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An Examination of Neighborhood Context  
and Risk for Youth Violence

by

Todd Ian Herrenkohl

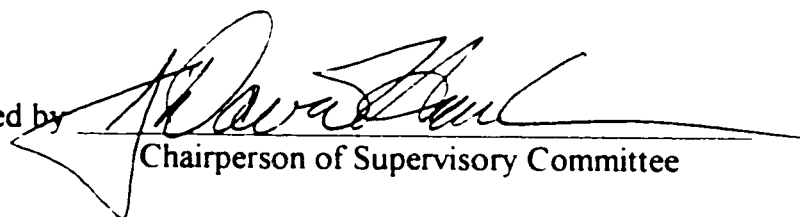
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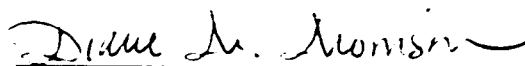
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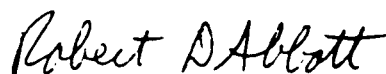
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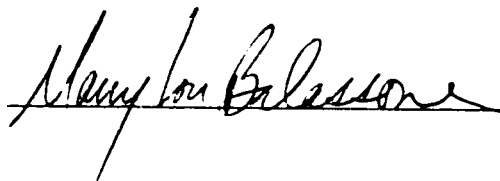
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### **Doctoral Dissertation**

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Abstract

An Examination of Neighborhood Context  
and Risk for Youth Violence

by Todd Ian Herrenkohl

Chairperson of the Supervisory Committee  
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Analyses combined measures from the 1990 census for Seattle with data from the Seattle Social Development Project (SSDP), a developmental longitudinal study of health-risk behaviors among urban youths. In the first set of analyses, multi-level models were constructed using the HLM program of Bryk, Raudenbush, & Congdon (1996). These models addressed the nested structure of individuals within neighborhoods (defined by block groups) and examined relationships between context measures derived from the 1990 census and individual-level outcomes. In the second set of analyses, standard logistic regression models were used to examine relationships between risk factor constructs and violence outcome measures.

Results from the multi-level regression models revealed that youths' perceptions of neighborhood disorganization and attachment to neighborhoods varied between block group areas and that variation was associated with levels of neighborhood disadvantage, measured by the 1990 census. Residential stability, a second census measure, was also related to youths' levels of attachment to their neighborhoods. Further, analyses showed that neighborhood disadvantage may be related to gang involvement and violence during adolescence.

Logistic regressions were used to estimate the prediction of violence (at ages 15, 16, and 18) using risk factor variables, all from youth-reports, representing the neighborhood, family, school, and peer domains. On the basis of theory, variables were entered hierarchically by blocks according to their domain of influence. An examination of the overall contribution of each domain to the prediction of violence and the unique effect of each risk factor was carried out. Analyses revealed that in all three hierarchical regressions (i.e. for violence at each age) each block contributed significantly to the overall prediction of violence. It was also determined that variables with unique effects were similar for violence at ages 15 and 16. Similarity between models was less apparent for violence at age 18. Generally, relationships between risk factors and violence at ages 16 and 18 remained consistent after controlling for violence at age 15. Implications of these findings for preventive interventions are discussed.

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To Leslie for her love and support

## CHAPTER 1 ETIOLOGY AND PREVENTION OF YOUTH VIOLENCE

### Introduction

This dissertation focuses on the etiology and prevention of youth violence. Data for the study described in Chapters 2-4 were collected as part of the Seattle Social Development Project (SSDP), a longitudinal study of urban youths in Seattle. Data were also collected from the 1990 national census of Seattle in order to examine neighborhood influences on violence.

To advance knowledge about the etiology of youth violence, and thereby improve the foundation for prevention, it is important to explore the interrelationships among risk factors in the onset and maintenance of violent behavior using testable theories. The study that is presented here builds on findings from recent literature reviews and from earlier analyses of data from SSDP to advance knowledge about processes of socialization that promote violence among adolescents. The study adds to research by 1) addressing violence as a focal outcome rather than as a component of a composite measure of antisocial behavior, 2) considering a theoretical framework that links together key risk factors related to neighborhoods, families, schools, and peer groups, 3) exploring, specifically, the effects of neighborhood context on violent behavior, and 4) assessing the strength of risk factors in multivariate models.

Chapter 1 begins with background information on the scope of the youth violence problem in the United States and addresses current thinking about strategies to reduce the incidence and prevalence of violent crimes, underscoring the importance of prevention.

Different prevention approaches are briefly described, as are pertinent findings in the research literature about risk factors for youth violence. A review of several theories relevant to the etiology of youth violence is also included in Chapter 1 to set a foundation for the study and analyses described in later chapters. A conceptual model based on these theories is presented at the end of Chapter 1. Chapter 2 introduces the methods for the study. An overview of the design of the study, sample, measures, and analytic techniques are presented in Chapter 2. Chapters 3 and 4 describe the analyses that were carried out and their results. Chapter 3 presents a set of multi-level regression models involving neighborhood and youth-report variables. These analyses aim to determine whether risk factors for youth violence (and the actual occurrence of violent acts) vary between neighborhoods and whether variation is associated with levels of disadvantage and residential stability in neighborhoods, measured by the 1990 census. Chapter 4 presents a set of logistic regression models involving many of the same youth-report variables and violence outcome measures identified in Chapter 3. These analyses seek to isolate risk factors for violence that are most salient during adolescence by analyzing variables in hierarchical regression models. In these models, risk factors are grouped by domain (neighborhood, family, school, and peer) and entered sequentially, according to theory. Chapter 5 concludes the dissertation with a discussion of implications for preventive intervention programs. In that discussion, a review of promising prevention approaches and examples of effective programs is provided.

## Background

The United States experiences higher levels of violence than other industrialized countries (Kelley, Huizinga, Thornberry, & Loeber, 1997; Howell, 1997). The number of crimes involving lethal violence has increased in recent decades, with homicides now being classified as a leading cause of death in this country (Howell, 1997). This trend has caused much concern among policy-makers, spurring action to develop promising crime reduction strategies. In addition to considering harsher penalties for law violators, increasing attention has been given to prevention (Howell, 1997). Effective prevention programs are built upon a thorough understanding of the etiology of violence. This dissertation concentrates on youth violence- violence perpetrated by individuals under age 18. Violence is defined broadly as an any act that involves serious harm, or threats of harm, to another person.

