptive. Both psychological and sociological theories recognize that behavior is influenced by contextual factors, such as the actions of peers, available role models, local institutions, and competition or cooperation in the neighborhood (Jencks & Mayer, 1990).

The psychological theories—particularly ecological, life options, and systems theories—concentrate on perceived neighborhood environment and proximal environment, and rely on surveys, focus groups, agency case records, or other forms of detailed studies of individual cases (Caspi, Bolger, & Eckenrode, 1987; Cooley, Turner & Beidel, 1995; Garbarino & Sherman, 1980). According to these theories, the way that youth perceive their communities contributes to the development of their beliefs, identity, and values, which in turn shape their behavior (Ajzen, 1987). Neighborhood environment influences the types of friends and peers that are available, and may create chronic stress for caregivers and youth, while the lack of legitimate economic opportunities may lead to criminal behavior (Elliott, 1994). Many researchers have examined the effect of protective factors as well as risk factors (Feldman, Stiffman, & Jung, 1987). Theories including both types predict that protective factors have both a direct positive effect on mental health and mitigate the negative effect of risk factors.

The sociological or economic theories concentrate on the macroenvironment in terms of employment, deterioration, and economic opportunities, and are largely used to explain rates of delinquent and criminal behavior among youth (Bursik & Webb, 1982). The relevant theories include social disorganization (Sampson & Groves, 1989), subculture (Wolfgang & Ferracuti, 1967), and labeling (Simcha-Fagan & Schwartz, 1986). Sociological studies use objective demographic statistics, such as Census Bureau or police records, as measures of neighborhood (Coulton, Pandey, & Chow, 1990; Jencks & Mayer, 1990). Sociologists and criminologists identify a range of variables characterizing neighborhoods at the aggregate level, e.g., poverty rates, concentrations of young unmarried males, unemployment rates, and crime or arrest rates. Other constructs, such as social control and cohesion, commitment and solidarity, or participation in institutions, also play important roles in theories about neighborhood influences.

These two approaches to environmental research—sociological (or objective) and psychological (or perceived)—are not mutually exclusive. While contextual sociological studies based on objective environmental measures can tell us that rates of violence correlate with demographic characteristics (Langhinrichsen-Rohling & Neidig, 1995; Wilson, 1987), psychological studies of perceived environmental measures can tell us how the environment relates to individual behavior. Only a very few studies, largely focusing on child maltreatment, have employed both perceptual and objective measures of environment. For example, Garbarino (Garbarino, Kotelny, & Grady, 1992; Garbarino & Sherman, 1980) used a 12-item scale to determine how people in a community perceive the problems suggested by demographic data, whereas Korbin and Coulton (1994) used both ethnographic and survey methods to understand the correlations between demographic variables and maltreatment rates. Occasionally, aggregate data are attached to individual subject records to evaluate the effects on individual behavior of living in a dangerous or impoverished community. However, we have been unable to find any study showing how well perceptions correlate to actual conditions.

Ecological theories of human development (Bronfenbrenner, 1986) and social work's person-in-environment perspective (Germain, 1991) focus on the interactions among multiple systems containing both positive and negative factors as key determinants of physical and mental health and social functioning. Research within the
field of developmental psychopathology has examined the complex interplay between personal and environmental risk and protective variables in determining behavioral and mental health outcomes for children and adolescents (Garmezy, 1991; Rutter, 1993). A supportive family environment and other external support systems that strengthen coping efforts are among the variables that may protect highly stressed children from adverse outcomes (Garmezy, 1991). Only a few studies have examined these theories in light of neighborhood variables. High social organization, in the form of friendship and kinship networks, has been found to mitigate the effects of bad neighborhoods on crime and delinquency (Sampson & Groves, 1989). There is also some evidence that social variables (e.g., good parenting) interact with bad neighborhood environments in determining behavior problems (Patterson, Reid, & Dishion, 1992).

