SUMMARY

Community Influences on Individual Delinquency: A Multilevel Analysis

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Community Influences on Individual Delinquency: A Multilevel Analysis

Crime rates are higher in inner city areas than elsewhere, and the high population density combines with higher rates to make the quantity of crime even more obviously centered in high crime areas. Explanations of differences among social areas in crime rates often assume that communities affect their inhabitants' criminal behavior and attempt to specify a mechanism through which this causal effect operates. In contrast, Wilson and Herrnstein (1985) have suggested that some places have high crime rates not because the community affects its inhabitants but because these places attract people predisposed to crime.

Speculation about the extent and nature of community effects on the criminal behavior of individuals far outweighs research on the topic. More knowledge is needed about (a) the extent to which community characteristics are related to criminal behavior net of individual characteristics and (b) whether and how communities influence individual criminal behavior.

ECOLOGICAL RESEARCH AND THE CORRELATES OF CRIME RATES

Quetelet (1842/1968), a pioneer in the scientific study of human behavior, mapped out the relation of crime rates to the characteristics of social areas in France in the mid 1800's. More recently Shaw and McKay (1942) showed how crime rates often decline in concentric zones away from a central -- high crime rate -- area in

cities. Similar patterns are found in many cities and for a variety of different specific kinds of misconduct. Subsequent research has usually provided evidence of strong associations between community characteristics and crime or victimization rates. Block (1979), for example, reported high correlations at the census tract level between log robbery rates and percentage high school graduates (-.54), percentage of families at 75% of the poverty level or below (.46), and percentage of families headed by females (.53). Researchers in the human ecological tradition (Shaw & McKay, 1942; G. Gottfredson & D. Gottfredson, 1985) have adduced evidence that crime, delinquency, or victimization rates vary in regular ways across social areas.

Recently, a number of investigators have adduced evidence about the evolution of high crime areas over time. For example, Shannon (1984) showed continuities in relationships between community characteristics and crime rates over time in Racine. This recent work suggests that crime is perpetuated over time in certain areas, and it suggests a focus on activities that might make communities less conducive to crime.

Theorists have suggested that variations across social areas may come about through two alternative mechanisms. One mechanism is a contextual one summarized by the hypothesis that high crime communities do not have control of their inhabitants. An alternative mechanism is a compositional one summarized by the hypothesis that high crime communities recruit and are inhabited by crime-prone

people. The distinction between a contextual process and a compositional process is important. A contextual explanation implies that strengthening a community's ability to exercise social control will reduce crime, whereas a compositional explanation suggests that crime rates might best be reduced in specific areas by making them less attractive to criminally disposed people. Direct attempts to determine whether the ecological correlations observed reflect contextual or compositional processes are rare.

The ecological research tradition focuses on rates of crime in social areas with differing characteristics. But Robinson's (1950) clear account of the "ecological fallacy" warns that an association discovered in data pertaining to social areas may be misleading if interpreted as if it applied to individuals. Individual-level correlations can be zero or opposite in sign of the corresponding ecological correlations. It is possible that the high correlations between community characteristics and crime rates often observed result from aggregation. Because there is usually considerable homogeneity within areas and substantial heterogeneity between areas on inhabitant characteristics that are at least modestly correlated with criminal behavior, aggregation would tend to produce high correlations. One aim of our research is to learn whether such a compositional process is all that is occurring, or whether communities also exert a contextual effect on the behavior of inhabitants.

INDIVIDUAL-LEVEL RESEARCH

The second research tradition has focused on the correlates of delinquency or adult crime, but workers in this tradition have seldom examined the role of neighborhood, community, or school characteristics in causing or restraining against crime. Hirschi's (1969) version of social control theory assumes that bonds to the social order (such as attachment to conventional others or institutions, belief in the validity of social rules, and commitment) restrain people from engaging in delinquent behavior. Other perspectives assume that peers may exert causal influence through social learning or differential association or that individuals differ in personality or other enduring characteristics influence learning and the capacity to restrain impulses and gain rewards through conventional channels.

From this research tradition has come evidence of a host of individual characteristics known to be statistically associated with delinquent behavior. These include school competency (-), impulsiveness or daring, belief in conventional rules (-), commitment to conventional goals (-), attachment to institutions and adults (-), being male and adolescent, association with delinquent peers, and exposure to harsh or erratic discipline in the family (for evidence or reviews see G. Gottfredson, 1981, in press; West & Farrington, 1975; and Wilson & Herrnstein, 1985).

PERSONS IN ENVIRONMENTS

Despite growing recognition of the potential importance of environments, most research on individual criminal behavior makes scant use of environmental formulations. It is possible, however, to make explicit predictions about the ways environments restrain individual behavior: Environments that have a high probability of responding to a person's behavior and signal expectations for behavior most clearly are most powerful in regulating a person's behavior. Communities with few resources to maintain social control will be ineffective in restraining people against criminal behavior. More specifically, in certain communities individuals will experience less supervision from adults, associate more with delinquent peers, and believe less in conventional proscriptions against misconduct.

Related hypotheses pervade accounts of delinquency from the social disorganization tradition. Reiss (1986) suggested that in communities with high proportions of children being raised without benefit of intact natural family units, crime may be more prevalent because the children are less well supervised or social bonds to parents or school are not so readily developed, and because peer influence and control flourishes instead.

PREVIOUS MULTILEVEL STUDIES

Reiss and Rhodes (1961) examined official delinquency for over 9,000 white boys enrolled in Nashville schools. They concluded that the status structure of the school is more influential than fathers' status. But the Reiss and Rhodes analyses do not provide a ready estimate of the relative importance of school and individual social status in explaining delinquency; a reanalysis of their data using multiple regression reveals that neither status variable accounts for much variance in delinquency.

Johnstone (1978) studied adolescents living in Chicago census tracts. Johnstone did not conclude, as had Reiss and Rhodes, that delinquency was highest in lower status neighborhoods. Instead, he suggested that the effect of community status varies both by the form of delinquent involvement and the socioeconomic status of the individual.

Simcha-Fagan and Schwartz (1986) examined community effects in a model of individual delinquency for a sample of 553 New York City teenage males. Their results imply that some community characteristics are significantly related to individual delinquency even when individual background measures are statistically controlled. The higher the community disorganization, the higher the severe self-reported delinquency and officially recorded delinquency. The small community effect is for the most part not mediated by school attachment, association with delinquent peers, or individual

background measures.

THE PRESENT RESEARCH

Individuals. Self-report data for 3729 junior high school students in ten schools located in four cities were examined. Survey response rates in Charleston ranged from .69 to .91, averaging .82. In Kalamazoo they ranged from .77 to .85, averaging .81. In Baltimore they ranged from .69 to .77, averaging .73. In Christiansted (VI) the response rate was .79. The overall survey response rate was .80. Only students for whom we obtained both a completed survey and a useable address are included in the study sample. The overall percentage useable addresses was 93.

Communities. In this study a community is defined as a census block group or enumeration district. Our 3729 individuals lived in 321 different block groups or enumeration districts.

Delinquency and individual characteristics.

Three self-report delinquency scales were used. A theft and vandalism scale, an interpersonal aggression scale, and a drug involvement scale. The research also examined measures of association with delinquent peers, belief in conventional social rules, attachment or commitment to school, involvement in conventional activities, and parental attachment and supervision.

Community variables. All measures of the community were derived from the 1980 Census of Population and Housing (Bureau of the Census, 1982). Two factors explained 45.3% of the variance in 13 community variables. The first factor is defined by a high proportion of families headed by females in the community, a high proportion of families on welfare and with incomes below the poverty level, a high divorce rate, and a low level of male employment. This factor resembles the description of the disorganized community found in Shaw and McKay's (1942) work and a community dimension, variously called "Family Disorganization" (Simcha-Fagan & Schwartz, 1986), "Social Problems" and "Social Deprivation" (Smith, 1973), "Family Status" (Ross, Bluestone & Hines, 1979), and "Poverty and Disorganization" (Gottfredson & Gottfredson, 1985). We call this factor Disorganization.

The second factor is defined by a high proportion of families with incomes above median income, a high proportion persons employed in professional and managerial occupations, a high proportion persons who completed high school, a high proportion of females employed, and a low ratio of families with farm income to families with earnings from wages and salaries. It is a socioeconomic status dimension, closely resembling the second dimension found in our previous work and in the work of others cited above. We call this factor Affluence and Education.

Disorganized communities are characterized by a low percentage of

children living in intact traditional families, a high percentage of population black, and a high percentage of housing units occupied by renters. Economic variables are the highest correlates of our second community factor--Affluence and Education. Communities scoring high on this factor are characterized by a high income level, average housing value, and standard of living. Percentage black and white are unrelated to this community factor.

Results

We found some statistically significant community effects on some measures of individual delinquent behavior, but they are small. For males, the level of disorganization of the community is positively related to involvement in both aggressive and property crimes. We found no evidence that community disorganization affects males' drug involvement. Community affluence is related to males' reports of theft and vandalism and drug involvement, and these are direct effects according to our statistical models. Males living in more affluent communities report more theft and vandalism and drug involvement (almost significantly more) controlling on the individual's social class, race, age, negative peer influence and degree of social bonding.

Community disorganization is related to females' reports of interpersonal aggression. Community disorganization level is not significantly related to other kinds of self-reported crime among females.

Affluence and education is related to female drug involvement, and this effect is mediated through other variables in the model. Once individual background characteristics are controlled, females living in more affluent areas are no more likely to report drug involvement than females living in less affluent areas.

The community effects we found are all small. The percentage of variance in the outcome variables accounted for by the community measures ranges from .002 to .01. In only one of the six statistical models examined was the magnitude of the community affluence effect greater than the magnitude of the individual-level parental education measure, which itself was small. Furthermore, the signs of the individual and community measures of socioeconomic status are opposite for males: Higher socioeconomic status males engage in less crime than do lower socioeconomic status males because social class is related to the theoretical intervening variables. But males living in high socioeconomic status neighborhoods engage in more criminal behavior than males in lower socioeconomic status neighborhoods.

The community factors appear to have small effects on some of the measures of the theoretical variables. Males and females in disorganized communities report more negative peer influence and less school attachment and commitment. They also report slightly less parental attachment and supervision, but these effects are not significant. The extent to which individuals accept the validity of rules is unrelated to the level of disorganization in the community

according to our analyses.

The effects of community Affluence and Education on the theoretical variables are weaker than those of Disorganization according to our statistical models.

These results provide limited support for a contextual effect of community on delinquency for males. Community Disorganization increases male interpersonal aggression and theft and vandalism, and it has its effect not through individual background measures but through the theoretical intervening variables. Community Affluence and Education increases male theft and vandalism and drug involvement, and these effects remain significant (or nearly significant) when controls for individual race, social class, age, social bonding and negative peer influence are applied. Although we can only speculate about the mechanism through which this effect operates, if it is a compositional effect rather than a contextual effect, it is due to individual characteristics other than race, social class and age.

Female delinquency is more dependent on individual background characteristics than is male delinquency, according to our models. Community Affluence is related only to drug involvement, and this association is reduced to zero when individual background measures are introduced. Community disorganization is related to females' reports of interpersonal aggression, but our study does not reveal the mechanism for this effect.

We also examined our data for interactions of community characteristics with individual socioeconomic status. Only for females did we find evidence that community effects varied significantly by individual socioeconomic status, and these interaction effects were small (the largest increment to variance in the outcome variable explained by any of the interaction terms was .008). For females, the social class of the individual is more highly related to interpersonal aggression in the least disorganized areas. Low status females in these areas report having committed more than twice as many such crimes as high status females.

Summary

The results provide evidence of a small community effect on individual delinquency. Individuals living in disorganized communities report more negative peer influence and less attachment and commitment to school than do individuals living in more organized communities. The effects of community disorganization on the theoretical intervening variables increases male delinquency, but this indirect effect of community disorganization is offset for drug involvement by other factors (not examined in our study) which increase drug involvement in the more organized communities. Females also report more interpersonal aggressive crimes if they live in more disorganized areas, and this effect is only partially mediated by the variables included in the model.