## Violence among Youths in the United States

National arrest and victimization records reveal that violent crimes involve adolescents and young adults disproportionately (Lowry, Sleet, Duncan, Powell, & Kolbe, 1995; Snyder, 1996). The number of youths who committed violent acts resulting in arrest increased markedly from 1986 to 1995 (Maguire & Pastore, 1995; Snyder, 1998, 1996). During those years, youth arrests increased by 90% for murder and nonnegligent manslaughter, by 78% for aggravated assault, and by 63% for robbery (Kelley et al.,

1997). In 1995 and 1996, the number of arrests for youths declined slightly, but remained well above numbers registered in the late 1980s and early 1990s (Snyder, 1998; 1996).

This trend involved arrests for murder, aggravated assault, robbery, and rape, crimes typically classified as index offenses by law enforcement agencies. An illustrative example of the general trend in arrests for index crimes among youths is provided in Figure 1.1.

This figure shows the numbers of arrests for pre-adolescent males and females from 1980 through 1996

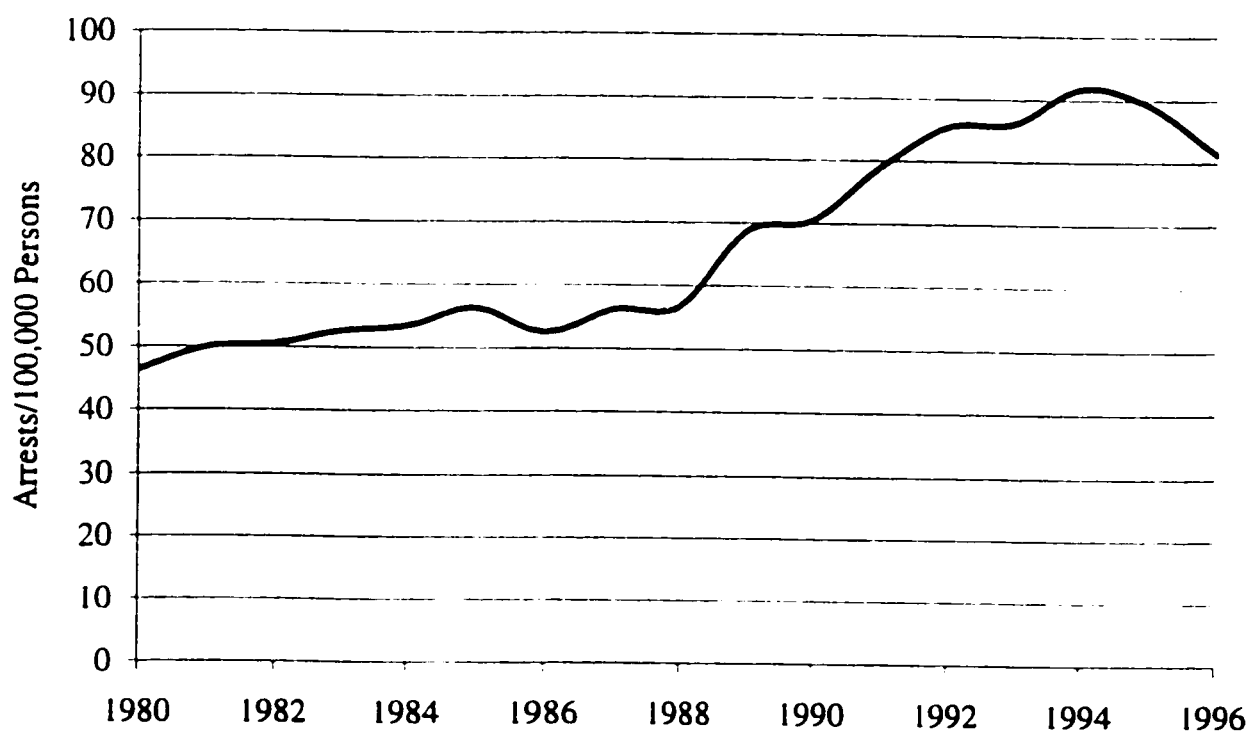


Figure 1.1. Violent Crime Index Arrest Rate Trends for 10 to 12 Year Olds (Snyder, 1998).

Not only are young people more likely to perpetrate violent crimes, they are also more likely to be victimized by violence. In the U.S., murders involving victims under age 18 increased by 82% from 1984 through 1994 (Kelley et al., 1997). For adolescents and young adults, deaths resulting from violence now occur with relative frequency. In fact, for African-American males in their late-teens and 20s, homicides are responsible for more deaths than other causes (Lowry et al., 1995). A large proportion of these crimes are carried out with the use of handguns (Kelley et al., 1997), which have become widely accessible to individuals of all ages (Howell, Krisberg, & Jones, 1995; Webster, Gainer, & Champion, 1993). Violent crimes most often occur between individuals of the same race and frequently involve individuals known to one another (Spivak, Hausman, & Prothrow-Stith, 1989; Lowry et al., 1995).

As the above figures suggest, youth violence is a significant public health problem in this country. By some estimates, the extent of the problem has yet to be fully recognized due to under-reporting and inaccuracies in record keeping (Hammond & Yung, 1993). The monetary costs of violent crimes are tremendous (Miller, Cohen, & Rossman, 1993; Spivak et al., 1989), as are the psychological and social costs. Developing effective strategies for reducing the incidence and prevalence of violence in American society requires coordination at the local, state, and national levels. The overarching objective of this dissertation is to provide information that can be used to increase public awareness, motivate action, and guide the design of prevention strategies to curb youth violence.

## Reducing Youth Violence

There are various approaches for reducing serious violent offenses committed by youths. One approach focuses exclusively on deterring violent crimes by threatening action by the police and by imposing harsh penalties on perpetrators (Tonry & Farrington, 1995). Proponents of a "get-tough" on crime strategy argue that individuals will be less likely to violate formal laws when they know that they will be apprehended and punished.

A second, not necessarily mutually exclusive approach, focuses on reducing violent crimes by rehabilitating offenders once they have been apprehended. This strategy operates from the premise that individuals who commit one serious violent act are likely to commit others. Thus, in theory, criminal violence can be lessened by sensitizing perpetrators to the suffering of victims and by helping them develop skills necessary to avoid situations where violence can occur. Programs involving rehabilitation include institutional and community-based treatment programs for adjudicated delinquents (see discussion in Howell & Hawkins, 1997).

A third crime reduction approach focuses on identifying and ameliorating factors that increase risk for violence before serious crimes occur. Thus, the goal is preventive intervention. Ultimately, prevention programs aim to produce individual, as well as social and contextual changes, that foster positive development for youths. Prevention programs may also focus on improving public safety and changing the opportunity structure in neighborhoods in which violence is prevalent. Many prevention programs have been developed and tested in recent years. A few have demonstrated effects in lowering the

incidence and prevalence of serious violent offenses (Brewer, Hawkins, Catalano, & Neckerman, 1995; Hawkins & Howell, 1997; Wasserman & Miller, 1998). Many have produced intermediate gains hypothesized to lower risk for youth violence (see Brewer et al., 1995; Hawkins & Howell, 1997; Wasserman & Miller, 1998).