The present authors have previously examined the impact of broad, objective socioeconomic indicators (such as unemployment rates) on adolescent and young adult behavior (Stiffman, Doré, Cunningham, & Earls, 1995; Stiffman, Earls, Doré, & Cunningham, 1992). However, this paper is unique in presenting data concerning the association of the perceived environment (through self-report), the objective environment (through census data and police district records), and environmental support in relation to adolescent behavior and mental health. This study is also unique in its use of structural equation modeling to examine several different mental health problems, using data that incorporate both perceived and objective environments, as well as both risk and protective variables; it is based on an interview survey that gathered information about perceived neighborhood environment, augmented by available demographic data from census reports. The study posits a model in which objective neighborhood qualities represented by census data have a direct effect on mental health, but in which some effects are mediated by the way in which youth perceive their environment (see Figure 1, below). Youth living in the worst census tracts would, as a result, have worse perceptions of their environment and more mental health problems. It was hypothesized that environmental support would improve both the youths' perception of their neighborhood and their mental health.

**METHOD**

**Design**

The Youth Services Project (YSP), funded by the National Institute of Mental Health, examined 792 adolescents' mental health needs, and their use of mental health services. All were from the city of St. Louis, and had used services offered by gateway service sectors: health, juvenile justice, child welfare, or education. These service sectors were all in a position to screen youth for mental health problems and either to provide some mental health services or refer for services elsewhere. The YSP recruited subjects with the aid of service providers, by having interviewers approach adolescents in the service sector waiting rooms, and by letters and posters requesting volunteers from each sector's service users. Over 95% of those approached agreed to participate. Trained professional interviewers administered individual interviews, averaging 58 minutes in length, to each respondent. Interviewers obtained informed consent from all subjects and their guardians. When possible, the interview was completed on site, immediately before or after services were obtained. Otherwise, the interviewer arranged an appointment for a future interview in the youth's home, or at a mutually acceptable site.

**Sample**

Subjects were all between 14 and 18 years of age, with a mean of 15.3 years; 13% were white, 86% African-American, and 1% other; 43% were male, and 57% female. The occupation of the parent who
provided the most financial support to the family in the prior six months determined their socioeconomic status; accordingly, 15% were on welfare, 39% laborers or semiskilled workers, 16% blue collar, 20% white collar, and 9% professional. Forty-two percent of the children lived in families headed by a mother only, 11% with mother and other adults, 14% in two-parent families, 14% in foster or group care, and 12% with non-parent relatives.

Comparisons with tallies of the demographics of youthful clients using the four gateway arenas revealed that the study sample was representative of adolescent public service sector users. Over all sites, there were no significant differences in race or gender, although the general client population was, on average, two months older than study subjects. Youth sampled from the child welfare or education sectors did not differ in race, gender, or age from teenage clients tallied by the respective service sectors. However, the health sample averaged three months younger than teenage clients tallied by the health sector, and the juvenile justice sample had fewer males (60% vs 75%) and averaged two months younger than teenage clients in the juvenile justice system. It should be noted that teenage clients tallied by the sector services and the study sample are not representative of the overall population of St. Louis, in which the proportion of blacks and whites is closer to 50-50.

INSTRUMENTS

Highly structured interview protocols yielded data concerning three of the latent variables posited in the model: mental health, perceived environment (divided, after analysis, into two: neighborhood environment and exposure to violence), and environmental support. Census data provided information concerning the fifth latent variable, objective environment (see Table 1 and 2).