Effects of community affluence on the theoretical variables are

smaller: males and females in more affluent areas report less involvement in school and community activities. This lowered involvement in school and community activities among youths from more affluent areas has little effect on delinquency because involvement is not highly related to delinquency. Community affluence has virtually no effect on male delinquency via the theoretical variables or the background variables included in our models. Community affluence increases males' involvement in property crimes and drugs. Females from more affluent areas use drugs more than those from less affluent areas, but this effect is explained by compositional differences.

Discussion

The results suggest that two relatively independent dimensions of community -- socioeconomic status and social disorganization -- are slightly related to delinquency, but the mechanisms relating each to delinquency are different. This study provides limited evidence that communities that are characterized by weak family and other social structures do, as Shaw and McKay suggested, lose control over their individual children. Disorganization of the community in which a child lives leads to less bonding to potentially controlling institutions, more negative peer influence, and more delinquency.

The socioeconomic status of the community has no effect on individual social bonding or association with deviant peers. Our study shows no effect of community affluence on aggressive criminal involvement, and the only other study which examined aggressive acts

separately from property and drug-related crimes (Johnstone, 1978) showed that a models which gave priority to family status rather than community status explained violent crimes the best. The best evidence implies that the affluence of one's community is unrelated to one's aggression.

Students who live in more affluent communities report more drug involvement and theft and vandalism. Johnstone (1978) suggested a relative deprivation explanation: Persons in positions of greatest status discrepancy engage in the most delinquency. Our results do not support this interpretation. Males from lower status families are more likely to engage in crime that others regardless of where they live.

Our results are more consistent with an opportunity interpretation, at least for persons from the middle and upper categories of family social class: Drugs are more available in more affluent communities and targets for theft are more attractive. Individuals from these communities engage in these activities more not because they are less bonded to society, not because they are more influenced by delinquent associates, not because they believe it is OK to steal and take drugs, but simply because the drugs are available and the targets are attractive. A measure of the availability of drugs or perceived attractiveness of targets is required to test this speculation directly.

The results suggest that individual delinquency is mainly the

result of characteristics and experiences of the individual which are largely unrelated to the characteristics of the community in which the individual resides. Delinquency is a function of (at least) the influence of negative peers and low levels of bonding to school and family.

If community characteristics do not have a sizeable effect on the delinquency of the individuals who inhabit those communities, what accounts for the large ecological-level correlation often observed between community characteristics and delinquency rates? Wilson and Herrnstein (1985) have suggested that elevated crime rates in poor and disorganized areas are due to compositional characteristics of the inhabitants rather than to contextual effects of the community. In their words, "A neighborhood may have more crime because conditions there cause it or because certain kinds of neighborhoods attract persons predisposed to criminality" (p. 291).

Our study suggests that compositional and contextual processes may both be operative. While the effects of community characteristics on individual delinquency are small, so are the effects of demographic characteristics of the individuals. But these small associations at the individual level may translate into much larger associations at the aggregate level when individuals are grouped together on the basis of demographic characteristics. Our study shows that, at least for males, the characteristics of the community influence the level of individual delinquency. But the results of our study do not tell us

how much of the large ecological-level correlation is due to contextual effects and how much is due to grouping of people whose individual characteristics predispose them to crime. Future research exploring this alternative explanation more fully would be helpful.

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ABSTRACT

One research tradition in criminology has focused on the distribution of crime among individuals, and a second tradition has examined the distribution of crime rates among social areas. Rarely are both traditions combined in a single study. This study uses data for 3,729 adolescents who are clustered within diverse social areas to explore community influences on their delinquent behavior. This strategy provides an opportunity to examine some mechanisms through which community organization -- measured independently of the characteristics of the individuals studied -- might contribute to the explanation of variations in individuals' delinquent conduct. Results imply that characteristics of the community have a small effect on delinquent behavior, and that the effect is different for different kinds of delinquency, and for males and females. Individuals living in neighborhoods characterized by weakened families units and low levels of social organization report more negative peer influence and less attachment and commitment to school than do individuals living in areas with stronger social fabric. These contextual effects result in higher levels of interpersonal aggressive and property crime for males living in these disorganized communities. Females in disorganized areas also report more aggressive crimes, but the effect is only partially mediated by the theoretical intervening variables. Community affluence also effects delinquent involvements, but the effect is not via the intervening mechanism suggested by Shaw and McKay, is present only for males, and is in the direction opposite

that expected: Males living in more affluent communities report more drug involvement and property crimes, regardless of their age, race, socioeconomic status, social bonding and delinquent associates. These effects of community socioeconomic status operate through variables other than those included in our model--probably availability of drugs and attractive targets for theft.

COMMUNITY INFLUENCES ON INDIVIDUAL DELINQUENCY: A MULTILEVEL ANALYSIS

Crime rates are generally higher in densely populated inner city areas with cheap, deteriorated housing than in more sparsely populated areas with expensive housing, and the higher population density combines with higher rates to make the quantity of crime even more obviously centered in the high crime areas. Numerous social science theories attempt to explain why individuals living in high crime areas commit more crime than do people in low crime areas. These theories (e.g. Cloward & Ohlin, 1960; Miller, 1958; Shaw & McKay, 1942; Sutherland, 1942) generally assume that the community affects their inhabitants' criminal behavior, and they attempt to specify the mechanism through which this causal effect operates. A recent exception (Wilson & Herrnstein, 1985) suggests that the ecological level correlation may be explained not by a causal effect of the community on its inhabitants, but by the unfortunate grouping in urban areas of persons whose individual characteristics predispose them to crime.

Speculation about the extent and nature of community effects of crime far outweighs research on the topic. Our understanding of crime would be facilitated by more conclusive research that shows the extent to which community characteristics are related to criminal behavior net of individual characteristics. And our understanding would be enhanced if we knew how the characteristics of social areas influence the risk of criminal behavior for the persons who inhabit them, if they do influence individual behavior. This paper reviews the two research traditions in criminology -- ecological and individual level

studies -- that have examined causes and correlates of criminal behavior<1> and the few studies which have attempted to combine the two traditions. It then presents the results of our multilevel study of the effect of community characteristics on individual delinquency.

ECOLOGICAL RESEARCH AND THE CORRELATES OF CRIME RATES

Quetelet (1842/1968), an early pioneer in the scientific study of human behavior, mapped out the relation of crime rates to the characteristics of social areas in France in the mid 1800's. More recent and better known examples of research revealing systematic relations between social areas and crime rates are provided by Shaw and McKay (1942) who showed how crime rates often decline in concentric zones away from a central -- high crime rate -- area in cities. Similar patterns are found in many cities and for a variety of different specific kinds of misconduct.

Subsequent research has usually provided evidence of strong associations between community characteristics and crime or

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<1>A third tradition, sometimes identified by the label "environmental criminology" involves the study of the locations where crime occurs. This research tradition is illustrated by the work of Brantingham and Brantingham (1981), Jeffrey (1971), and Newman (1972). This tradition contrasts with our focus on the distribution of people who engage in offenses, wherever those offenses are committed. Although the environmental criminology perspective is relevant in the sense that people who reside in and primarily experience well-defended environments may learn to avoid crime, when restricted to this sense the environmental perspective seems to merge with the social disorganization perspective -- the primary remaining distinction being the focus on offense location rather than offender residence data. The distribution of offense locations is outside the scope of our investigation. We are primarily concerned with the socialization of individuals.

victimization rates (Block, 1979; Harries, 1976; Pope, 1978). Block, for example, reported high correlations at the census tract level between log robbery rates and percentage high school graduates (-.54), percentage of families at 75% of the poverty level or below (.46), and percentage of families headed by females (.53). Researchers in the human ecological tradition (Shaw and McKay, 1942; White, 1932; Lander, 1954; Bordua, 1958; Gordon, 1967; Chilton & Dussich, 1974; G. Gottfredson & D. Gottfredson, 1985) and social geographers (Jonassen & Peres, 1960; Hadden & Borgatta, 1965; Smith, 1973) have adduced evidence that crime, delinquency, or victimization rates vary in regular ways across social areas.

Recently, Bursik (1986), Shannon (1984), and Schuerman and Kobrin (1986) have contributed evidence about the evolution of high crime areas over time. For example, Shannon showed continuities in relationships between community characteristics and crime rates over time in Racine, and Schuerman and Kobrin attempted to identify changes in community characteristics associated with changes in crime rates. This recent work suggests that crime is perpetuated over time in certain areas, and it suggests a focus on activities that might make communities less conducive to crime.

Social disorganization theorists have suggested some mechanisms through which variations across social areas come about. One mechanism is a <u>contextual</u> one summarized by the hypothesis that high crime communities do not have control of their inhabitants. An alternative mechanism is a <u>compositional</u> one illustrated by Wilson and Herrnstein's (1985, p. 291) hypothesis that high crime

communities recruit and are inhabited by crime-prone people. The distinction between a contextual process and a compositional process is important. A contextual explanation involves the proposition that the ways areas are socially organized exert influences on the individuals who inhabit those areas, whereas a compositional explanation involves the proposition that the aggregate outcomes observed are a result of the aggregate characteristics of the individuals who inhabit the areas. Direct attempts to determine whether the ecological correlations observed reflect contextual or compositional processes are rare.

The ecological research tradition focuses on rates of crime in social areas with differing characteristics. But Robinson's (1950) clear account of the "ecological fallacy" warns that an association discovered in data pertaining to social areas may be misleading if interpreted as if it applied to individuals. Individual-level correlations can be zero or opposite in sign of the corresponding ecological correlations. More specifically, a grouping effect occurs when the membership of the ecological unit (e.g., neighborhood or school) is statistically linked with one or both of the variables involved in the correlation. For example, segregation by socioeconomic level among schools produces a larger correlation between socioeconomic status and academic achievement test means at the school level than is observed at the individual student level. Whereas individual-level correlations between SES and achievement tests are typically around .3, averages for schools in a district may correlate .8 or higher (Cooley, Bond, & Mao, 1981). It is possible

that a similar process produces the high and often reproduced correlations between community characteristics and crime rates. Because there is usually considerable homogeneity within areas and substantial heterogeneity between areas on inhabitant characteristics that are at least modestly correlated with criminal behavior, aggregation would tend to produce high correlations. One aim of our research is to learn whether such a compositional process is all that is occurring, or whether communities also exert a contextual effect on the behavior of inhabitants.

INDIVIDUAL-LEVEL RESEARCH

The second research tradition has focused on the correlates of adult crime or delinquent behavior, but workers in this tradition have seldom examined the role of neighborhood, community, or school characteristics in causing or restraining against crime. Some of this research is linked to theory, especially research on delinquency (as opposed to the generally less theoretical work on the practical problem of predicting adult recidivism). One perspective relevant to our work is Hirschi's (1969) version of social control theory, which assumes that bonds to the social order (such as attachment to conventional others or institutions, belief in the validity of social rules, and commitment) restrain people from engaging in delinquent behavior. Also relevant are perspectives that assume that peers may exert causal influence through a social learning or differential association mechanism, and individual difference perspectives that assume individuals differ in personality or other enduring

characteristics that influence learning to restrain one's behavior and gain rewards through conventional channels.

From this research tradition has come evidence of a host of individual characteristics known to be statistically associated with delinquent behavior. These include school competency (-), impulsiveness or daring, belief in conventional rules (-), commitment to conventional goals (-), attachment to institutions and adults (-), being male and adolescent, association with delinquent peers, and exposure to harsh or erratic discipline in the family (for evidence or reviews see G. Gottfredson, 1981, 1987, West & Farrington, 1975, and Wilson & Herrnstein, 1985).

PERSONS IN ENVIRONMENTS

Most research on individual criminal behavior makes scant use of environmental formulations. Despite growing recognition of the importance of environments, situations, and person-environment interactions (e.g., Barker, 1968; Epstein & O'Brien, 1985; Holland & G. Gottfredson, 1976; Houts, Cook, & Shadish, 1986; Magnusson & Endler, 1977), and despite repeated calls for greater attention to environmental and situational influences on criminal behavior (Martin, Sechrest, & Redner, 1981; Monahan, 1981; Reiss, 1986; Shah, 1978), little research has investigated the influence of the environment on criminal behavior.<2>

<2>For exceptions see Glaser (1969), S. Gottfredson & Taylor (1984), Reitzes (1955), and Monahan & Klassen (1982).