In the following section, different prevention strategies will be discussed.

Attention is then given to risk and protective factors for youth violence as potential foci for prevention programs

### Prevention Strategies

Tonry and Farrington (1995) suggest that there are three (potentially overlapping) approaches for preventing antisocial behavior among youths. They include developmental prevention, community prevention, and situational prevention. Developmental prevention focuses on aspects of children's socialization that increase or decrease their potential to engage in violence (and other forms of antisocial behavior). An example of a developmental prevention program is a service designed to enhance parenting practices so as to strengthen parent-child bonds and promote effective monitoring and discipline of children's misbehavior (Brewer et al., 1995). Community prevention focuses on social and environmental conditions associated with the broader ecological contexts in which families operate. An example of this approach is a program designed to improve cohesion among neighborhood residents as a means for strengthening informal social control networks and building supports for parents (see related discussion in Sampson, 1994). Situational

prevention focuses on reducing opportunities for violence. A program of this kind might involve installing lights in public places and promoting safety awareness, such as walking in pairs after dark. As Tonry & Farrington (1995) suggest, comprehensive crime prevention packages would optimally include services in each of these areas. Findings derived from analyses carried out in this study are applicable to each of these prevention approaches, although primary attention is given to the underpinnings of developmental prevention.

#### Examining Predictors of Youth Violence

In order to prevent youth violence, it is necessary to learn about potential causes. This requires empirical examination of risk and protective factors, referred to more generally as "predictors." As defined by Coie, Watt, West et al (1993), "risk factors are variables associated with a high probability of onset, greater severity, and longer duration" (p 1013) of a disorder or form of antisocial behavior, such as violence. Protective factors, on the other hand, have a less defined relationship with a given disorder or pattern of behavior, but act in some capacity to lower risk of onset, severity, and duration of that outcome.

Risk factors for violence may be malleable (i.e., potentially changeable), such as poor family management and academic failure. They may also be non-malleable (i.e., unchangeable), such as male gender. Preventive interventions focus on ameliorating risk factors that are malleable, while building protection against risk factors that are non-

malleable to improve development.

## Risk Factors

Researchers have made considerable progress toward identifying risk factors for antisocial behavior, generally. Recent attention has focused more intensively on risk factors for violence given upward trends in violent crime arrests among youths (see reviews by Farrington, 1997, Hawkins, Herrenkohl, Farrington, & Brewer, 1998; Lipsey & Derzon, 1998; Reiss & Roth, 1993; Sampson & Lauritsen, 1994). Reviews of the literature indicate that certain biological and psychological characteristics of individuals predict violent behavior, and, therefore, are potential risk factors. Risk factors are also related to children's socialization in families, schools, and peer groups.

This dissertation study investigates risk factors identified in the research literature and examined in earlier analyses of SSDP data (see Herrenkohl, Maguin, Hill, Hawkins, Abbott, & Catalano, 1998). Although biological and psychological risk factors are important to consider in designing prevention programs, the primary foci of the present study are risk factors associated with neighborhoods, families, schools, and peer groups.

Findings from existing research on risk factors relevant to the present study are presented below. Unless otherwise stated, findings involving the SSDP data refer to those reported by Herrenkohl et al. (1998).

**Neighborhood Disadvantage:** Research has established a relationship between structural conditions in neighborhoods and rates of violent crimes (Sampson & Lauritsen, 1994). Yet, little is known about how these structural conditions are mediated in the development of individual violence (Loeber & Wikstrom, 1993). Only recently has attention been focused exclusively on this issue (see Elliott, Wilson, Huizinga, Sampson, A. Elliott, & Rankin, 1996, Furstenberg, 1993, Sampson, 1997, Sampson, Raudenbush, & Earls, 1997). Many studies have examined childhood exposure to family poverty as a proxy for environmental risk (Hawkins et al., 1998). Findings from these studies are consistent—children raised in poor families are more at-risk for violence than children raised in relatively affluent families (Elliott, Huizinga, & Menard, 1989; Farrington, 1989, 1991; Wikstrom, 1985). A few studies (see example in Elliott et al., 1989 and review by Farrington, 1997) have linked urban living to criminal violence, but failed to isolate neighborhood characteristics that directly influence violent behavior. In recent analyses of SSDP data, the relationship between youths' reports of neighborhood disorganization and their violent behavior was considered. We found that neighborhood disorganization (measured at ages 14 and 16) was a strong predictor of later violence. The odds for violence at age 18 for youths who lived in areas characterized by run down housing, crime, poverty, drug selling, gangs, and undesirable neighbors were significantly greater than for the remainder of the sample.

In the present study, as a methodological objective, the validity of youth-report data for studying neighborhood context is examined. The study also includes analyses of the effect of neighborhood context on risk factors for violence (and occurrence of

violence) for youths in SSDP. The relevance of these objectives to the research literature is described in detail with reference to research questions presented later.

**Poor Family Functioning** The extent to which families provide a safe and nurturing environment for children has a strong influence on their psychological adjustment and behavior (Capaldi & Patterson, 1996, Hawkins, et al., 1992, Patterson et al., 1989; Yoshikawa, 1994). Poor family management, which involves parents' failure to set clear expectations for children's conduct and poor supervision practices, is a consistent predictor of antisocial behavior, including violence, across studies (Farrington, 1989, 1997, Wells & Rankin, 1988). Highly punitive and abusive discipline also predicts later violence (Widom, 1989, Widom & Ames, 1994), as does family conflict (Farrington, 1989; McCord, 1979) and violence among family members (Elliott, 1994; Farrington, 1991, McCord, 1988). Poor family management and family conflict (measured as separate constructs) predicted violence among youths in previous analyses of SSDP data. Youths who were poorly supervised by their parents at ages 14 and 16, for example, were more likely to commit violent acts at age 18 than others. According to social control theory, the influence of poor family functioning on youths' misconduct is reflected in weak family bonds (Catalano & Hawkins, 1996, Hirschi, 1969). Weak bonds between parents and children increase children's vulnerability to negative social influences outside of the home.