Mental health/behavior. Measures of depression, conduct disorder, and substance (alcohol and drug) abuse or dependence came from the Diagnostic Interview Schedule for Children-Revised (DISC-R) (Schaffer et al., 1993). Information about suicidality was derived from questions in the DISC-R

### Table 1

<table>
<thead>
<tr>
<th>PROPERTIES OF THE STRUCTURAL EQUATION MODEL: FACTOR LOADING AND RELIABILITY</th>
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</thead>
<tbody>
<tr>
<td><strong>CONSTRUCT &amp; INDICATORS</strong></td>
</tr>
<tr>
<td>Objective Environment</td>
</tr>
<tr>
<td>Proportion on public assistance</td>
</tr>
<tr>
<td>Proportion below poverty level</td>
</tr>
<tr>
<td>Proportion on vacant lots</td>
</tr>
<tr>
<td>Proportion of rentals @ $100-$149</td>
</tr>
<tr>
<td>Proportion of unemployment</td>
</tr>
<tr>
<td>Reverse-scored head-of-household income</td>
</tr>
<tr>
<td>Reverse-scored per capita income</td>
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<tr>
<td>Environment Support</td>
</tr>
<tr>
<td>Peer influence</td>
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<tr>
<td>Family instability</td>
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<tr>
<td>Family support</td>
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<tr>
<td>Family mental health</td>
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<tr>
<td>Perceived Neighborhood Environment</td>
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<tr>
<td>Drugs in neighborhood</td>
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<tr>
<td>Shootings in neighborhood</td>
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<tr>
<td>Murders in neighborhood</td>
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<tr>
<td>Abandoned buildings in area</td>
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<tr>
<td>Mental Health</td>
</tr>
<tr>
<td>Suicidality symptoms</td>
</tr>
<tr>
<td>Depression Sx excluding suicidality</td>
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<tr>
<td>Post traumatic stress Sx</td>
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<tr>
<td>Conduct disorder Sx excluding violent behavior</td>
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<tr>
<td>Substance abuse Sx</td>
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<tr>
<td>Violent behavior</td>
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</tbody>
</table>

Values in this position denote Composite Reliability (analogous to coefficient alpha, an internal consistency measure).

Values in this position denote Indicator Reliability (amount of variance in the variable explained by the factor, the square of factor loading).
Table 2

STANDARD DEVIATIONS (SD) AND INTERCORRELATIONS FOR FACTORS

<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>OE</th>
<th>ES</th>
<th>PE</th>
<th>VE</th>
<th>MH</th>
<th>EP</th>
<th>IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective Environment (OE)</td>
<td>0.99</td>
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<tr>
<td>Environmental Support (ES)</td>
<td>0.76</td>
<td>0.11</td>
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<tr>
<td>Perceived Neighborh. Env. (PE)</td>
<td>0.80</td>
<td>0.42</td>
<td>-0.17</td>
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<td></td>
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<tr>
<td>Violence Exposure (VE)</td>
<td>0.93</td>
<td>-0.04</td>
<td>-0.35</td>
<td>0.29</td>
<td></td>
<td></td>
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<tr>
<td>Mental Health (MH)</td>
<td>0.89</td>
<td>-0.03</td>
<td>-0.51</td>
<td>0.29</td>
<td>0.59</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Externalizing (EP)</td>
<td>0.90</td>
<td>-0.03</td>
<td>-0.36</td>
<td>0.30</td>
<td>0.52</td>
<td>0.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internalizing (IP)</td>
<td>0.89</td>
<td>-0.04</td>
<td>-0.51</td>
<td>0.14</td>
<td>0.41</td>
<td>0.72</td>
<td>0.33</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Depression section that asked about thoughts of death, plans for suicide, and attempts at suicide in the preceding six months. The DISC-R allows two separate operationalizations of the depression construct: 1) a diagnosis of depressive disorder based on computer algorithms that combine symptoms according to the criteria in DSM-IV; and 2) a count of symptoms lasting two weeks or more, or that interfere significantly with the youth's life. Adaptations of the symptom counts are used here as indicator variables.

An index of violent behavior was developed from the conduct disorder section by summing the number of violent acts, which included: causing injury or death, mugging someone, threatening someone, rape, beating, serious physical fighting, use of weapons in fights, being physically cruel, or bullying.