Gottfredson and Cook (1984) proposed a theory of persons in environments that makes explicit predictions about the ways environments restrain individual behavior. The theory predicts that environments that have a high probability of responding to a person's behavior and signal expectations for behavior most clearly are most powerful in regulating a person's behavior. Face-to-face groups are, according to this perspective, powerful influences on behavior. Most crime is committed together with other persons, and a straightforward prediction of this perspective is that in communities with few resources to maintain social control a high proportion of face-to-face environments will be ineffective in restraining people against criminal behavior. More specifically, they hypothesize that in certain communities, individuals will experience less supervision from adults, associate more with delinquent peers, and believe less in conventional proscriptions against misconduct. In other words, some communities fail to control the behavior of their inhabitants by failing to provide these kinds of personal control.

Related hypotheses pervade accounts of delinquency from the social disorganization tradition. Reiss (1986) discusses mechanisms by which community contextual effects on individual delinquency may operate. For example, in communities characterized by high proportions of children being raised by other than intact natural family units, crime may be more prevalent because the children are less well supervised or because social bonds to parents or school are not so readily developed. In such circumstances, Reiss reasons, "parental authority and control is replaced by that of peers. . . .

The effect of weakened family control is heightened when a strong peer-control system forms an antisocial subculture" (p. 15).

PREVIOUS MULTILEVEL STUDIES

We know of only three multilevel studies of the effect of community characteristics on individual criminal involvement. The first (Reiss & Rhodes, 1961) examined official delinquency status for more than 9,000 white boys who were enrolled in one of the thirty-nine public, private, or parochial schools in Nashville, Tennessee during the 1957 school year. The researchers crosstabulated official delinquency status by a seven-category measure of the socioeconomic status of the school ("social status structure") and a three-category measure of the socioeconomic status of the boys' fathers ("ascribed social status"). They found that official delinquency status was related both to ascribed social class and to the average social class of the school, but that "the status structure of the school exercises a greater effect on delinquent behavior than does ascribed status." This conclusion was based on the observation that the range of variation of ascribed status was less than that of the status structure of schools: The overall delinquency rate for lower class individuals was 7.6%, compared with 3.0% for higher class individuals; the rate for individuals from upper & upper middle class schools was 0.5% compared with 15.6% from lower class schools.

Reiss & Rhodes' crosstabular analyses do not provide a ready estimate of the relative importance of school and individual social status in explaining delinquency. A reanalysis of their data using

multiple regression reveals that delinquency is more a function of school social status than individual social status: The standardized regression coefficients of delinquency on the two status measures are -.02 (not significant) for the individual and -.08 ($p < .01$) for the school measure.<3> The reanalysis also reveals that neither status variable accounts for much variance in the delinquency outcome: Together they account for less than one percent.

Closer examination reveals that, although school status is significantly related to delinquency, only the extreme categories of the school status variables account for the observed association between school status and delinquency. The delinquency rate for individuals in the lowest school status category (five schools) is .26 of one standard deviation below the grand mean, and for individuals in the highest category (six schools) it is .14 of one standard deviation above the mean. All other categories are within .10 standard deviation of the grand mean.

Although provocative, the results of the Reiss and Rhodes study cannot be interpreted as providing evidence for a contextual effect of the socioeconomic status of the school. The study controls for race and gender by virtue of its design, and socioeconomic status, which is unrelated to delinquency status. Another relevant individual

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<3>These significance tests use the number of individuals in the analysis as the number of independent observations. The significance of the school-level variables may be overestimated because the number of independent observations for the school variables is much smaller (n=39) than the number of individuals. The standards error of the estimate used in the calculation of statistical significance is almost certainly underestimated.

characteristics left uncontrolled is the age of the student, which is certainly correlated with delinquency status, and is almost certainly correlated with school socioeconomic status. Schools systematically vary in their retention rates. Schools that retain large proportions of their students each year have students who are considerably older than those that promote large proportions of students. In a southern school district with which we are currently working, the percentage of students on the expected grade level ranges from 42 to 70%. This difference, due to different retention policies, results in large differences from school to school in the age of the students in the school. Although we have not computed the correlation of average student age with school socioeconomic level, the correlation between proportion of students retained last year and the percentage students on free or reduced lunch (an indicator of socioeconomic status) is .57 ($p = .02$). Clearly, an alternative explanation for the Reiss and Rhodes results is a compositional one.

Johnstone (1978) studied 14 to 18-year-old males and females living in 221 different census tracts in Chicago. This study complimented the Reiss & Rhodes study by including females and nonwhites as well as white males, using self-reports of delinquency as well as official records, and using census tracts rather than schools as communities. The study also examined the effect of community characteristics on different kinds of delinquency including aggressive, property, drug-related and status offenses.

Johnstone reported the mean level of each kind of delinquency for individuals in each cell defined by the crosstabulation of a

census-derived measure of community socioeconomic status and family socioeconomic status. It is impossible to derive from the data presented an estimate of the percentage of variance explained in the dependent variable by each status measure or a standardized estimate of the effect of community status on individual delinquency. The pattern of mean differences is nevertheless interesting.

The results imply that different models fit the data for different kinds of offenses. For serious property offenses (burglary, larceny, and robbery) and self-reported arrest, the best-fitting model was one which assumed that the socioeconomic status of the family of origin, but not of the community, determines delinquency. For violent offenses (fighting and weapons), the best-fitting model was one which assumed that the effects of family and community status are cumulative. For status offenses and drug-related offenses, the best-fitting model was a "relative deprivation" model which assumed that the greatest amount of delinquency occurs in situations in which the individual experiences the greatest amount of social disadvantage. Under this model, lower class individuals in higher class areas engage in the most and higher status individuals in lower status areas the least delinquency.

Reiss and Rhodes concluded that delinquency was highest in lower status neighborhoods. Johnstone did not replicate that finding, but rather suggested that the effect of community status varies both by the form of delinquent involvement and the socioeconomic status of the individual. Only drug use was consistently lower in lower class neighborhoods. Covariation with community status for the other forms

of delinquency depended upon the family status of the individuals. Among middle-class individuals, serious property and aggressive crimes were highest and drug use lowest in lower-class neighborhoods. But among lower class individuals, serious property crimes, drug use, and status offenses were lowest in lower-class neighborhoods.

In summary, the results of the Johnstone study do not accord with the Reiss & Rhodes study in suggesting that the lower socioeconomic status communities produce more individual delinquency and that community socioeconomic status is more important than family socioeconomic status in explaining delinquency. Instead, the results raise interesting questions about interactions between individual and neighborhood status. Lacking information on the standards deviations of the variables, it is impossible to determine whether the observed community effects are large or small.

Simcha-Fagan and Schwartz (1986) recently examined community effects in a model of individual delinquency among 553 teenage males in 12 New York City communities. These authors employed more sensitive measures of community characteristics than those used in previous studies. A factor analysis of census indicators identified two dimensions of neighborhood--family disorganization (measured by the percentage of married-couple families, divorce rate, percentage children living in two-parent families, etc.) and area social rank (measured by family income, percentage of persons employed in professional and managerial occupations, etc.). Simcha-Fagan and Schwartz used these census-based measures of community characteristics as well as measures of formal and informal community structure and the

extent of the deviant-criminal subculture in the neighborhood derived from interviews with community residents. They measured delinquency using both official and self-reports. Most importantly, they included measures of the intervening variables through which community is most likely to operate according to criminological theory--attachment and commitment to school and association with delinquent peers. These measures were derived from interviews with the participating adolescents.

The sampling procedure used in the study was intended to maximize variation in type of community. Census tracts were categorized into six groups created by crosstabulating the two census-derived community measures described above. Neighborhoods falling more than three-fourths of a city-wide standard deviation above or below the city mean were excluded, and predominantly white and predominantly black neighborhoods were selected from each of the resulting cells (one cell was excluded because too few tracts fell into it). Note that while this sampling design succeeds at maximizing neighborhood heterogeneity on the measures used in the sampling framework and at minimizing the association among the variables used in the sampling framework so that their independent effects on delinquency might be assessed, it also restricts the range on area socioeconomic status, and may have resulted in the selection of atypical neighborhoods.

Simcha-Fagan and Schwartz used multiple regression and LISREL to assess the effects of community characteristics on individual delinquency and the measures of intervening variables. The LISREL model includes four community measures, corresponding individual

measures, and age. The results imply that some of the community measures remain significantly related to individual delinquency even when individual background measures are controlled. The higher the community disorganization, the higher the severe self-reported delinquency and officially recorded delinquency.<4> This effect is for the most part not mediated through school attachment, association with delinquent peers, or individual background measures. Community economic level has no independent effect on delinquency when individual characteristics are controlled, but the high correlation at the individual level between community economic level and disorganization (-.65) makes it difficult to separate the effects of these two community dimensions.

The magnitude of the community effect found in the Simcha-Fagan and Schwartz study is small. The percentage of variance in the outcome measures explained by the community measures is small--not exceeding 2.2% for any one of the community measures. The models regressing individual delinquency on all community and individual background variables and age account for between 2 and 7.8% of the variance in the delinquency measures, and most of that variance is explained by age. The zero-order correlations between community economic level and community disorganization and self-reported delinquency are -.05 and .08, respectively, and their standardized regression coefficients are -.06 and .06 in the self-report equations

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<4>The census measure of disorganization was excluded from the model when its high correlation with one of the interview-derived measures--Community Disorder-Criminal Subculture--precluded the use of both. The results reported here refer to the interview-derived measure.

in which they are significant.

METHOD

Data

Individuals. Data were collected as part of the national evaluation of the Office for Juvenile Delinquency Prevention's Alternative Education Initiative--the School Action Effectiveness Study (SAES; G. Gottfredson, 1982; Gottfredson, Gottfredson, & Cook, 1983). SAES student questionnaires were administered to students in sixty-nine schools. These data were augmented with parallel data from the evaluation of a similar school-based delinquency prevention project operating in two Baltimore City schools--The Effective School Project (ESP; D. Gottfredson, 1987). From this pool of seventy-one schools we selected all public junior high schools from which we collected data on a representative sample of students, and for which we obtained students' street addresses. Ten schools serving grades six through eight, seven through nine or seven and eight survived this selection process. The schools are located in four cities: Charleston, SC; Kalamazoo, MI; Christiansted, St. Croix (Virgin Islands); and Baltimore, MD.

Half of the schools in the sample are located in the urban centers of Charleston and Baltimore. Three are located in suburban communities, one in a rural farming community and one in a tourist center in the Virgin Islands. Student demographic characteristics, shown in Table 1, indicate that our study sample is predominantly

minority--71 percent black-- but is more typical of the nation in its level of socioeconomic status. A national survey of 1978 high school seniors (Bachman, Johnson, & O'Malley, 1980) showed that 69 and 76 percent of their fathers and mothers, respectively, had completed high school, and that 26 and 18 percent had completed college. Table 1 shows that the percentage parents completing high school and college in our sample was seventy-four and eighteen, respectively.

The prevention projects operating in some of the schools in the sample were instrumental in changing school means for some of the measures examined in this study. If the programs also altered the associations among measures examined in this study we would be unable to generalize the results of the study to schools not participating in such programs. As a check, we compared correlations of the two community measures in our study with each of the other variables included in the study for the treatment school for which we observed the greatest program effects (Gottfredson and Cook, 1986) and its untreated control school. The differences between the correlations for the two schools were trivial. The absolute value of the difference between the correlations for the two schools was small: It ranged from .005 to .154, with a mean of .078. None of the differences between schools was statistically significant at the .05 level. Participation in the delinquency prevention program did not alter in important ways the patterns of covariation among the variables examined.

Surveys were completed in Spring, 1982, for all SAES schools. Baltimore surveys were administered two years later. A random sample

of approximately 200 students was drawn from a current school roster for each participating school, except for three schools which elected to survey the entire student population. Students who were part of an experimental treatment in the school, control students, and students who were part of a previous year's random sample were also included in the survey sample. Members of these populations were randomly deleted from the current study sample to ensure that they were given no more weight than the randomly selected study participants. Cases were deleted until the proportion of these "special" students was equal to the proportion of the entire student population included in the study.

Survey response rates were acceptable in all schools. In Charleston they ranged from .69 to .91, averaging .82. In Kalamazoo they ranged from .77 to .85, averaging .81. In Christiansted the response rate was .79. In Baltimore they ranged from .69 to .77, averaging .73. The overall survey response rate for all twenty schools was .80.