**Poor Academic Achievement and Weak Commitment to School:** A link between academic failure and antisocial behavior other than violence is well-established (Hawkins, et al., 1992; Maguin & Loeber, 1996; Yoshikawa, 1994). In previous analyses of SSDP data, academic failure from an early age predicted violence in adolescence. In the Seattle sample, low academic achievement at ages 10, 14 and 16, measured by standardized test scores and youth-reported grades, predicted violence at age 18. Weak bonds to school, which are reflected in a child's lack of commitment to educational tasks and enthusiasm towards school, also predicted violent behavior among SSDP participants (Williams, 1994)

**Involvement with Delinquent Peers** Involvement with delinquent peers is strongly related to youth violence (Battin, Hill, Abbott, Catalano, & Hawkins, 1998; Elliott & Menard, 1996; Farrington, 1989; Lipsey & Derzon, 1998; Thornberry, Krohn, Lizotte, & Chard-Wierschem, 1993; Williams, 1994). Association with peers in a gang context may have a particularly pronounced effect on risk for violence during a youth's time of involvement (Battin et al., 1998; Hill, Hawkins, Catalano, Kosterman, Abbott, & Edwards, 1996). Having delinquent peers at ages 10, 14, and 16 strongly increased the likelihood of violence at age 18 for youths in SSDP. Being involved in a gang also increased the likelihood a youth engaged in violence. The odds for violence among youths who reported they belonged to gangs at age 14 were three times greater than the odds for other youths in the SSDP sample. The odds for violence at age 18 of youths involved in gangs at age 16 were more than four times greater than for others in the sample.

## Protective Factors

Although the present study does not focus on protective factors per se, it is important to emphasize their relevance to the etiology of violent behavior and the design of preventive interventions.

Researchers have identified factors that positively influence children's development by counteracting the influence of risk exposure (Farrington, 1994; Hawkins, et al., 1992; Reiss & Roth, 1993; Rutter, 1985; Jessor, 1991). Resiliency studies have shown that many youths exposed to multiple risk factors do not engage in antisocial behavior (Catalano, Arthur, Hawkins, Berglund, & Olsen, 1998), suggesting that resistance to negative influences may be facilitated through preventive intervention. Knowledge of protective factors is particularly important for combatting the effects of risk factors that are not malleable (Farrington, 1997; Hawkins et al., 1992). As Farrington (1994) notes, protective factors can take on different forms and relationships to risk factors. A protective factor may represent the opposite of a risk factor on a given variable. The example given by Farrington (1994) is intelligence. Low intelligence may increase an individual's risk for antisocial behavior, such as violence, while high intelligence may be associated with lower risk. A protective factor may also "be free-standing with no corresponding, symmetrically-opposite risk factor" (Farrington, 1994, p. 2). For example, being involved in sports or extracurricular activities after school may provide structure as well as opportunities for involvement with prosocial peers, acting to protect youths from risks associated with exposure to delinquent peers and inadequate supervision in after-

school hours. Yet, alone, not participating in sports activities does not lead to increased risk for violent behavior. Finally, a protective factor may be defined on the basis of its interaction with a risk factor and measured by its potential to moderate or mediate that risk factor's effect. For example, a child with a learning disability may be at-risk for behavior problems due to greater potential for school failure and dropout. If that child is from a family of well educated and financially-secure parents, he or she is likely to be provided with resources and social supports that markedly improve academic potential. Thus, family socioeconomic status, in this case, may act as a protective factor against vulnerability associated with being learning disabled.

Research addressing protective factors has been slower to develop than research on risk factors. Devoting additional attention to research in this area is necessary to advance knowledge of the etiology of youth violence and improve the efficacy of prevention programs.

### Review of Relevant Theories

In order to put empirical findings to use in the prevention of youth violence, it is necessary to link them using theory. Theories articulate how risk and protective factors exert their influence on behavior, specifying targets for intervention. This section reviews theories relevant to the etiology of youth violence. A description of the conceptual model guiding the present study follows this review. The theories presented below speak to potential causes of violence (and antisocial behavior more generally) at the neighborhood

(community) and individual levels.

Social disorganization theory and structural strain theory, discussed first, seek to explain the ecology of violent and non-violent crimes. These theories do not aim to address determinants of individual behavior, but instead focus on environmental conditions that promote crime rate differences at the community level (Sampson & Wilson, 1995). Nonetheless, they are useful for thinking about how the structure of neighborhoods may influence social processes that promote violence among individuals. Although some attempts have been made to study neighborhood effects on individual-level outcomes (see Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Elliott et al., 1996; Garbarino, 1992; Loeber & Wikstrom, 1993), more cross-level studies are needed. Below, the conceptual and empirical foundations of five primary theories are addressed: social disorganization theory, structural strain theory, social control theory, differential association theory, and social learning theory.

### **Social Disorganization Theory**

According to the tenets of social disorganization theory, crime rates differ across neighborhoods according to structural arrangements "that facilitate or inhibit social control" (Sampson, 1994). The theory hypothesizes that when norms for prosocial behavior fail to be reinforced by residents, individuals will be less likely to conform to prosocial standards. Because impoverished inner-city neighborhoods experience high residential turnover and anonymity among residents, the collective promotion and

reinforcement of social norms and the regulation of neighborhood functions through informal social control networks is impaired. Widespread nonconformity resulting from lax controls further weakens community integration. As Traub & Little (1994) note, "social organization (social order) exists when behavioral regularity and social organization bind the individuals and institutions in a society closely together. When consensus concerning values and norms is upset and traditional rules no longer apply, conflict, social disorganization, and the volume of deviance are all apt to increase" (p. 54).

Research on social disorganization theory can be traced to work beginning outside of the United States prior to the twentieth century (Bursik & Grasmick, 1995). However, Shaw and McKay (1942) are credited with developing this area of study in the United States (Bursik & Grasmick, 1995, Sampson & Lauritsen, 1994). Shaw & McKay considered the extent to which youth offender rates varied by neighborhoods in the city of Chicago. They found that crime rates were highest and most persistent in deteriorated areas closest to the city's center and lowest in its outskirts (Shaw & McKay, 1942, Bursik & Grasmick, 1995). Through their research, Shaw & McKay concluded that neighborhoods with high crime rates were most often characterized by economic deprivation, high residential mobility, and ethnic heterogeneity. They surmised that these factors together contributed to the social disorganization of neighborhoods, which, in turn, lowered social control. Studies that followed Shaw & McKay's formative work have tended to support their findings (Messner & Tardiff, 1986; Patterson, 1991, Sampson, 1987, 1994, 1997, Sampson & Lauritsen, 1994; Sampson et al., 1997).