Objective environment. The data set containing the youth self-reports was augmented with census tract data. A census tract code was added to each case based on the address at which the youth lived when interviewed in 1994. Then, data from the 1990 census were merged into the case-by-case database. This allowed the use of the aggregate data as individual attributes of each youth's environment.

Perceived environment. Information about neighborhood environment consisted of adolescents' ratings of their neighborhood problems, which included: shootings, murders, abandoned buildings, neighbors on welfare, prostitution, drug dealing, and homeless individuals.

An index of overall exposure to violence was derived from items culled from sections of the YSP interview concerning post-traumatic stress—modified from the Diagnostic Interview Schedule (Robins, 1985; Robins, Helzer, Croughan, & Ratcliff, 1981)—and stressful life events—from the Diagnostic Interview for Children and Adolescents (Welner, Reich, Herjanic, Amado, & Jung, 1987). Items included: witnessing, hearing, or experiencing shootings, rapes, assaults, murders, or knifings; threats to self or family members; and beating/killing or attempted suicides of friends or family members.

Environmental support. The interview contained no specific scale for environmental support for adolescents, as no published scale with established reliability and validity existed at the time the study was carried out. Therefore, interview items were chosen based on the hypothesis that the relevant support areas for youth would include family and peer environments, and other support; related items were selected to measure the latent variable.

For family environment, information was obtained about parental mental health problems, family instability, and parent-child relations. To assess parental mental health, interviewers presented respondents with thumbnail sketches of a variety of mental health problems, as described in detail elsewhere (Stiffman, 1989). If respondents stated that a family member fit that description, they were asked to identify the family member. Parent-child relationships were assessed via an adaptation of the Family Satisfaction Scale (Hudson, 1982). Subjects rated how much of the time, over
In the course of the prior six months, their family got on their nerves, they really enjoyed their family, they were able to depend on their family, their family argued too much, or they felt like a stranger in their home. Possible answers to each question ranged from "almost all of the time" to "rarely or never."

For environmental support outside the family, information was obtained about structured activities, peer misbehavior, and social support. Structured activities were scaled by counting the number of different types of activities in which the subject participated during the prior six months. These included religious activities, extracurricular clubs, sports, and classes. To measure peer misbehavior, respondents were asked to rate how many of their peers (none, a few, about half, most, or all) had trouble with the police, used drugs or marijuana, were both unemployed and out of school, used drugs/drank alcohol daily, or had become pregnant. A summary score from these questions indicated peer misbehavior, which has been correlated with other types of problem behavior, such as changes in AIDS-risk (Stiffman et al., 1992) and violence (Stiffman et al., 1996). To measure social support, four sets of questions were adapted from the Global Assessment Scale (Baker, Jordry, Intagliata, & Strauss, 1995). Subjects were asked if they had a professional, special nonprofessional, or group that they could rely on for help; and for each such relationship, they were asked how helpful it was.

**ANALYSES**

This study tested a model showing how objective environment affected both perceived neighborhood environment and mental health problems, and how environmental support mediated the path from neighborhood environment to mental health problems (see Figure 1). Also tested was a parallel model that used perceived environment as the dependent variable, since it is not clear conceptually whether perception influences mental health or mental health influences perception. The structural equation models were tested using CALIS (SAS Institute Inc., 1989).

The analyses followed a two-step procedure (Hoyle, 1995): principal factor analysis and then structural equation modeling (SEM) analysis.* The first step was used in lieu of a measurement model for several reasons: 1) our interest was not in the "measures" per se, but in the causal model; 2) the number of variables that would have to be entered into CALIS for a measurement model of the data would have been computationally cumbersome; and 3) factors as indicator variables reduce the random error and uniqueness associated with indicators measured as straight summary scores. This is particularly true when, as in our data, many variables have unusual distributions or are dichotomous. Therefore, principal factor analyses were performed on the indicator variables for each latent variable so as to reduce the multiple items into a single representation of the underlying construct (Nunnally 1978; SAS, 1989). The second step, SEM analysis, made use of the factor scores in CALIS modeling to examine the fit between our model, as posited, and the data. Reliabilities and factor loadings analogous to measurement model data are presented in Tables 1 and 2, and the causal models in Figures 1–5.