Only students for whom we obtained both a completed survey and a useable address are included in the study sample. For purposes of this study, a "useable address" is an address for which we were able to locate a census geographical code at the block group or enumeration district level. The proportion of students with surveys who also had a useable address was high in those cities which are part of a Standard Metropolitan Statistical Area (SMSA) because for these cities current address-census area mapping files are made available by the U.S. Census Bureau. For the non-SMSA cases, we obtained street maps, tax maps showing the location of each house number on each street, and

census maps showing the boundaries of each census block or enumeration district. We used these maps to link street addresses to census areas. For Kalamazoo and Baltimore the percentage virtually all addresses were useable. For Charleston and Christiansted the percentage useable addresses was 82 and 86, respectively. The overall percentage useable addresses was 93.

Communities. In this study a community is defined as a census block group or enumeration district. Blocks are the census bureau's smallest geographical unit. They contain about 100 persons (but range from 0 to 1000 persons), and are bounded on all sides by a visible physical feature such as a street, railroad track or stream. Much of the information collected by the census bureau is censored at the block level in order to protect the confidentiality of individual responses. But most information collected by the census is available at the next highest level of aggregation--the block group. A census block group is composed of approximately 10 city blocks and contains between 1000 and 1200 persons. Most of the individuals in our sample live in blocked areas. Christiansted in the Virgin Islands and two complete and one partial school catchment area in our Charleston sample are not blocked. For these areas, our communities are census enumeration districts, the smallest unit of census geography for which statistics are prepared in area without blocks. Enumeration districts contain 500 to 600 people.

Table 2 shows the number of individuals and communities in each of the five cities, as well as the average number of individuals per community. Our 3729 individuals live in 321 different block groups or

enumeration districts. The number of individuals residing in a given block group depends on characteristics of the communities, such as the population density and the percentage of the population attending the public school, and on our sampling techniques and response rates. For example, our strategy of sampling the entire student population rather than a random sample in the Baltimore schools results in a higher number of individuals per community in Baltimore.

Measures

All measures of individuals are taken from the surveys described earlier. Student race and age are single items. The remaining individual measures are scales. Table 3 shows their number of items and alpha reliabilities. Some alphas were estimated in the current sample before deleting "special" cases, and others were estimated using the full SAES sample. The content of the scales is as follows:

Delinquent Behavior

Three delinquency scales are used. They are self-report scales which ask the respondent to report whether or not he or she engaged in specific activities during the past year. The items are summed to create variety scales for three types of criminal activity.

Theft and vandalism. This scale is composed of items asking the student to report engaging in seven specific property offenses. Items range in seriousness from joyriding to breaking and entering. Its alpha reliability is .75.

Interpersonal aggression. This scale is composed of items

asking the student to report engaging in five specific offenses against persons. Items range in seriousness from hitting or threatening to hit another student to carrying a concealed weapon. Its alpha reliability is .64.

Drug involvement. This is a scale composed of seven items asking the respondent to report about the use of certain drugs in the last year. It includes items asking about the use of cigarettes, alcohol, pot, glue, and "other" drugs. It also includes items asking if the student has gone to school "high" or sold drugs. Its alpha reliability is .77.

Delinquent Associates

Negative peer influence. This is a nine-item scale asking students to describe the characteristics of their friends. Items include "Most of my friends think getting good grades is important" and "How many of your friends have been picked up by the police?". Its alpha reliability is .65.

Social Bonding

These measures are designed to assess bonding to the social order as described by Hirschi (1969).

Belief in rules. This six-item scale includes items such as "It is all right to get around the law if you can" and "Taking things from stores doesn't hurt anyone". Its alpha reliability is .53.

School attachment/commitment. This eighteen-item scale

includes items such as "I like this school" and "I have lots of respect for my teachers". as well as questions about educational and occupational aspirations, perceived parental pressure to go to college, and effort expended on school work. Its alpha reliability is .77.

Involvement. This is a twelve-item checklist asking students to report whether or not they spent time on any of the activities in the list. Activities include athletic teams, various kinds of school clubs, community organizations such as scouts and the Y, and helping out as a library assistant or office helper at school. Its alpha reliability is .62.

Parental attachment/supervision. This ten-item scale includes items such as "How much do you want to be like the kind of person your mother (father) is?" and "How close to you feel towards your mother (father)?" as well as items asking students to report about how closely parents watch for student misbehavior and how they react when it occurs. Such items include "My parents know where I am and what I am doing" and "I would be punished if my parents knew that I broke a school rule". Its alpha reliability is .67.

Community Variables

All measures of the community are derived from the 1980 Census of Population and Housing (Bureau of the Census, 1982). The following variables were constructed from census counts:

Poverty. Proportion of families with incomes 1.24 times the

poverty level or below.

Professional/managerial employment. Proportion of employed persons aged 16 and over employed in professional or managerial occupations.

Farm income. Ratio of families with income from farm self-employment to families with wage and salary income.

Family income. Proportion of families with income of $12,000 or above.

Welfare. Proportion of families with income from public assistance or welfare.

Female-headed households. Ratio of female-headed households with children under 16 to husband-wife-headed households with children under 16.

Divorced. Proportion of persons aged 14 and over who are married with spouse absent, separated, or divorced.

Female employment. Proportion of females aged 16 or over who are employed or in the armed forces.

Female unemployment. Proportion of females aged 16 or over in the labor force and who are unemployed.

Nonpublic school enrollment. Ratio of nonpublic to public school enrollment.

Male employment. Proportion of males aged 16 or over who are

employed or in the armed forces.

Male unemployment. Proportion of males aged 16 or over and in the labor force who are unemployed.

Education. The proportion of population 25 years or older who completed four years of high school or more.

Proportion black. Proportion of population black.

Proportion white. Proportion of population white.

Proportion native American. Proportion of population native American.

Proportion Asian. Proportion of population Asian.

Proportion hispanic. Proportion of persons who are classified into any of the 1980 census' five Spanish categories in the question on "origin or descent."

Occupied housing. Proportion of housing units occupied.

Renter occupancy. Percentage of housing units occupied by renters.

Telephones. Proportion of occupied housing units with telephones.

No baths. Proportion of year-round occupied housing units with no bath or only half of a bath.

Housing value. The aggregate house value of specified

owner-occupied noncondominium housing units.

Proportion female. Proportion of population female.

Children in natural families. Proportion of children living with a natural parent in a married couple family.

Mental hospital population. Proportion of population who are inmates of mental hospitals.

Group quarters. Proportion of population in group quarters.

Per capita income. Total per capita income in 1979.

Means, standard deviations, and correlations among all measures used in this study are presented in Appendix Tables A1 and A2, separately for males and females.

Community Factors

We selected a 10% random sample of block groups and enumeration districts in Illinois as a construction sample for developing community factors. The first thirteen census variables in the list above were factor analysed. Variables were constructed to match as closely as possible the census variables used in previous factor analyses of census variables.

Table 4 shows the factor analysis of the census variables. We examined several solutions, and found the two-factor varimax-rotated orthogonal principal factor analysis most interpretable. This solution matches closely the solutions found in our own previous work

(Gottfredson & Gottfredson, 1985), the work of social geographers (Hadden & Borgatta, 1965; Smith, 1973) and in a recent contextual analysis of the effect of community characteristics on individual delinquency (Simcha-Fagan & Schwartz, 1986). The two factors explained 45.3% of the variance in our 13 census variables. The first factor is defined by a high proportion of families headed by females in the community, a high proportion of families on welfare and with incomes below the poverty level, a high divorce rate, and a low level of male employment. This factor resembles the description of the disorganized community found in Shaw and McKay's (1969) work and a community dimension, variously called "Family Disorganization" (Simcha-Fagan and Schwartz, 1986), "Social Problems" and "Social Deprivation" (Smith, 1973), "Family Status" (Ross, Bluestone & Hines, 1979), and "Poverty and Disorganization" (Gottfredson & Gottfredson, 1985). We call this factor Disorganization.

The second factor is defined by a high proportion families with incomes above the national median income, a high proportion persons employed in professional and managerial occupations, a high proportion persons who completed high school, a high proportion employed females, and a low ratio of families with farm income to families with earnings from wages and salaries. It is a socioeconomic status dimension, closely resembling the second dimension found in our previous work and in the work of others cited above. We call this factor Affluence and education.

Table 5 shows the correlations of the community factors with other census variables. The correlations indicate that disorganized

communities are characterized by a low percentage of children living in traditional families, a low percentage white and a high percentage black population, and a high percentage housing units occupied by renters. These areas are also characterized by a low income and standard of living as indicated by the absence of telephones and bathrooms in the home.

The economic variables are the highest correlates of our second community factor--Affluence and education. Communities scoring high on this factor are characterized by a high income level, average housing value, and standard of living. Percentage black and white are unrelated to this community factor.

We computed factor scores for all census block groups and enumeration districts containing at least one individual in our sample and merged the community scores with the individual records. Table 6 shows the mean, standard deviation, and range of factor scores for individuals in the four cities included in the study. The table shows that the individuals in our sample live in relatively disorganized and poor communities. Recall that the construction sample for the community measures was a random sample of block groups from Illinois. The mean of each of the dimensions was zero and the standard deviation one in the construction sample. The means for Disorganization for individuals in our sample is greater than zero for all four cities, and it is more than a standard deviation above the construction sample mean for one of our cities. The range within each city is great, but extremely disorganized communities are represented while extremely organized ones are not.

The distribution of the second community factor--Affluence and education--more closely resembles the construction sample distribution. Most communities in our sample are within two standard deviations of the construction sample mean, and the city averages are all within one third of one standard deviation of the construction sample mean.

The two community factors are correlated in the study sample (r=-.152 and -.232 for females and males, respectively).

Analytic Strategy

Multiple regression is the primary mode of analysis. All analyses are done separately for males and females because tests for interaction by gender implied that the regressions vary by gender. We regressed the three delinquency measures on the community factors. Then we added the individual background measures and the measures of the theoretical intervening variables to the model and decomposed the total effect of the community measures into indirect effects via the background and theoretical measures and direct effects (effects which are not mediated by other variables in the model). We also examined community factor by individual socioeconomic status interaction effects to see if the effect of community characteristics varies by level of individual socioeconomic status, as suggested by Johnstone.

Results

Tables 7 and 8 show standardized regression coefficients from the regression of delinquency on the two community measures only (the

first column under each outcome measure), the community measures and the individual background measures (the second column under each outcome measure), and on all independent measures (the third column under each outcome measure). The tables shows that the level of delinquency to which an individual admits on a self-report instrument and the level of disorganization or affluence of the community in which the individual lives are associated, but that the association varies by gender and type of delinquency. Although some of the community effects are statistically significant<5>, they are small.

For males (Table 7), the level of disorganization of the community is positively related to involvement in both aggressive and property crimes. These effects are mediated by the other variables included in the model (primarily the theoretical intervening variables). Community disorganization has no net effect on males' Drug involvement, but this is the result of offsetting indirect and direct effects: Variables included in the model increase Drug involvement for males living in disorganized communities, but other, unmeasured, variables decrease Drug involvement for these individuals.

Community affluence is related to males' reports of Theft and

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<5>Estimating significance in multilevel equations is not straightforward. The number of independent observations is equal to the number of individuals for measures taken from the student surveys, but equal to the number of communities for the two community measures. Standard errors for regression and correlation coefficients relating survey measures to community measures are calculated using the number of individuals. This inflates the significance of the community measures. The "significant" associations with community measures would not be significant using the most conservative test (i.e., using the number of communities in the calculation of the standard error).

vandalism and Drug involvement, and these effects are not mediated through other variables included in the model. The direction of this community effect is not as anticipated by previous studies which used only global measures of delinquency. Males living in more affluent communities report more Theft and vandalism and Drug involvement (almost significant), controlling on the individual's social class, race, age, negative peer influence and degree of social bonding.

Tables 8 shows the corresponding regressions for females. Community disorganization is related to females' reports of interpersonal aggressive-type crimes. This community effect is mediated only partly through the theoretical intervening variables. Community disorganization level is not significantly related to other kinds of self-reported crime among females.