Recently, Sampson et al (1997) examined the relationship between social and economic disadvantage in neighborhoods in the Chicago area and level of collective efficacy (cohesion and informal control) among residents, as a mediating factor in predicting violent crimes. Their measures of neighborhood disadvantage were based on census data, while their measures of collective efficacy were based on reports from neighborhood residents. They found that neighborhood disadvantage predicted the occurrence of violent crimes, supporting earlier research findings. They also found that the level of collective efficacy reported by residents partially mediated the influence of neighborhood disadvantage on violence. They concluded that low collective efficacy is a consequence of social disorganization and concentrated poverty that contributes to a greater likelihood for violence within neighborhoods.

In another recent study, Elliott et al (1996) examined relationships between neighborhood context, neighborhood social processes, and developmental outcomes (and patterns of behavior) for youths. Outcomes were analyzed at the neighborhood and individual levels. The study examined the extent to which levels of informal control exerted by neighborhood residents, residents' involvement in informal social networks, and social integration mediated the effect of neighborhood disadvantage on youths' prosocial competence, involvement with conventional friends, and antisocial behavior. Data were collected in two sites, Denver and Chicago. Using methods similar to Sampson and his colleagues, Elliott et al. (1996) combined census data and reports from neighborhood residents in order to obtain measures of neighborhood composition and functioning. The researchers found significant mediated effects of neighborhood disadvantage on

developmental outcomes, particularly when outcomes were assessed at the neighborhood level. Less definitive results were obtained for outcomes examined at the individual level, but a similar trend in the findings was observed. Findings varied somewhat between the Denver and Chicago sites, leading the researchers to speculate that differences in sampling may have influenced their results.

The findings of these recent studies are noteworthy given the dearth of information in the research literature about neighborhood context and mediational processes supporting or inhibiting antisocial behavior (and violence specifically). The study carried out for this dissertation contributes to knowledge by examining potential mediators of neighborhood disorganization related to families, schools, and peer groups, in the development of youth violence.

### **Structural Strain Theory**

Structural strain theory focuses primarily on the extent to which economic and social inequalities influence crime rates apart from absolute poverty or social disorganization. The theory holds that the commission of violent and non-violent crimes involve "adaptive responses to the strain of incongruence between a person's internalization of culturally defined success goals and his or her culturally approved means for achieving those goals" (Tittle, 1995, p. 4). According to traditional strain theorists (Merton, 1938; Cloward & Ohlin, 1960), all individuals have similar aspirations for success. However, some, typically those with limited resources, are more likely to violate

laws because they have relatively few opportunities to advance their education, receive vocational training, and sustain employment. Threatened by the possibility of remaining marginalized from mainstream society, individuals resort to alternative, often illicit, means to improve their status (Agnew, 1985). Antisocial patterns are supported within criminal subcultures that provide opportunities and rewards for negative behavior.

Researchers interested in structural strain theory have studied the effects of income inequality on violence at the neighborhood level. For example, Messner and Tardiff (1986), proposing that there are often large discrepancies in the financial status of families within a given neighborhood, examined the relationship between income inequality and homicides in 26 neighborhoods of Manhattan. They found that income inequality had no unique effect on total numbers of crimes committed. In contrast, the overall level of poverty in neighborhoods predicted variation in homicide rates. In conclusion, the researchers suggest that their analysis may have been too narrow to capture the effect of strain on violent crime rates. They propose that perceptions of relative deprivation may involve individuals' experiences in the larger society rather than within particular residential areas.

Scholars interested in violence among African-American and other minority youths suggest that broad societal imbalances are, in fact, responsible for differences in levels of crimes between races. They propose that criminal behavior stems from the oppression of minority groups in the United States. For African-Americans in particular, perceptions of relative deprivation are intertwined with racial discrimination and social stratification (Blake & Darling, 1994; Gibbs & Merighi, 1994; Oliver, 1989a, b). As Gibbs & Merighi

(1994) point out, African-American males continue to face "nearly insurmountable barriers to success through traditional avenues of business, the professions and government service" (p.64), which has resulted in their turning to "alternative avenues" to improve their social standing and affirm masculine roles. A shortage of education and employment opportunities limit upward social mobility. However, as Oliver (1989a, b) notes, critics of this perspective argue that it over-predicts the number of African-American youths who commit crimes. In this regard, one would expect to see many more youths violating laws than the relative few who do.

#### *Agnew's (1985) Adaptation of Structural Strain Theory*

In response to the difficulties inherent in operationalizing the theory's focal concepts, structural strain theory has received little empirical validation (Agnew 1985). According to Agnew (1985), several weaknesses in the theory have prevented it from generating support. For example, in contrast to the theory's principles, studies have demonstrated that many individuals who violate laws do not necessarily have high aspirations for success, as would be expected. Rather, both their aspirations for success and their expectations for achieving success are low. Furthermore, the theory fails to provide a rationale for the commission of law-violating acts that involve individuals from more affluent social groups and neglects to explain why antisocial patterns fluctuate rather than remain constant over time.

Agnew's (1985) adaptation of strain theory proposes that antisocial behavior stems not only from blocked opportunities for success, but also from individuals' inability to escape painful and aversive situations. Whereas traditional strain theory proposes that "the individual is walking toward a valued goal and his or her path is blocked," Agnew's incorporation of a pain-avoidance model suggests that antisocial behavior may occur when "the individual is walking away from an aversive situation and his or her path is blocked" (Agnew, 1985, p 154). Aversive situations, as Agnew describes, are experienced by individuals from all social groups. In the same way that structural barriers can promote psychological conflict leading to violence, strain may also be associated with dysfunctional interpersonal relationships. For example, children, distressed by conflict in their relationships with family members and peers may resort to violence as a means of rebellion. Child abuse and neglect involve aversive parent-child interactions that may directly prompt aggression and violent offending (Agnew, 1985, Widom, 1989, Widom & Ames, 1994). Unable to stop others from mistreating them, children may act out violently against their parents and others or run away from home (Agnew, 1989). These responses are precipitated by anger and feelings of helplessness and despair.

Relative to traditional strain theory, Agnew's model characterizes sources of strain more broadly and redefines the motivational structure that underlies antisocial behavior. His perspective also conceptualizes antisocial behavior as a fairly individualized phenomenon, which runs counter to the tenets of the original theory, making them more distinct than complimentary. These distinctions aside, the model does offer a useful framework for understanding how aversive stimuli may promote strain and prompt

maladaptive behavioral responses, including violence.