*For those unfamiliar with SEM, it may be helpful to relate it to other, more familiar forms of analysis, like regressions or correlations. Although it is not entirely accurate, one can think of the path coefficients as being similar to regression slope coefficients where all variables have the same standard deviation. This makes them analogous to correlations, although occasionally they can go beyond the bounds of -1 and +1, while correlations cannot. SEMs can be emulated by doing a series of ordinary least-squares regression models where sometimes a particular variable is an independent and other times a dependent variable. SEM programs like CALIS have the advantage of being able to estimate all coefficients simultaneously. Further, the analyses require that causal theories be invoked in setting up the models to be tested. Thus, the path coefficients carry more causal weight than regression or correlation coefficients.
Initial principal factor analysis demonstrated that perceived environment and violence exposure were two separate factors, each representing a different latent construct, not one as was originally hypothesized. Therefore, the model was reconfigured to include as latent constructs both perceived neighborhood environment and exposure to violence. In the reconfigured model, both perceived neighborhood environment and violence exposure were hypothesized to contribute to mental health. Some items originally conceptualized as measuring violence exposure did not load strongly onto the violence factor and were thus dropped. These included attempted suicide of a friend or family member, and fighting or quarreling within the home. The resultant measured factor was therefore exclusively composed of items indicating active incidents of violence directed toward the subject or others.

The development of measures for the latent construct of environmental support was largely exploratory. Initially, summary scores were included from indices of environmental support. As a group, these index scores neither loaded onto one factor nor indicated the presence of a few discrete, conceptually clear factors. Therefore, two alternatives were tried: 1) the development of a higher-order factor drawn from a pool of those interview items that appeared to be related to any aspect of environmental support; and 2) dropping all index scores that did not load satisfactorily on a single factor. The higher-order factor did not substantially improve the factor loadings, but created a conceptual fuzziness concerning support. Thus, a first-order factor was used, dropping the low-loading items that were related to structured activities and support from nonfamily members. This left a factor defined by family and friends (peer influences, family instability, family emotional support, and family member’s mental health). We recognize the low factor loadings. However, low loadings have not been found to be harmful when the number of cases is high (as in this study) or when the model is well specified (Bandalos, 1997). Due to the theoretical importance of social support, it was retained in the initial analysis of the model; after analysis, due to its significance as a predictor, it was retained in the model.

Based on problem behavior theories (Jessor, 1993) and the field’s tendency to generalize about mental health problems, it was assumed that the scales from the DISC-R and our violent behavior index would combine to form a mental health factor score, representing the degree of mental health problems. However, factor analyses of the measures indicating mental health/behavioral problems indicated that there might be two highly related factors: one comprised of internalizing problems (suicidality, depression, and post-traumatic stress symptoms), and the other comprised of externalizing problems (conduct disor-
Once again, the possibility of using mental health problems as a higher-order factor was explored, but results were the same as using the first-order factor for mental health problems. Therefore, the model was tested three ways: with mental health problems as the dependent variable; with internalizing problems alone as the dependent variable; and with externalizing problems alone as the dependent variable.

After the initial factor analysis, four alternate theoretical models were estimated. Each consisted of five latent variables: 1) objective environment, using a factor derived from census data (coefficient \( \alpha = .98 \)); 2) perceived neighborhood environment, using a factor derived from the neighborhood scale items (\( \alpha = .86 \)); 3) environmental support, using a factor from items indicating peer influence, family instability, family support, and family mental illness (\( \alpha = .58 \)); 4) exposure to violence, using a factor derived from items comprising the violence exposure scale (\( \alpha = .64 \)); and 5) mental health, using either a factor comprised of all the mental health variables, i.e., number of symptoms of depression, conduct disorder, alcohol or drug abuse, suicidality, violent behavior, and post-traumatic stress (\( \alpha = .78 \)), or either internalizing (\( \alpha = .74 \)) or externalizing (\( \alpha = .80 \)) problems (see TABLE 2).