Affluence and education is related only to female Drug involvement, and this effect is totally mediated through other variables in the model. Once individual background characteristics are controlled, females living in more affluent areas are no more likely to report drug involvement than females living in less affluent areas.

The community effects shown in tables 7 and 8 are small. The percentage of variance in the outcome variables accounted for by the community measures ranges from .002 to .01. In only one of the six equations regressing delinquency on the community and background factors is the magnitude of the community affluence effect greater than the magnitude of the individual-level parental education measure,

which itself is small. Note also that the signs of the individual and community measures of socioeconomic status are opposite for males: Higher socioeconomic status males engage in less crime than do their lower socioeconomic status counterparts because social class is related to the theoretical intervening variables. But males living in high socioeconomic status neighborhoods engage in more criminal behavior than their counterparts in lower socioeconomic status neighborhoods.

Table 9 shows the effects of the community variables on the theoretical variables. The table entries are standardized regression coefficients in regressions of the theoretical variables on the community factors and the background variables. The community factors have small effects on some of the measures of the theoretical variables. Males and females in disorganized communities report more Negative peer influence and less School attachment and commitment. They also report slightly lower levels of Parental attachment and supervision, but these effects are not significant. Interestingly, the extent to which individuals accept the validity of laws (Belief) is unrelated to the level of disorganization in the community. These community effects on the theoretical variables increase the delinquency of these youths.

Consistent with the results reported in previous tables, effects of Affluence and education on the theoretical variables are weaker than those of Disorganization. Females and males in more affluent communities are less involved in school and community activities. This would tend to reduce delinquent behavior for youths in these

communities because involvement is positively related to delinquency.

These results provide limited support for a contextual effect of community on delinquency for males. Community disorganization increases male Interpersonal aggression and Theft and vandalism, and it has its effect not through individual background measures but through the theoretical intervening variables. Community Affluence and education increases male Theft and vandalism and Drug involvement, and these effects remain significant (or nearly significant) when controls for individual race, social class, age, social bonding and negative peer influence are applied. Although we can only speculate about the mechanism through which this effect operates, if it is a compositional effect rather than a contextual effect, it is due to other individual characteristics other than race, social class and age.

Female delinquency is more highly dependent upon individual background characteristics than is male delinquency, according to this study. Community affluence is related only to Drug involvement, and this association is reduced to zero when individual background measures are introduced. Community disorganization is related to females' reports of interpersonal aggression, and our study is inconclusive about the mechanism for this effect.

We also examined our data for interactions of community characteristics with individuals socioeconomic status. Only for females did we find that the community effects varied significantly by individual socioeconomic status, and these interaction effects were

small despite their significance (the largest increment to variance in the outcome variable explained by any of the interaction terms was .008). For females, the social class of the individual is more highly related to interpersonal aggression in the least disorganized areas than in other areas. Low status females in these areas report having committed more than twice as many such crimes as high status females. This relationship is observed only for females in the least disorganized areas, and results in a high level of crime among low status females who reside in highly organized areas -- an observation which is somewhat consistent with the relative deprivation argument advanced by Johnstone (although it applies to community disorganization rather than community affluence). The data for males and for the other outcomes for females do not support the relative deprivation argument.

Summary

The results of our study provide evidence of a small community effect on individual delinquency. To summarize, individuals living in disorganized communities report more Negative peer influence and less Attachment and commitment to school than do individuals living in more organized communities. The effects of community disorganization on the theoretical intervening variables increases male delinquency, but this indirect effect of community disorganization is offset for Drug involvement by other factors (not included in our study) which increase drug involvement in the more organized communities. Females also report more interpersonal aggressive crimes if they live in more disorganized areas, and this effect is only partially mediated by the

variables included in the model.

Effects of community affluence on the theoretical variables are smaller: males and females in more affluent areas report less involvement in school and community activities. This lowered involvement in school and community activities among youths from more affluent areas has little effect on delinquency because involvement is not highly related to delinquency. Community affluence has virtually no effect on male delinquency via the theoretical variables or the background variables included in our models. Unmeasured effects of community affluence increase males' involvement in property crimes and Drug involvement, and females from more affluent areas use drugs more than those from less affluent areas, but this effect is explained by compositional differences.

Discussion

Major theoretical perspectives that have laid the foundation of our discipline (Shaw and McKay, 1942; Sutherland, 1942) imply that the social organization of the community influences individual delinquency. With rare exception the mechanism through which the community is said to exert its influence on individuals has not been examined empirically, but rather has been presumed on the basis of the often-observed large association between community-level measures of crime and disorganization or poverty.

This study suggests that two dimensions of community -- socioeconomic status and social disorganization -- are slightly related to delinquency, but the mechanisms relating each to

delinquency are different. This study provides some evidence that communities that are characterized by weak family and other social structures do, as Shaw and McKay suggested, lose control over their children. Children in these areas report less bonding to potentially controlling institutions and more negative peer influence, and more delinquency.

The socioeconomic status of the community has no effect on social bonding or association with deviant peers. Our study shows no effect of community affluence on aggressive criminal involvement, and the only other study which examined aggressive acts separately from property and drug-related crimes (Johnstone) showed that a models which gave priority to family status rather than community status explained violent crimes the best. The best evidence implies that community affluence level is not related to crimes involving aggression.

Drug involvement and Theft and vandalism are higher in more affluent areas. Both Johnstone's and our studies found this to be true. But these effects are not straightforward. Johnstone offered guarded support for a relative deprivation explanation: The social class of the individual and the community interact such that persons in positions of greatest status discrepancy engage in the most delinquency. Our results do not generally support this interpretation. Males from lower status families are no more likely to engage in crime if they lived in middle or upper class neighborhoods than if they live in lower class neighborhoods. These individuals are more likely to engage in crime that others regardless

of where they live. Females from lower socioeconomic status families who live in the most organized communities are more likely to engage in interpersonal aggressive crimes than such individuals who live in less organized communities, but this pattern is not replicated for the other outcomes.

Our results are more consistent with an opportunity interpretation, at least for persons from the middle and upper categories of family social class: Drugs are more available in more affluent communities and targets for theft are more attractive. Individuals from these communities engage in these activities more not because they are less bonded to society, not because they are more influenced by delinquent associates, not because they believe it is OK to steal and take drugs, but simply because the drugs are available and the targets are attractive. Of course, this interpretation is speculative. We have no measure of availability of drugs or perceived attractiveness of targets. But this does seem the most likely explanation of the "direct" effect of community affluence observed in our data.

The results of our study suggest that individual delinquency is primarily the result of characteristics and experiences of the individual which are largely unrelated to the characteristics of the community in which the individual resides. Delinquency is a function of (at least) the influence of negative peers and low levels of bonding to school and family. The effects of community characteristics on these measured risk factors for delinquency as well as on unmeasured variables is small. A maximum of two percent of the

variance in individual delinquency is accounted for by community factors in any of the multilevel studies examined -- and a more reasonable estimate is less than one percent. Regression coefficients relating individual delinquency to measures of community characteristics in equations which control for individual background measures imply that the maximum change in the delinquency outcome that can be attributed to any measure of community is minuscule. The largest standardized regression coefficients found in any of the studies for any of the community variables was .12, meaning that a standard deviation change in the community measure would produce a change of only 12% of one standard deviation on the delinquency outcome. In the present study, our largest community effect translates into a mean difference of about .02 on a delinquency scale measured from zero to one. In contrast to earlier studies which have concluded that "the delinquency life chances of boys in any status group tend to be greatest in the lower status areas" (Reiss & Rhodes, 1961, abstract); and "both serious and commonplace varieties of delinquent expression are linked to status contexts" (Johnstone, 1978, abstract), we must conclude that community effects on delinquent behavior are practically meaningless.

Among the methodological concerns that might temper our conclusions are the following:

1. Poorly defined communities. Census geographical areas, although based on reasonable physical boundaries, do not necessarily correspond to any definition of "community" that social scientists might hold. Research on the effects of

alternative definitions of community boundaries is badly needed.

2. Restricted variability in community measures. All of the studies of community characteristics on individual characteristics have used sample with restricted ranges on the community characteristics. School districts in Nashville and census tracts in Chicago and New York City have been used in previous studies. This study uses a wider range of community types (i.e., it includes rural areas, island communities, inner-city areas, and suburban areas), but this sample clearly does not cover the entire range of community types. The communities in our sample are considerably more disorganized and somewhat less affluent than the communities in our construction sample (a random sample of block groups in Illinois). It is possible that the restricted range of communities reduces the correlation between community characteristics and the outcomes of interest.

3. Invalid community measures. One might argue that the census-based community measures are not valid indicators of the community conditions specified in the our theories. More direct measures of community organization, loss of control over children, and delinquent traditions may be required. Simcha-Fagan and Schwartz provide evidence for the validity of census-based community measures by showing that measures of community disorganization and low economic status derived from interviews with random samples of community residents correlate highly and in the expected direction with census-based measures.

4. Invalid self-report delinquency measures. Some evidence (Hindelang, Hirschi, and Weis, 1981) suggests that self-report delinquency measures are less valid for highly delinquent, black male populations than for others. The absence of strong association in our predominantly minority sample between self-reported delinquency and the community measures may be due to invalid measurement of the dependent variable. If this were true we would expect to see higher associations between the community measures and official measures of delinquency than with self-report delinquency, and we would expect to see weaker correlations of self-report delinquency and other variables in the model for the subpopulations in our sample most closely resembling the Hindelang, Hirschi, and Weis low-validity sample.

A preliminary examination of this issue provided evidence on both sides: Simcha-Fagan and Schwartz found slightly stronger effects of some of their community measures on official than on self-report delinquency. And a quick comparison of correlations between self-report delinquency and all other measures used in the present study for a predominantly white school in Kalamazoo and a predominantly black school in Baltimore found fairly large differences between the correlations: The Kalamazoo sample had consistently higher correlations than the Baltimore sample and the differences were not trivial. On the other hand, an earlier report based on the SAES data (D. Gottfredson and G. Gottfredson, 1984) found little meaningful variation in the correspondence of official and self-reported delinquency for different race and sex

groups. The differential validity issue should receive more careful research attention.

If community characteristics do not have a sizeable effect on the delinquency of the individuals who inhabit those communities, what accounts for the large ecological-level correlation often observed between community characteristics and delinquency rates? Wilson and Herrnstein (1985) have suggested that elevated crime rates in poor and disorganized areas are due to compositional characteristics of the inhabitants rather than to contextual effects of the community. In their words, "A neighborhood may have more crime because conditions there cause it or because certain kinds of neighborhoods attract persons predisposed to criminality." (p. 291, emphasis added).

Our study suggests that compositional and contextual processes may both be operative. While the effects of community characteristics on individual delinquency are small, so are the effects of demographic characteristics of the individuals. But these small associations at the individual level may translate into much larger associations at the aggregate level when individuals are grouped together on the basis of demographic characteristics. Our study shows that, at least for males, the characteristics of the community influence the level of individual delinquency. But the results of our study do not tell us how much of the large ecological-level correlation is due to contextual effects and how much is due to grouping of people whose individual characteristics predispose them to crime. A more critical test of the compositional argument would one that attempted to account for the large community-level association between delinquency and

community characteristics using a within-community model of delinquency, i.e., a model using only deviations from community means, and a larger variety of aggregated personal characteristics as contextual measures. Future research should explore this alternative explanation more fully.

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Table 1

Race and Parental Education
Level of Students, by City and School

City/school	Percentage		% Parents completed	
	Black	Spanish	High school	College
Charleston	76	01	81	21
	31	01	89	30
	89	01	82	18
	87	02	86	23
	94	00	79	18
	67	01	70	18
Kalamazoo	25	02	78	26
	20	02	78	27
	35	02	78	22
Christiansted	54	26	62	13
Baltimore	88	01	68	12
	90	00	65	09
	85	01	71	16
All projects	71	02	74	18

Table 2

Number of Individuals and Communities, by City

City	Number of		Number of individuals per community	
	Individuals	Communities	Average	Range
Kalamazoo	748	81	9.2	1 - 35
Charleston	1112	88	12.6	1 - 59
Christiansted	108	20	5.4	1 - 15
Baltimore	1761	132	13.3	1 - 67

Note. All communities are census block groups, except for nine of the communities in Charleston and all of the communities in Virgin Islands, which are census enumeration districts.