### **Social Control Theory**

Hirschi's (1969) social control theory proposes that antisocial behavior results from individuals' weak bonds to society (Hirschi, 1969; Krohn, Lanza-Kaduce, & Akers, 1984). The underlying premise of Hirschi's social control theory is that law-violations occur when individuals fail to develop strong attachments to others, when they fail to develop beliefs in, and commitment to, conventional rules, and when they have minimal involvement in activities that promote prosocial values. The theory assumes that individuals are inherently drawn toward nonconformity and obey rules only when there is an established incentive to do so. Bonds to significant others, groups, and institutions that value and uphold prosocial rules and standards that provide individuals' motivation to operate within the bounds of the law. Individuals regulate their behavior in accordance with formal laws, choosing to engage in patterns of conduct that coincide with, rather than challenge, others' expectations. A commitment to the values underlying those expectations, and a belief in their utility, further assures conformity. Hirschi's theory implies that a shared set of norms govern social interactions and that individuals will be more inclined to respect those norms when they recognize that they are advantaged by doing so.

Hirschi's theory has been criticized for its failure to account for antisocial influences on individual patterns of behavior (Elliott, Huizinga, & Ageton, 1985). As

Hirschi originally proposed, delinquent peers, for example, should have negligible effects on individuals' behavior because relationships among antisocial youths are superficial and cold (Hirschi, 1969). Some research has suggested, to the contrary, that the relationship patterns of delinquent and non-delinquent youths are quite similar (Giordano, Cernkovich, & Pugh, 1986). Empirical findings support a strong link between antisocial peer involvement and criminal behavior, including violent offending (Ageton, 1983; Battin, et al., 1997; Elliott, 1994; Elliott & Menard, 1996; Farrington, 1989; Farrington, Loeber, Elliott, Hawkins, Kandel, Klein, McCord, Rowe, & Tremblay, 1990; Keenan, Loeber, Zhang, Stouthamer-Loeber, & VanKammen, 1995; Lipsey & Derzon, 1998). Recent adaptations of Hirschi's model emphasize the importance of antisocial peer influences in the etiology of youth violence (see Catalano & Hawkins, 1996).

In extending Hirschi's (1969) theory to encompass the influence of neighborhood context on the development of antisocial behavior, there is evidence that children reared in impoverished inner-city communities are disadvantaged by fewer opportunities for bonding to prosocial family members, nonfamilial adults, and peers in their neighborhoods and are thus more inclined to defy, rather than respect, laws. Potentially, fathers' absence from many urban families (particularly African-American families) contributes to this dynamic by precluding children from bonding with a second adult family member (see McAdoo, 1993 for a related discussion). Further, because single mothers are often overburdened by work and family responsibilities and receive little community support, they may be less likely to engage in activities with their children that foster strong affectional ties, further undercutting family bonds (McLanahan, 1983; McLanahan &

Sandefur, 1994)

### **Differential Association Theory and Social Learning Theory**

Differential association (Sutherland, 1947, Sutherland & Cressey, 1970) and social learning (Bandura, 1977) theories propose that antisocial behavior is learned through interactions with others in group contexts. While in the company of others who hold beliefs and attitudes (referred to as "definitions" in Sutherland's & Cressey's model) favorable to the violation of laws, individuals will acquire the motivation for committing criminal acts, as well as the skills and techniques for carrying them out (Gorman & White, 1995). Within delinquent peer groups, for example, it is presumed that antisocial behavior is promoted by a network of shared values that legitimizes negative conduct, such as violence, and that individuals are prepared to engage in a wide range of illicit acts.

Sutherland & Cressey (1970) argue that individuals can be exposed to both prosocial and antisocial influences. The potential for individuals to be swayed toward one line of behavior or another is dependent on the "frequency, duration, priority, and intensity" (Sutherland, 1947) of their exposure to prosocial or antisocial groups and individuals (and the messages they send in opposition to, or in support of, the violation of social norms and standards). In describing this dynamic, Tittle (1995) notes that it is the ratio of an individual's exposure to "crime-favorable messages" to his or her exposure to "anti-crime messages" that determines whether that person develops a positive or negative orientation to criminal behavior (p.2).

In order to explain the differences in crime rates at the neighborhood level, Sutherland & Cressey (1970) suggest that certain residential areas will support greater opportunities for antisocial learning. They propose that although most communities are characterized by social groups with orientations toward antisocial behavior as well as prosocial and law-abiding behavior, some areas (presumably inner-city, urban areas) are characterized by a predominance of antisocial groups. The fact that children face limited opportunities for prosocial involvement within these particular communities, while at the same time being provided with frequent opportunities to learn antisocial behaviors, increases the probability of their involvement in crimes. It is from this perspective that Sutherland & Cressey argue that the differential organization (toward or against criminal behavior) of communities, rather than their disorganization per se, relates to higher crime rates (Hamilton & Rauma, 1995)

*Akers' (1985) Adaptation of Differential Association Theory*

Akers' (1985) adaptation of differential association theory capitalizes more directly on the principles of social learning theory in an attempt to shed light on the mechanisms through which behaviors are learned in group contexts. In so doing, Akers offers a more direct account of the intragroup dynamics to which Sutherland and Cressey refer. Akers' theory suggests that through a process of "differential association," individuals associate with others in group settings, providing contexts for behavior modeling and reinforcement, as well as for the acquisition of prosocial or antisocial definitions. Behavior modeling

provides a foundation for early learning and tapers off as individuals take ownership of the values, beliefs, and norms that characterize their social groups. The maintenance of those behaviors is influenced by rewards that follow behaviors and by individuals' expectations for future benefits. Previous experiences influence the expectations that individuals hold and the probability that particular patterns of behavior will continue. Earlier learning experiences also influence the extent to which individuals readily support and promote group values and norms. According to Akers' theory (as well as Sutherland's original theory), the more involved individuals are with particular social groups, the more influential the beliefs and values of those groups will be. Associations that occur with greater frequency, more intensity, and over longer durations will have a more powerful influence on individuals' conduct than those that are more occasional and short-lived.

As a general model, differential association and social learning theories may be described as representatives of a cultural deviance or subculture perspective (Gorman & White, 1995). Simply put, this perspective promotes the idea that norms for behavior are variable across social groups and that antisocial behavior is an expression of the recognized standards in particular social circles. It is implied by this perspective that certain individuals will be more likely to violate formal laws because they have been socialized according to competing norms and values. The factors that underlie this dynamic vary widely, but may be linked to broad societal imbalances that make it more palatable for some groups to support prosocial norms. This perspective parallels the position of traditional strain theory which proposes that structural inequalities promote nonconformity among the most disadvantaged groups in society. Within these groups,

some forms of antisocial behavior are legitimated in attempts to improve individuals' social standing.