RESULTS

Univariate Analyses

Mental health disorders/behavior problems. High percentages of the youth had some mental health or behavioral problems, with 12%-16% meeting diagnostic criteria and 22%-58% having significant numbers (3 or more) of symptoms. In addition, two-thirds of respondents reported that they had engaged in violent behavior in the prior six months.

Perceived Environment

Neighborhood. Youth rated their neighborhoods as having many problems. Drug-dealing was widespread: over three-quarters of respondents perceived a lot (49%) or some (29%). Shootings were frequent: two-thirds perceived a lot (37%) or some (36%). Abandoned or vacant buildings were perceived as regular features: two-thirds reported a lot (35%) or some (34%). Neighborhood residents were poor: over three-quarters of the youth reported a lot (42%) or some (36%) of their neighbors being on welfare. Murders were less common: just under half of respondents perceived a lot (34%) or some (15%). Homelessness and prostitution were least commonly perceived: almost half reported homeless people in their neighborhood (13% a lot, 30% some), while one-third reported prostitution (15% a lot, 18% some).

Exposure to violence. Youth in this study perceived extremely high rates of exposure to violence in the prior six months; only 7.5% reported no exposure. In addition, almost 40% had an acquaintance or friend beaten or killed. One-quarter (25%) reported that they themselves had been attacked or beaten; 26% reported a suicide attempt of a friend or family member; and 28% reported physical fights in their home. Nineteen percent said that a family member had been hurt or threatened with physical harm, and 21% reported that they themselves had been hurt or threatened in their home. Over half (56%) had seen a person killed or seriously hurt, and 13% reported having been sexually assaulted or raped.

STRUCTURAL EQUATION MODELS

The originally conceptualized SEM (FIGURE 1) indicated that objective environment and environmental support (two exogenous latent variables) would contribute to mental health. Perceived neighborhood environment, determined by objective environment, would also contribute to mental health. The alternative model posited that it is mental health that contributes to perceived environment, rather than vice versa.

Mental health as dependent variable. SEM procedures resulted in a model dem-
Stiffman et al.

Figure 2
MENTAL HEALTH AS DEPENDENT VARIABLE

![Diagram]

AGFI = 0.996
Chisq = 1.09, df = 2
N = 787
p = 0.58
RMSEA = 0.000

Demonstrating that objective environment contributed to perceived neighborhood environment, but did not contribute directly to mental health or exposure to violence (Figure 2). When examining the model for mental health as a whole, perceived neighborhood environment was determined (28% of the variance) by objective environment, environmental support, and exposure to violence. Exposure to violence was determined (12% of the variance) by environmental support and objective environment. Mental health was determined (47% of the variance) by perceived neighborhood environment, exposure to violence, and environmental support. There was only minimal correlation between the two exogenous variables, environmental support and objective environment (-0.11). Youth who believed that their neighborhood was deteriorating were more likely to have been exposed to violence (0.26), less likely to have environmental support (-0.13), and more likely to live in an environment that objective census data indicated was deteriorating (-0.44). Respondents with less environmental support were exposed to more violence (-0.35). Those with worse mental health problems were more likely to be exposed to violence (0.44), more likely to perceive their neighborhood as deteriorating (0.11), and less likely to have environmental support (-0.34).

Internalizing problems as dependent variable. When examining the model only for internalizing problems (Figure 3), the determination of perceived and objective neighborhood remained the same. But the impact of environmental support on internalizing problems rose to -0.42, while the influence of both perceived environment and violence exposure declined to -0.01 (a
nonsignificant level) and .27, respectively. Further, only 32% of the variance in internalizing problems was explained.