Table 3

Numbers of Items and Alpha Reliability Coefficients for Individual Scales

Scale	Number of items	Alpha reliability
Parental education[a]	2	.78
Parental attachment/ supervision	10	.67
Negative peer influence[a]	9	.65
School attachment/commitment	18	.77
Involvement[a]	12	.62
Belief in conventional rules[a]	6	.53
Drug involvement	7	.77
Theft and vandalism	7	.75
Interpersonal aggression	5	.64

Note. Unless otherwise noted, reliability was estimated in the current study sample before random deletion of cases to obtain representativeness of school populations (N = 9165).

[a]Reliability estimate taken from G. Gottfredson (1984).

Table 4

Varimax Rotated Principal Factor Analysis of Census Variables

Census variable	Factor I	Factor II	h^2
Welfare	.81	-.11	.70
Poverty	.75	-.32	.70
Divorced	.65	-.04	.48
Female-headed households	.86	.09	.70
Male employment	-.60	.30	.60
Female employment	-.24	.46	.41
Male unemployment	.53	-.19	.50
Female unemployment	.46	-.24	.33
Professional/managerial employment	-.26	.61	.52
Family income	-.51	.61	.61
Education	-.53	.56	.66
Farm income	-.25	-.45	.27
Nonpublic school enrollment	-.03	.38	.18

Note. The factor analysis is based on a random sample of Illinois communities (N = 1224).

Table 5

Pearson Correlations Relating Community Scales to Selected Census Variables

Census variable	Community scale: Disorganization	Community scale: Affluence and education
Proportion black	.69	.05[a]
Proportion white	-.71	-.03[a]
Proportion native American	.02[a]	.01[a]
Proportion Asian	-.08	.21
Proportion hispanic	.18	-.12
Occupied housing	-.07*	.11
Renter occupancy	.59	-.10
Telephones	-.57	.38
No baths	.26	-.38
Housing value	-.29	.49
Proportion female	.27	.08
Children in natural families	-.85	-.06[a]
Mental hospital population	.03[a]	-.02[a]
Group quarters	.04[a]	.07*
Per capita income	-.44	.59

Note. Correlations based on a random sample of Illinois communities (N = 1224). All correlations are significant at the $p < .01$ level unless otherwise indicated.

* $p < .05$

[a] Not significant

Table 6

Means, Standard Deviations and Ranges
for Community Scales by City

	Disorganization				Affluence and education			
City	X	SD	Range	N	X	SD	Range	N
Kalamazoo	.68	1.14	-.96 - 3.38	742	.20	.64	-1.41 - 1.58	742
Charleston	.58	.74	-.83 - 3.74	1094	-.33	.58	-2.13 - 1.45	1094
Christiansted	.74	.66	-.24 - 2.33	108	-.32	.64	-1.24 - 1.66	108
Baltimore	1.76	.80	-.18 - 4.84	1743	-.14	.44	-1.09 - 1.40	1743

Table 7

Standardized Regression Coefficients Relating Three Measures of Delinquency to Community Factors, Individual Background Measures, and Theoretical Predictors -- Males

	Interpersonal aggression			Theft and vandalism			Drug involvement		
Disorganization	.088**	.064	.021	.058*	.057	.015	-.006	-.030	-.076**
Affluence and education	.021	.020	.033	.089**	.075*	.092**	.059*	.045	.050
Age		.099**	.037		.093**	.031		.175**	.100**
Parental education		-.068*	.002		-.063*	.004		-.089**	-.007
Hispanic		-.008	-.008		.007	.004		.001	.000
Black		-.028	.028		-.087**	-.033		-.082**	-.022
Negative peer influence			.258**			.230**			.259**
Parental attachment/ supervision			-.074**			-.090**			-.134**
School attachment/ commitment			-.184**			-.209**			-.172**
Involvement			.037			.080**			-.027
Belief			-.120**			-.123**			-.098**
R2	.007	.022	.233	.009	.029	.249	.004	.049	.276

Note. Tests of significance for community measures are based on the number of individuals.

* $p < .05$
** $p < .01$

Table 8

Standardized Regression Coefficients Relating Three Measures of Delinquency to Community Factors, Individual Background Measures, and Theoretical Predictors -- Females

	Interpersonal aggression			Theft and vandalism			Drug involvement		
Disorganization	.094**	.086**	.057*	-.042	-.009	-.034	.013	.029	-.002
Affluence and education	-.023	-.034	-.011	.021	-.012	.010	.049*	.000	.007
Age		.111**	.037		.067*	.006		.204*	.124**
Parental education		-.096**	-.014		-.040	.028		-.123**	-.024
Hispanic		-.007	-.010		-.017	-.022		-.080**	-.079**
Black		-.078**	-.012		-.151**	-.099**		-.222**	-.153**
Negative peer influence			.237**			.189**			.184**
Parental attachment/ supervision			-.156**			-.097**			-.194**
School attachment/ commitment			-.168**			-.157**			-.135**
Involvement			.116**			.096**			-.012
Belief			-.092**			-.108**			-.077**
R2	.010	.039	.239	.002	.028	.171	.002	.105	.270

Note. Tests of significance for community measures are based on the number of individuals.

* $p < .05$
** $p < .01$

Table 9

Standardized Regression Coefficients Relating Theoretical Variables to Community Factors, by Gender

Community factor	Negative peer influence	Parental attachment/ supervision	School attachment/ supervision	Involvement	Belief
Males					
Disorganization	.114**	-.050	-.069*	-.013	.016
Affluence and education	-.007	-.010	.021	-.100**	.028
R2	.059	.047	.079	.032	.005
Females					
Disorganization	.068*	-.032	-.066*	-.052	-.032
Affluence and education	-.041	-.026	.023	-.078**	.045
R2	.067	.065	.109	.076	.024

* $p < .05$
** $p < .01$

Table A1

Means, Standard Deviations and
Pearson Correlations--Males

	Age	White	Black	Spanish	Parental Educ. Level	Negative Peer Inf.	School Attach./ Commit.	Parental Attach./ Superv.	Community Disorg.	Community Affluence & Ed.	Involvement
Age	1.0000	-.0068	.0137	.0030	-.0845	.1086	-.1894	-.1699	.1830	.0316	-.1087
White	-.0068	1.0000	-.6964	-.0602	.1748	.0437	-.0737	-.0101	-.4593	.3456	-.0942
Black	.0137	-.6964	1.0000	-.2093	-.1136	-.0635	.0871	.0095	.3973	-.2881	.0582
Spanish	.0030	-.0602	-.2093	1.0000	-.0259	-.0240	-.0400	-.0766	-.0323	.0089	.0051
Pared	-.0845	.1748	-.1136	-.0259	1.0000	-.1752	.1799	.1168	-.2391	.2302	.0894
Negpeer	.1086	.0437	-.0635	-.0240	-.1752	1.0000	-.4686	-.3213	.1128	-.0274	-.0401
School	-.1894	-.0737	.0871	-.0400	.1799	-.4686	1.0000	.4765	-.0867	.0286	.1320
Parent	-.1699	-.0101	.0095	-.0766	.1168	-.3213	.4765	1.0000	-.0859	.0111	.0678
Comdisorg	.1830	-.4593	.3973	-.0323	-.2391	.1128	-.0867	-.0859	1.0000	-.2322	-.0129
Comaffed	.0316	.3456	-.2881	.0089	.2302	-.0274	.0286	.0111	-.2322	1.0000	-.0904
Involv	-.1087	-.0942	.0582	.0051	.0894	-.0401	.1320	.0678	-.0129	-.0904	1.0000
Belief	-.0252	.0396	-.0375	-.0381	-.0092	-.2607	.3374	.2793	-.0082	.0322	-.0276
DR	.1771	.1080	-.0948	.0225	-.0773	.4132	-.4083	-.3396	-.0197	.0608	-.0828
IA	.1168	-.0192	.0020	-.0021	-.0838	.4018	-.3809	-.2827	.0828	.0011	-.0049
TV	.1104	.0534	-.0790	.0259	-.0578	.3892	-.3971	-.2980	.0369	.0754	.0275

	Belief	Drug Inv.	Interpers. Aggression	Theft & Vand.	Mean	Std Dev	Cases
Age	-.0252	.1771	.1168	.1104	3.1286	1.2246	1843
White	.0396	.1080	-.0192	.0534	.1668	.3729	1858
Black	-.0375	-.0948	.0020	-.0790	.7078	.4549	1858
Spanish	-.0381	.0225	-.0021	.0259	.0178	.1321	1858
Pared	-.0092	-.0773	-.0838	-.0578	2.3948	1.0821	1493
Negpeer	-.2607	.4132	.4018	.3892	.2586	.2125	1723
School	.3374	-.4083	-.3809	-.3971	-.0844	.4592	1492
Parent	.2793	-.3396	-.2827	-.2980	-.0287	.4684	1465
Comdisorg	-.0082	-.0197	.0828	.0369	1.1369	1.0134	1834
Comaffed	.0322	.0608	.0011	.0754	-.1276	.5667	1834
Involv	-.0276	-.0828	-.0049	.0275	.2095	.1744	1672
Belief	1.0000	-.2603	-.2720	-.2773	.6569	.2472	1395
DR	-.2603	1.0000	.6005	.6207	.1636	.2263	1556
IA	-.2720	.6005	1.0000	.6097	.2467	.2547	1604
TV	-.2773	.6207	.6097	1.0000	.1197	.2004	1556

Table A2

Means, Standard Deviations and
Pearson Correlations--Females

	Age	White	Black	Spanish	Parental Educ. Level	Negative Peer Inf.	School Attach./ Commit.	Parental Attach./ Superv.	Community Disorg.	Community Affluence & Ed.	Involvement
Age	1.0000	.0164	-.0078	-.0064	-.1154	.1353	-.2339	-.1724	.1749	.0594	-.1384
White	-.0078	-.7171	1.0000	-.2172	-.0735	-.0780	.1074	.1035	.3780	-.2685	.0643
Black	-.0064	-.0640	-.2172	1.0000	-.1112	.0523	-.0434	-.0199	-.0506	-.0678	-.0075
Spanish	-.1154	.1464	-.0735	-.1112	1.0000	-.2004	.2138	.1620	-.1694	.1986	.2197
Pared	.1353	.0296	-.0780	.0523	-.2004	1.0000	-.4300	-.2909	.0747	-.0472	-.1058
Negpeer	-.2339	-.0667	.1074	-.0434	.2138	-.4300	1.0000	.4782	-.0795	.0166	.2385
School	-.1724	-.0593	.1035	-.0199	.1620	-.2909	.4782	1.0000	-.0350	-.0330	.2068
Parent	.1749	-.4678	.3780	-.0506	-.1694	.0747	-.0795	-.0350	1.0000	-.1520	-.0646
Comdisorg	.0594	.3666	-.2685	-.0678	.1986	-.0472	.0166	-.0330	-.1520	1.0000	-.0561
Comaffed	-.1384	-.0909	.0643	-.0075	.2197	-.1058	.2385	.2068	-.0646	-.0561	1.0000
Involv	-.0600	.0657	-.0145	-.0530	.1307	-.2896	.3607	.2469	-.0594	.0690	.0139
Belief	.2253	.1789	-.1859	-.0209	-.1269	.3515	-.3849	-.3740	.0059	.0473	-.1370
DR	.1361	-.0140	-.0287	.0181	-.1233	.3822	-.3671	-.3152	.0980	-.0377	.0056
IA	.0708	.1361	-.1455	.0208	-.0355	.3050	-.3037	-.2398	-.0454	.0276	.0177
TV											

	Belief	Drug Inv.	Interpers. Aggression	Theft & Vand.	Mean	Std Dev	Cases
Age	-.0600	.2253	.1361	.0708	3.0295	1.2738	1833
White	.0657	.1789	-.0140	.1361	.1744	.3795	1841
Black	-.0145	-.1859	-.0287	-.1455	.7089	.4544	1841
Spanish	-.0530	-.0209	.0181	.0208	.0190	.1366	1841
Pared	.1307	-.1269	-.1233	-.0355	2.2804	1.1076	1466
Negpeer	-.2896	.3515	.3822	.3050	.1924	.1873	1772
School	.3607	-.3849	-.3671	-.3037	.0447	.4322	1651
Parent	.2469	-.3740	-.3152	-.2398	.0110	.4822	1637
Comdisorg	-.0594	.0059	.0980	-.0454	1.1839	1.0403	1823
Comaffed	.0690	.0473	-.0377	.0276	-.1398	.5618	1823
Involv	.0139	-.1370	.0056	.0177	.2219	.1784	1708
Belief	1.0000	-.2310	-.2654	-.2344	.7163	.2225	1606
DR	-.2310	1.0000	.5115	.4457	.1761	.2241	1699
IA	-.2654	.5115	1.0000	.4730	.1488	.1985	1729
TV	-.2344	.4457	.4730	1.0000	.0453	.1136	1719

Methodological Issues in Estimating Multilevel Models

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ABSTRACT

One research tradition in criminology has focused on the distribution of crime among individuals, and a second tradition has examined the distribution of crime rates among social areas. Rarely are both traditions combined in a single study. This paper discusses the rationale for research that takes advantage of data for a large number of adolescents who are clustered within diverse social areas to explore community influences on the delinquent behavior of individuals. This strategy provides an opportunity to examine some mechanisms through which community organization -- measured independently of the characteristics of the individuals studied -- might contribute to the explanation of variations in individuals' delinquent conduct. Some approaches to the examination of multilevel data are described, and preliminary results are presented.