Recent studies on delinquent gangs and peer groups attest to the power of subculture influences in shaping individual behavior. Gang influences have been found to be particularly strong during youths' time of involvement (Battin et al., 1998). Battin et al. (1998) compared criminal offense patterns for individuals without delinquent peers, those with delinquent peers not involved in a gang, and those who identified themselves as gang members. Compared to the other two groups, individuals involved in gangs engaged in more violent offenses, general delinquency, and drug-selling. These offense patterns dropped notably after individuals' gang involvement ended (Hill et al., 1996). Battin et al. (1998) suggest that the normative culture of delinquent gangs may exacerbate the aggressive tendencies of individual gang members in promoting a level of deviance beyond levels engendered by friendships with delinquent peers. Others have also identified a strong empirical relationship between gang involvement and criminal behavior (see Spergel, 1984, Thornberry et al., 1993). These findings lend credence to the tenets of differential association/ social learning theories. However, further study of gang contexts is needed to delineate the mechanisms through which gangs exert their influence. Some preliminary work in this area suggests that gangs promote violent offending by exposing members to a culture that makes antisocial behavior acceptable, by increasing members' opportunities to use violence, and by rewarding participation in violent acts (Kennedy & Baron, 1993).

## Untangling Race Differences In the Perpetration of Violence

An ongoing focus of discussion in the research literature is on race differences in youth violence. As previously indicated, African-American males are over-represented as perpetrators of violence (Kelley et al., 1997). Understanding why race differences in violent offending persist in contemporary society is a particularly important objective for criminologists and prevention scholars and one that must be addressed by theory.

According to those who study race-crime differences, the characteristics of neighborhoods in which most African-Americans reside differ significantly from those that are predominantly white (Huston, McLoyd, & Coll, 1994; Sampson, 1987; Wilson, 1987). Unlike poor European-Americans who occupy a range of "ecological niches," poor African-Americans tend to live in the most disadvantaged areas (National Research Council, 1993; Sampson, 1994). In other words, African-Americans in poverty tend to remain in segregated, highly disadvantaged areas, while European-Americans in poverty are more likely to occupy residences in areas with a greater socioeconomic mix. Areas in which poor European-Americans live tend to be more economically and socially stable. It is typically the case that areas where poor African-American families live are characterized by a high percentage of single parent households, welfare-dependent families, and unemployed or underemployed adults (Blake & Darling, 1994; Jones, 1995; Sampson & Wilson, 1995; Wilson, 1987). As Wilson (1987) notes, inner-city neighborhoods that once contained both working class and middle class black families are now occupied only by those that are the most severely disadvantaged, promoting the establishment of urban

ghettos. This change was influenced by "structural economic changes related to the deindustrialization of central cities" (Sampson & Wilson, 1995, p.43), involving the movement of industry out of inner city areas and labor market shifts that reduced the availability of well-paying jobs. Youths who live in these inner city areas are likely to be "differentially exposed to criminogenic structural conditions" (Sampson, 1994, p.27).

As discussed previously in relation to structural strain theory, some scholars propose that "blacks engage in delinquent behavior because they distrust or reject the values and interests of mainstream society" (Dembo, 1988, p.142). This suggests that African-American males, as victims of racial discrimination and "inferiorization" (Oliver, 1989a, b), have become a marginalized group that has adopted its own norms for behavior and images for success. The images that connote status within black communities are derived from patterns of socialization that emphasize exaggerated masculine roles for men (Oliver, 1989a, b). Oliver (1989a, b) suggests that males may aspire to become "tough guys" and "players of women," promoting behaviors that threaten their own well-being and the well-being of others (Gibbs & Merighi, 1994). Poor self-esteem and undefined social identities contribute to the willingness of young males to engage in high-risk behaviors (Garrett, 1995). The lack of positive male role models in some African-American families may also prompt young males to look outside of their families for male-to-male relationships. To their detriment, role models in local communities may reinforce, rather than challenge, negative images and stereotypes.

Although there is no convincing evidence that African-American males differ from males of other races in their beliefs, values, and relationship patterns generally, there is

little doubt that many youths encounter social and cultural influences that negatively affect the way they perceive the world around them and, in turn, behave. These influences are likely to be more specific to neighborhoods rather than constant across residential areas (Sampson & Wilson, 1995). Reflective of this pattern is the differential organization of inner-city neighborhoods toward antisocial conduct. Inner-city African-American youths are more likely to be exposed to and join delinquent gangs (Dembo, 1988), witness violent crimes (Shakoor, and Chalmers, 1991), and take part in drug use and selling than youths living in other settings. Notably, empirical findings suggest that African-American males, in particular, are the most vulnerable to gang influences, which may dramatically increase their risk for violent offending (Dembo, 1988, Battin et al., 1998).

Although analyses carried out in this study do not test for differences in the etiology of violence for individuals of different races per se, race differences in offending, and their underpinnings, are discussed. Additionally, in multivariate models racial status serves as a covariate, addressing potential differences across individuals associated with race that may affect variables being analyzed. It is assumed that risk factors for violence do not operate differently for individuals of different races, though, the level of exposure to risks is variable across groups. This assumption has been validated in earlier analyses of SSDP data with substance abuse as an outcome (Catalano, Hawkins, Krenz, Gillmore, Morrison, Wells, & Abbott, 1993) and in other studies on violence (e.g. Hawkins, Laub, & Lauritsen, 1998, Sampson, 1987, 1994).

## A Conceptual Model of the Etiology of Violent Behavior

The Social Development Model (SDM) (Catalano & Hawkins, 1996) synthesizes the hypotheses of social control theory, differential association theory, and social learning theory. The SDM organizes these perspectives in a model of human development that stresses the interplay between individuals and their social environments. According to the SDM, primary socializing contexts (i.e., neighborhood, family, school and peer groups) within which children develop are interconnected and mutually influencing. What occurs in one context affects a child's experiences in another. The model suggests further that the influence of social units on a child's development varies with age. For example, the socializing experiences of young children primarily involve interactions with family members. After school entry, however, experiences in the school context and peer groups become influential in processes of socialization. The emphasis in the SDM on the relationship between social contexts is consistent with an ecological frame that highlights a synergistic relationship among social units of a large systemic network (Bronfenbrenner, 1979). This perspective can be applied to the etiology of youth violence. An ecological model consistent with the principles put forth in the SDM suggests that the structure and functioning of neighborhoods affects the functioning of families, schools, and social networks that operate within them by promoting or deterring opportunities for prosocial and antisocial learning in public settings and by influencing the extent to which social groups and institutions (e.g., families and schools) may operate effectively toward promoting the healthy development of children. Children who are reared in poor,

disorganized, and crime-ridden neighborhoods will be more likely than children raised in less deprived conditions to encounter social factors that support, rather than deter, antisocial conduct, including violence. Primary to this process is a child's exposure to delinquent peer groups that flourish in areas in which there is poor social control (Catalano & Hawkins, 1996, Sutherland & Cressey, 1970)