Externalizing problems only as dependent variable. When examining the model only for externalizing problems (FIGURE 4), the impact of environmental support declined to -0.19, while the impact of both violence exposure and perceived environment on externalizing problems remained relatively similar to that for mental health problems as a whole (.41 and .15, respectively). However, once again, only 33% of the variance was explained, in contrast to 47% in mental health as a whole.

Perceived environment as dependent variable. When examining perceived environment as a dependent variable (FIGURE 5), the relationships of environmental support with violence exposure, perceived environment, and mental health remain substantially similar (-0.35, -0.07 and -0.35, respectively), as do the relationships between objective and perceived environment (.44) and violence exposure and mental health (.46). However, the impact of violence exposure on perceived environment drops to .17 when the impact of mental health is included. Further, the explained variance in perceived environment rises only by .01, while the variance explained in mental health drops by .02. These findings present a clear case for a reciprocal relationship between perceived environment and mental health. However, because the present focus is on determinants of mental health problems, rather than determinants of environmental perceptions, we chose to continue the analyses using the mental health measures as a dependent variable, while recognizing the reciprocity of the two factors.

There are many indices used to test the
significance of structural equation models. Chi-squares test if there is a significant difference between the model as posited and the results. Thus chi-square significance indicates a poor fit to the model. All our models had nonsignificant chi-squares, indicating that the data fit the model. Other indices test the degree of the goodness of fit. The values of all the goodness of fit indices for all of our models were extremely good. The Adjusted Goodness of Fit Index (AGFI) adjusts for degrees of freedom, with values closer to one indicating a better fit between model and data. For our models, AGFI was always in the .99 range. Root Mean Square Error Approximation (RMSEA) adjusts the lack of fit chi-square both for degrees of freedom and sample size. A small value indicates that the model fits the data well (e.g., values less than .05 with an upper confidence limit of less than .08 are considered evidence of a good fit). The RMSEAs for our models were always less than .03, and in some models as low as .000.

The absence of a significant relationship between objective environment and exposure to violence occurs after the relationship between objective and perceived neighborhood environment is controlled, indicating that violence occurs outside of neighborhood deterioration. All associations were significant in the direction hypothesized by the SEM. All models further showed that the presence of a supportive social environment mediates the influence of violence exposure and perceived neighborhood deterioration on mental health problems.

DISCUSSION

The present results clearly show that objective environment does not have a direct impact on adolescents' mental health. Instead, the effect of objective environment on mental health is mediated through its influence on perceived neighborhood environment, which does directly affect mental health. Further, environmental support moderates the effect of poor objective environment on perceived neighborhood deterioration. In the presence of environmental support, perceptions of environment are likely to be less negative. Finally, the negative effect of perceived neighborhood environment on mental health is partially canceled when there is a supportive social environment, while the effect is augmented in the presence of exposure to violence. Interestingly, despite the clear association between perception of environment and objective environment, only the youths' perception of their environment was associated with their mental health.

The relative influence of perceived environmental support and exposure to violence varied in relation to how mental health was measured: including all problems, only internalizing problems, or only externalizing problems. The mitigating effect of environmental support was stronger for internalizing than externalizing problems, while the negative effect of violence exposure and perception of negative environment was stronger for externalizing problems. Both results are quite consistent with theories that recognize the effects of modeling (Bandura, 1986) and of aggression breeding aggression (Patterson et al., 1992).

A repeated question raised in much violence research has been whether youth who exhibit more violent behavior or other behavior problems are more likely to perceive violence or deteriorating qualities in their environments (Thornberry et al., 1994). The direction of effects has not been at all clear. However, the present study, which elucidates the association between perceived and objective neighborhood, provides an initial indication that it is the youths' perception of their neighborhood, and not the objective reality to which the perception is related, that is associated with their behavior problems. Confidence in this conclusion is strengthened by the fact that the range of census neighborhoods in this study was quite constricted, insofar as all respondents came from the city of St. Louis. The relationships might appear strong-
er if the sample also had youth from affluent suburban neighborhoods. Yet, despite this constricted range, the relationship between perception and reality was strong. Further, the relationship remained strong even though the specific referent neighborhood perceived by each youth is not known, and it is highly likely (particularly since some respondents lived on the border of several tracts) that it did not correspond exactly to the census tract. That such a strong association still occurred serves to bolster confidence in the reality base of our respondents’ reports.