A PERSPECTIVE ON ECOLOGICAL AND INDIVIDUAL DATA ON DELINQUENCY

Any criminologist who is familiar with the size and direction of the correlations typically found between measures of criminal behavior and social class in studies of individuals, and who has had a chat about crime with a scientist from another discipline is likely to have discovered that the outsider correctly perceives the sign of the correlation but grossly overestimates its magnitude. Behavioral scientists without knowledge of the research results often guess that the correlation is around -.3 to -.4 or higher, whereas the values reported in the literature are much smaller -- nearly always less than .2 and often near 0. Similarly, lay persons appear to overestimate the individual-level association between poverty, unemployment, or race and crime to a remarkable degree although they usually can not index their estimates by guessing the size of a correlation coefficient. Why are these associations overestimated?

One possible explanation is that these outsiders have been unable to escape popular treatments of crime -- sometimes written by criminologists or kindred souls -- that offer class-based theories of crime or that suggest that poverty or unemployment would naturally provoke criminal behavior either out of frustration or necessity. These theories are sometimes bolstered

by the presentation of aggregate-level correlations that are large in absolute value.

Another possibility is that these lay persons move between rural areas, suburbs, business districts, and slums and make personal observations -- and that they watch the evening news on television. Crime rates are generally higher in densely populated inner city areas with cheap, deteriorated housing than in more sparsely populated areas with expensive housing, and the higher population density combines with higher rates to make the quantity of crime even more obviously centered in the high crime areas. The stereotypes thus developed of the places with relatively high crime rates are then generalized to the guesses about the correlation between crime and social class at the individual level. I suspect that often enough this stereotype extends to generalizations about the general lack of moral virtue of the inhabitants of the dense, deteriorated neighborhoods. The stereotype also seems to lead to fear of specific persons who match the stereotype as well as to fear of the places where the quantity of crime is high. In short, outsiders and a few criminologists from time to time fall prey to the ecological fallacy of interpreting relationships observed for data applying to human aggregates as if they applied to individuals.

Our understanding of crime would be facilitated by clear accounts of the ways crime rates are distributed among social areas on the one hand and of the ways criminal behavior is distributed among individuals within social areas on the other. And understanding would be enhanced if we knew how the characteristics of social areas influence the risk of criminal behavior for the persons who inhabit them, if they do influence individual behavior.

Denise Gottfredson, Rich McNeil, and I are examining self-reported data from about 5000 individual adolescents obtained from surveys in 20 schools together with census data pertaining to the areas in which these individuals resided to explore the distribution of delinquent behavior both between and within social areas. We are still in the midst of grappling with these data, but in today's symposium we will provide you with a progress report. I will start by describing two research traditions in criminology -- ecological and individual level studies -- and by explaining the theoretical rationale for our investigation.(1> I will also describe our approach to the

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(1>A third tradition, sometimes identified by the label "environmental criminology" involves the study of the locations where crime occurs. This research tradition is illustrated by the work of Brantingham and Brantingham (1981), Jeffrey (1971), and Newman (1972). This tradition contrasts with our focus on the distribution of people who engage in

statistical modeling problem. Then I will provide you with an overview of the between school and within school variation in delinquent behavior and show you some between school correlates of levels of delinquent behavior. Denise Gottfredson will then describe results pertaining to individuals that include estimates of the influence of community characteristics on delinquent behavior and of the ways those influences may operate.

ECOLOGICAL RESEARCH AND THE CORRELATES OF CRIME RATES

Quetelet (1842/1968), an early pioneer in the scientific study of human behavior, mapped out the relation of crime rates to the characteristics of social areas in France in the mid 1800's. More recent and better known examples of research revealing systematic relations between social areas and crime rates are provided by Shaw and McKay (1969) who showed how crime rates show systematic patterns among areas in cities. Similar patterns are found in many cities and for a variety of different

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offenses, wherever those offenses are committed. Although the environmental criminology perspective is relevant in the sense that people who reside in and primarily experience well-defended environments may learn to avoid crime, when restricted to this sense the environmental perspective seems to merge with the social disorganization perspective -- the primary remaining distinction being the focus on offense location rather than offender residence data. The distribution of offense locations is outside the scope of our investigation. We are primarily concerned with the socialization of individuals.

specific kinds of misconduct.

Subsequent research has usually provided evidence of strong associations between community characteristics and crime or victimization rates (Block, 1979; Harries, 1976; Pope, 1978). Block, for example, reported high correlations at the census tract level between log robbery rates and percentage high school graduates (-.54), percentage of families at 75% of the poverty level or below (.46), and percentage of families headed by females (.53). Researchers in the human ecological tradition (Shaw and McKay, 1969; White, 1932; Lander, 1954; Bordua, 1958; Gordon, 1967; Chilton & Dussich, 1974; G. Gottfredson & D. Gottfredson, 1985) and social geographers (Jonassen & Peres, 1960; Hadden & Borgatta, 1965; Smith, 1973) have adduced evidence that crime, delinquency, or victimization rates vary in regular ways across social areas.

Recently, Bursik (1986), Shannon (1984), and Schuerman and Kobrin (1986) have contributed more evidence that neighborhood characteristics are related in regular ways to crime rates. For example, Shannon showed continuities in relationships between community characteristics and crime rates over time in Racine, and Schuerman and Kobrin attempted to identify changes in community characteristics associated with changes in crime rates. This recent work is important because it may reveal how high

crime areas can evolve over time. It suggests that crime is perpetuated over time in certain areas, and it suggests a focus on activities that might make communities less conducive to crime.

Social disorganization theorists have suggested some mechanisms through which these variations across social areas come about. One mechanism is a contextual one summarized by the hypothesis that high crime (disorganized) communities do not have control of their inhabitants. An alternative mechanism is a compositional one illustrated by Wilson and Herrnstein's (1985, p. 291) hypothesis that high crime communities recruit and are inhabited by crime-prone people. The distinction between a contextual process and a compositional process is important. A contextual explanation involves the proposition that the ways areas are socially organized exert influences on the individuals who inhabit those areas, whereas a compositional explanation involves the proposition that the aggregate outcomes observed are a result of the aggregate characteristics of the individuals who inhabit the areas. Although most criminologists appear to prefer contextual explanations, direct attempts to determine whether the ecological correlations observed reflect contextual or compositional processes are rare.

The ecological research tradition focuses on rates of

crime in social areas with differing characteristics. But Robinson's (1950) clear account of the "ecological fallacy" warns that an association discovered in data pertaining to social areas may be misleading if interpreted as if it applied to individuals. Individual-level correlations can be zero or opposite in sign of the corresponding ecological correlations. More specifically, a grouping effect occurs when the membership of the ecological unit (e.g., neighborhood or school) is statistically linked with one or both of the variables involved in the correlation. For example, segregation by socioeconomic level among schools produces a larger correlation between SES and academic achievement test means at the school level than is observed at the individual student level. Whereas individual-level correlations between SES and achievement tests are typically around .3, averages for schools in a district may correlate .8 or higher (Cooley, Bond, & Mao, 1981). It is possible that a similar process produces the high and often reproduced correlations between community characteristics and crime rates. Because there is usually considerable homogeneity within areas and substantial heterogeneity between areas on inhabitant characteristics (e.g., socioeconomic status) that are at least modestly correlated with criminal behavior, aggregation would tend to produce high correlations. One aim of our research is to learn whether such a compositional process is all that is

occurring, or whether communities also exert a contextual effect on the behavior of inhabitants.

INDIVIDUAL-LEVEL RESEARCH

The second research tradition has focused on the correlates of adult crime or delinquent behavior, but workers in this tradition have seldom examined the role of neighborhood, community, or school characteristics in causing or restraining against crime. Some of this research is linked to theory, especially research on delinquency (as opposed to the generally less theoretical work on the practical problem of predicting adult recidivism). One perspective relevant to our work is Hirschi's (1969) version of social control theory, which assumes that bonds to the social order (such as attachment to others, belief in the validity of social rules, and commitment) restrain people from engaging in delinquent behavior. Also relevant are perspectives that assume that peers may exert causal influence through a social learning or differential association mechanism (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979), and individual difference perspectives that assume individuals differ in personality or other enduring characteristics that influence learning to restrain one's behavior and gain rewards through conventional channels (Wilson & Herrnstein, 1985; G. Gottfredson,

in press).

From this research tradition has come evidence of a host of individual characteristics known to be statistically associated with delinquent behavior. These include school competency (-), impulsiveness or daring, belief in conventional rules (-), commitment to conventional goals (-), attachment to institutions and adults (-), being male and adolescent, association with delinquent peers, and exposure to harsh or erratic discipline in the family (for evidence or reviews see G. Gottfredson, 1981, 1987, West & Farrington, 1975, and Wilson & Herrnstein, 1985).

PERSONS IN ENVIRONMENTS

Most research on individual criminal behavior makes scant use of environmental formulations. Despite growing recognition of the importance of environments, situations, and person-environment interactions (e.g., Barker, 1968; Epstein & O'Brien, 1985; Holland & G. Gottfredson, 1976; Magnusson & Endler, 1977), and despite repeated calls for greater attention to environmental and situational influences on criminal behavior (Martin, Sechrest, & Redner, 1981; Monahan, 1981; Reiss, 1986; Shah, 1978), little research has investigated the influence of the environment on criminal behavior.(2>

A recent report by S. Gottfredson and Taylor (1984) is provocative because -- although it found no main effect of neighborhood "civility" on the post-release criminal behavior of men released to Baltimore neighborhoods -- it found statistical interactions of unmeasured community characteristics with prior record. Taken at face value, this result suggests that something about the neighborhood influenced the risk of criminal behavior. But it is not clear what that something was or how it operated. The meaning of these provocative results is unclear. The research was limited by the lack of comprehensive data about the neighborhoods, interactions could have arisen for technical reasons relating to the way variables were measured (Birnbaum, 1974), and the mechanism through which environmental influences may have operated was not examined in the research. Most important, prior ecological research would have led to the expectation of a main effect of environment -- a finding that some environments were less restraining than others. This result was not found.

Recently, Mike Cook and I proposed a theory of persons in environments that makes explicit predictions about the ways environments differ in their capacity to restrain individual

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(2>For exceptions see Glaser (1964), S. Gottfredson & Taylor (1984), Reitzes (1955), and Monahan & Klassen (1982).

behavior. The theory predicts that environments that have a high probability of responding to a person's behavior and signal expectations for behavior most clearly are most powerful in regulating a person's behavior. More specifically, we hypothesize that in certain communities, individuals will experience less competent supervision from adults and therefore associate more with delinquent peers, believe less in conventional proscriptions against misconduct, and engage in more delinquent behavior.

Related hypotheses seem to pervade accounts of ways individual behavior might be influenced by reference to the social disorganization tradition. Reiss (1986) discussed mechanisms by which community contextual effects on individual delinquency may operate. For example, in communities characterized by high proportions of children being raised by other than intact natural family units, crime may be more prevalent because the children are less well supervised or because social bonds to parents or school are not so readily developed. In such circumstances, Reiss reasoned, "parental authority and control is replaced by that of peers. . . . The effect of weakened family control is heightened when a strong peer-control system forms an antisocial subculture" (p. 15).