In interpreting these results, several limitations of the study should be noted. First, since all sample respondents were from public service sectors in only one Midwestern city, they may not be representative of urban or inner-city adolescents; the sample describes the situation faced by youth who come into contact with public services, rather than that of adolescents in general. However, the sample did include both youth who received mental health services and those who did not, despite their need for such services. Adolescents in other U.S. cities or adolescents not using public sector services may experience different ranges of environmental characteristics and associated behavioral, emotional, and mental health problems. Nevertheless, anonymous tallies kept by public service providers indicated that our sample was representative of teens using the gateway sectors in St. Louis.

Secondly, much of our data were collected through face-to-face interviews in which respondents were asked for retrospective information over the previous six months. Youth involved in violent behavior may be more or less predisposed to notice violence around them. Because some questions addressed illegal activities, including violent behavior, social desirability may have influenced responses. That, along with inaccurate memory and recall, might have lead to under- or overreporting particular forms of behavior. Thirdly, due to the form of analyses, the final model, splitting perception of neighborhood from exposure to violence, was based on data-driven model modifications, and thus should be replicated in other samples before accepting its generalizability.

The weakest portion of the model was the measurement of environmental support. We elected to retain the construct due to its conceptual importance. That this factor played a strong and consistent role in the final model, therefore, is particularly important. Low factor loadings make it more difficult to obtain good fit indices (Ding, Velicer, & Harlow, 1995), but make little difference if the model is well specified (Bandalos, 1997). Family support and stability play important roles in protecting youth from violence exposure. They enhance mental health (by protecting youth from internalizing problems such as depression). They also influence adolescents’ perceptions of their environment, which, in turn, directly contribute to their mental health. This study demonstrates the critical importance of family support and stability to the well-being of children and adolescents living within deteriorating neighborhood environments. Clearly, interventions that support and strengthen the protective function of families may constitute a good investment in children’s mental health.

The understanding of the relationship between objective and perceived environment, as well as that among perceived environment, environmental support, violence exposure, and mental health, has important implications for practice, theory building, and future research. Each must take into account families, peers, neighborhoods, and communities. The percentages of adolescent mental health problems and behavior explained by such variables indicate the need for social, as well as personal, intervention. Three relationships are clear: 1) the youths’ perception of their environments are based in reality; 2) the environments, as perceived by the youth, are important in understanding their mental health and behavioral problems; and 3) environ-
mental support partially cancels the impact of deteriorating environments on the problems of youth.

Much effort in mental health prevention has been devoted to school or community-center efforts that focus solely on the knowledge, attitudes, or self-esteem of the youth themselves, with only a few programs also involving parents or families. The structural equation model described in this paper implies that those interventions will not be enough, as they do not target important causal factors. Interventions should also be directed at the community or neighborhood and the family environment, i.e., with the youths’ real environment, their perceptions of that environment, and their available environmental support.

This study also demonstrates support for those theories that incorporate an understanding of the environment’s impact on the youths’ perception, and that of their perception on behavior. Thus, those sociological theories that deal only with macro-environments, while neglecting the importance of perception, and those psychological theories that deal only with perception, while neglecting the importance of macro-environments, each miss important aspects of the total picture.

As with much research, the present findings underscore the need for more basic research and applied intervention evaluation. The results of this study would be strengthened by other research replicating the model with other populations in different environments. The ultimate goal of much behavioral research is to affect the lives of individuals similar to the subjects of this study. To advance toward this end, the next logical research step would be the development, implementation, and evaluation of a theory-based intervention simultaneously targeting community environment, youths’ perceptions, and environmental support.

REFERENCES