Some hypotheses appear to imply statistical interactions of

community and individuals. For example, Cloward and Ohlin (1960) have suggested that community characteristics determine the particular subcultural solution to blocked opportunities, so that utilitarian crime may evolve in more organized lower class communities whereas violent crime may evolve in disorganized communities.

RESEARCH QUESTIONS

Our research focuses on the following questions:

1. Is there evidence of contextual effects of social organization on the diversity or seriousness of individual criminal behavior net of personal background and other psychosocial characteristics? Put another way, does evidence imply that community characteristics contribute directly to the explanation of criminal behavior? What community characteristics?

2. Is there evidence of contextual effects of social organization on known risk factors for individual criminal behavior? These characteristics include those implied by social control theory (belief, commitment, attachment), self-concept, association with delinquent peers, and supervision by adults. Are data consistent with a hypothesis

that community social organization influences the risk of criminal behavior by influencing these risk factors?

3. Do community characteristics appear to interact with personal characteristics such that certain kinds of persons are more likely to engage in criminal behavior in some kinds of communities than in others? If such interactions appear to be present, can the be accounted for by some plausible misspecification of individual-level models?(3>

(3>An example of how the misspecification of an individual-level model could create the appearance of an interaction of community and individual characteristics may be useful. Suppose it were observed that the within-school regressions of delinquent behavior on school grades varied from school to school, with the slope being steeper for schools in more disorganized communities. Exploration of the data might show that low performing students in disorganized communities are more often placed in self-contained classrooms and exposed to less compensatory instruction or behavioral intervention than low performing students in more organized communities. Including individual-level measures of compensatory instruction or behavioral intervention may make the within school regressions homogeneous. Instances of apparent interactions may also be due to incorrect specification of the the measurement model or functional form of the relation of the individual measures to the underlying hypothetical constructs (Birnbaum, 1974). In both of these examples, improved specification of the individual-level model will produce more informative results than the finding of an interaction. The usual recommendation that educational researchers attempt to model regression slopes as outcome variables in multilevel analyses (Burstein, 1978) is a way of searching for instructional practices that alter the relation between student input and later educational performance. Just as many criminologists hope to find some set of practices or arrangements that would lead to less delinquency for the subset of individuals at highest risk of delinquent behavior, educational researchers often hope to discover a set of practices

ESTIMATION OF COMMUNITY INFLUENCE

Denise Gottfredson will be describing the specific research design, sample, and measures used in our research. I will limit my remarks to a description of the analytic strategy for multilevel data.

The data and our hypotheses are multilevel. They involve data about individuals and about communities, with many individuals inhabiting the same community. These dual levels introduce technical difficulties that are ignored by some researchers but that can lead to misleading statistical conclusions if not attended to. Because community characteristics are the same for all persons inhabiting the same environment, the values for these variables are not independent of each other for persons in an environment. Hence, the common assumption of the most often used statistical procedures (that each observation is independent) is violated, as are assumptions about the independence of error terms. When these problems are ignored by using community-level variables in individual-level

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or arrangements that do away with the link between student pretest scores and posttest scores -- thus producing equal outcomes for students differing in initial achievement or ability. One way of thinking about this search is to view it as a search for individual experiences or exposures that, when added to the individual level model more completely specify the model. See Cooley et al. (1981).

equations (and degrees of freedom appropriate for the individual-level equation) the standard errors are incorrectly estimated.

Our approach has two distinctive features that we believe to be important. First, we intend to decompose the multilevel equation into its individual-level and community-level components, and adjust the estimated effect of each component for the effects of the other. Second, we will adopt the heuristic and simplifying assumption that <u>if</u> the individual-level measurement and structural model is adequately specified community-individual statistical interactions will not be present. This second assumption is equivalent to assuming that statistical interactions are not present and that any interactions which appear should be regarded as signals to seek improved specification of the individual-level model.

The following account illustrates our approach precisely, although necessarily in technical form. These procedures build on work previously applied only in other research areas (Burstein, 1980; Cronbach, 1976), and they are intended to yield more statistically correct estimates of community influence on behavior. I will give a simplified example after first presenting these technical details.

Notation.

Y_{ij}	A vector of criterion (crime) scores for individuals j in communities i.
$Y_{i.}$	A vector of mean criterion (crime) scores for communities i.
$Y_{ij}-Y_{i.}$	A vector of deviations of j individuals' criterion scores from the mean criterion score for each's community.
$Y_{..}-Y_{i.}$	A vector of deviations of i communities' criterion (crime) scores from the grand mean criterion score.
Z_{ki}	A matrix of k predictor scores for i communities.
γ	A vector of k effect parameters for each community predictor score.
τ_i	An error term at the community level.
$X_{m,ij}$	A matrix of m personal characteristics for individuals j in communities i.
β	A vector of m effect parameters for each personal characteristic.
ε_{ij}	An error term at the individual level.
a	An additive constant.
β_w	A vector of effect parameters for the pooled within community regression with community effects removed.
$X_{m,i.}$	A matrix of m mean predictor scores (averaged across all individuals in the community) for i communities.

Equation 1 shows the model for effects of personal and community characteristics on individual criminal behavior.

$$Y_{ij} = a + \gamma' Z_{ki} + \tau_i + \beta' X_{m,ij} + \varepsilon_{ij} \qquad (1)$$

The criterion variable in this equation Y(ij) can be decomposed into two parts, the first being the estimated mean delinquency for all persons in the community, and the second being the

estimated deviation of person j's delinquency score from that mean. The coefficients of equation 1 are therefore estimated in two steps.

First, the effects of personal characteristics adjusted for any community-level effect on criminal behavior is obtained using equation 2. This equation is estimated using deviation scores (i.e., the pooled within-community covariance matrix is used), effectively controlling for sources of variation among communities.

$$Y_{ij} - Y_{i.} = \beta'_w(X_{m,ij} - X_{m,i.}) + \varepsilon_{ij} \qquad (2)$$

Before performing estimates using the pooled within-community covariance matrix, tests for the homogeneity of these matrices -- or tests for the equality of within community regression slopes (Timm, 1975) -- are performed. These are tests for statistical interactions of community with individual characteristics -- for the parallelism of regression lines.

It has become increasingly common in the face of statistical interactions in hierarchical models to succumb to the temptation to model the variability in regression slopes. One context for such modeling is the search for educational environments that have an "equalizing" effect -- reducing the relationship between socioeconomic status and academic achievement, for example.

Raudenbush and Bryk (1986) have recently proposed a systematic approach to modeling regression slopes that holds promise of being more efficient than earlier methods (Burstein, 1980). In general terms, a problem with the slopes-as-dependent-variables approach is that the sampling variability of estimated slopes tends to be large, making statistical tests for significant predictors inefficient.

Our approach eschews attempts to model variability in regression coefficients and instead seeks to eliminate heterogeneity of regression by seeking appropriate measurement and structural model specifications for the within ecological unit regression. This approach has the virtue of challenging the researcher to specify as fully as possible how the individual-level process operates and then to ask questions about how a higher-level variable may influence variables in the individual-level model. Nevertheless, it is possible that statistical interactions of community with individual characteristics can not be eliminated by model specifications for within ecological unit processes. Such an outcome would require that estimates of a pooled within community process not be made but instead that substantive interpretations of the interactions be sought, however speculative such interpretations may be.

Second, community-level effects are estimated using

equation 3, adjusting for the individual-level effects estimated in the first step. This equation is estimated using the community as the unit of analysis; it produces estimates of the effects of community characteristics on delinquency adjusted for the estimated effects of the individuals who inhabit that community.

$$Y_{i.} - \beta_w' X_{m,i.} = a + \gamma' Z_{ki} + \tau_i \qquad (3)$$

It has become painfully evident that trade-offs are required in implementing this multilevel research strategy. These trade-offs involve the desire to examine small social areas on the one hand, and the need for adequate numbers of individuals in each area to produce dependable area statistics on the other. Denise Gottfredson will shortly present information implying that for very small ecological units we usually have too few individuals to make meaningful analyses employing the foregoing strategy. More specifically, census block-group units usually contain too few cases to implement this strategy and so Denise will describe results that do not implement this model. In contrast, aggregation at the school level results (for our sample) in a relatively small number of ecological units making the estimation of ecological level models a questionable undertaking. We are exploring strategies for clustering contiguous block-groups with similar patterns of community

characteristics to result in a compromise level of community analysis.

BETWEEN AND WITHIN COMMUNITY VARIANCE IN DELINQUENT BEHAVIOR

Before closing, I wish to make one more observation on an interesting phenomenon relating to analyses of data at the individual and aggregate levels. The school is plausibly the most defensible ecological unit to examine when pondering social organizational effects on delinquent behavior. This is so because of the central role of this institution in the day-to-day life of adolescents outside of their families. I will illustrate this interesting phenomenon using the school as a unit of analysis despite the small number (20) of schools available in the data file we are currently examining.

Researchers in the ecological tradition commonly examine patterns of covariation among variables measured at or aggregated to the level of the ecological unit under observation. Usually, this is done without raising questions about the proportion of variance in delinquent behavior that lies between versus within ecological units. In the sample we are examining, a relatively small proportion of the variance in several distinct delinquency measures is between schools as Table 1 shows. Most of the variance is within schools. The proportion of variance between

schools is somewhat larger for measures of interpersonal aggression and drug involvement than for theft and vandalism.

The small proportion of variance between schools does not, however, imply that ecological correlations with aggregated personal characteristics or census data aggregated at the school level will be small. As Table 2 shows, these correlations can be quite high. This phenomenon leads to the sobering observation that seemingly quite strong ecological correlations can be of limited value in explaining the vast majority of variability in individual delinquency.

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Table 1

Within and Between School Variance in Delinquent Behavior

Criterion variable	% within	% between
All cases (Minimum pairwise n = 4581)		
Total delinquency	97.2	2.8
Interpersonal aggression	95.2	4.8
Theft and vandalism	98.7	1.3
Drug involvement	96.5	3.5
Males (Minimum pairwise n = 2116)		
Total delinquency	97.8	2.2
Interpersonal aggression	95.5	4.5
Theft and vandalism	98.4	1.6
Drug involvement	96.4	3.6
Females (Minimum pairwise n = 2432)		
Total delinquency	94.9	5.1
Interpersonal aggression	93.2	6.8
Theft and vandalism	97.7	2.3
Drug involvement	94.4	5.6

Note. Twenty schools. Within school variance includes variance due to measurement error, but the delinquency scales have moderate to high internal consistency coefficients.

Table 2

Ecological Correlations: Community and Compositional Variables and Three Measures of Male Delinquent Behavior

	Drug involvement	Interpers. aggression	Theft and vandalism
	Males		
Community factors			
Disorganization	-17	21	-12
Affluence and education	08	34	43
Percentage			
Black	-14	22	-19
Hispanic	-16	-57**	-32
Mean			
Age	54*	-50*	-19
Parental education	00	60**	43
Attachment to parents	-68**	-01	-26
Parental supervision	-62**	-48*	-58**
Negative peer influence	64**	58**	78**
Commitment to goals	-47*	03	-15
Attachment to school	-20	-40	-44
Variety of involvement	-25	06	-13
Belief	-24	-45*	-43
Drug involvement	--	25	50*
Interpersonal aggression	25	--	74**
Theft and vandalism	50*	74**	--
	Females		
Community factors			
Disorganization	-25	07	-31
Affluence and education	48*	28	50*
Percentage			
Black	-38	05	-39
Hispanic	-18	-44	-22
Mean			
Age	25	-56**	-23
Parental education	07	42	27
Attachment to parents	-72**	-08	-38
Parental supervision	-58**	-26	-25
Negative peer influence	62**	47*	55*
Commitment to goals	-22	-29	-08
Attachment to school	-70**	-54*	-46*
Variety of involvement	-20	02	17
Belief	02	-23	08
Drug involvement	--	40	72**
Interpersonal aggression	40	--	54*
Theft and vandalism	72**	54*	--

Note. Twenty schools. Decimals omitted.

* $p < .05$ ** $p < .01$