The organization of neighborhoods also influences the extent to which families and schools can successfully nurture children's prosocial development. Findings from empirical studies indicate that a strong relationship exists between a family's exposure to threatening environmental factors and its level of functioning (Garbarino, 1992, Mason, Cauce, Gonzales, Hiraga, & Grove, 1994). These studies suggest that because of the stress brought on by poverty and social disorganization, parents tend to be less emotionally supportive and positively engaged with their children, straining parent-child bonds. Environmental stressors may also contribute to poor family management and abusive discipline by parents (Garbarino, 1992, Mason et al., 1994). Further, low-income, poorly educated parents may be inadequately prepared to help children acquire requisite cognitive and social-interaction skills that promote school success and positive social interactions (Dishion, Patterson, Stoolmiller, & Skinner, 1991; Patterson et al., 1989; Reid, 1993). Because of poor skill development, children may fall behind on educational tasks, be disruptive during class, and be rejected by teachers and prosocial peers (Conduct Disorders Prevention Research Group, 1992; Patterson et al., 1989). Fewer positive role models in disadvantaged neighborhoods may further undermine a child's aspirations to succeed academically and stay in school until completion (Brooks-Gunn et al., 1993).

Collectively, these circumstances contribute to an increased vulnerability to antisocial peer influences (Dishion et al., 1991, Patterson et al., 1989; Snyder, Dishion, & Patterson, 1986), by weakening school bonds (Catalano & Hawkins, 1996). Children who repeatedly encounter negative interactions with family members, teachers, and prosocial peers will be less likely to develop bonds to individuals and institutions that promote positive values and beliefs. Rather, they will tend to gravitate towards peers whose experiences are similar to their own and whose values and patterns of conduct support antisocial behavior (Patterson et al., 1989). Within delinquent peer groups, norms supporting violence (and other antisocial behaviors) are legitimated and violent behaviors are modeled and reinforced (Akers, 1985).

Following from theory and empirical findings, a conceptual model representing neighborhood, family, school, and peer predictors of violent behavior is presented in Figure 1.2. This model, which shows neighborhood risk factors as most distal to violence in the development sequence, and school, and peer influences as the most proximal influences, will guide the analyses in the proposed study. The directional paths among the family, school, and peer constructs are consistent with the empirical findings discussed above, but will not be tested specifically in the analyses carried out in this study. Analyses described in subsequent chapters focus on relationships between neighborhood context and risk factors in the family, school, and peer domains in affecting violence as an outcome. Attention is also paid to the interrelationships among risk factors themselves. While the full complexity of the conceptual model is not represented in analyses (due, in part, to the construction of measures and analytic methods used), primary aspects of the

model are addressed. Findings derived in the study elucidate important linkages, previously unexamined, between neighborhood variables and individual-level constructs (related to family, school, and peer influences) hypothesized to underlie the development of youth violence.

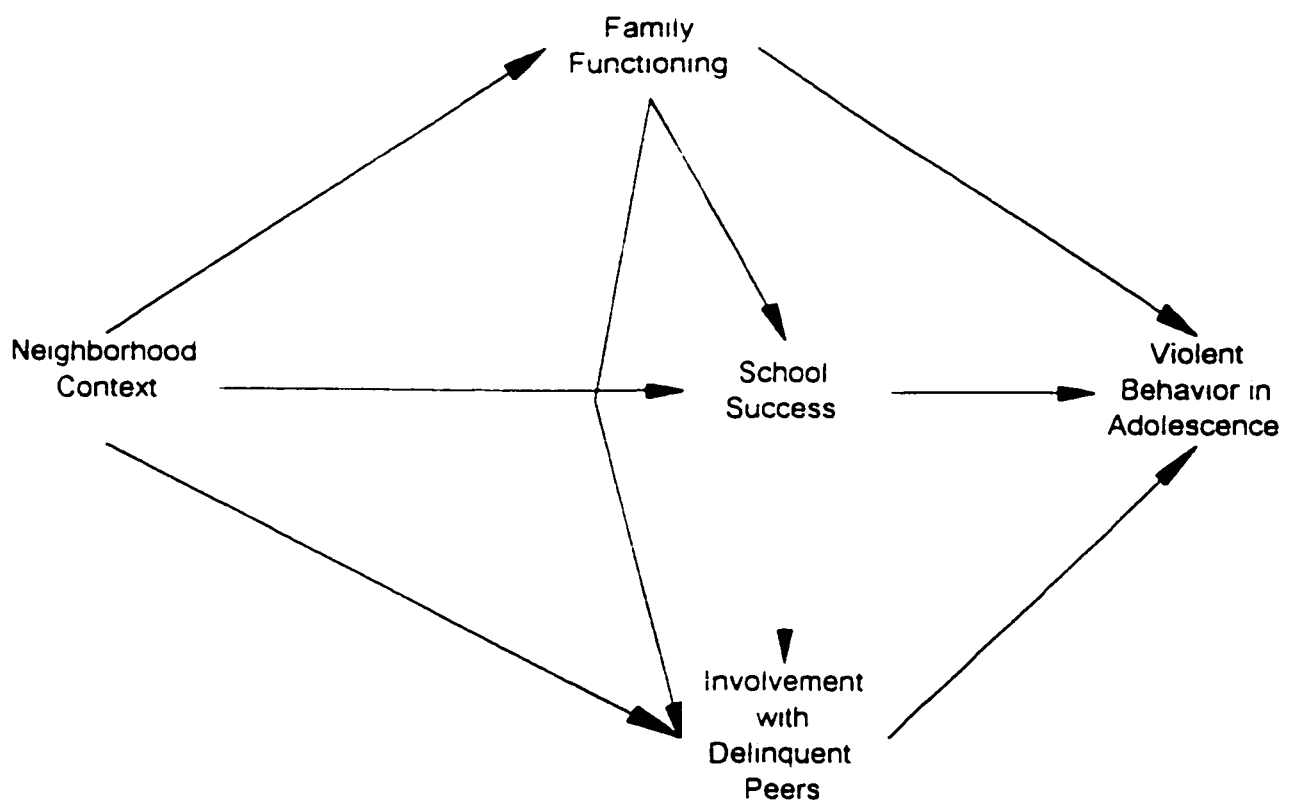


Figure 1.2 Conceptual Model

## CHAPTER 2. METHODS

This chapter introduces the methods for the present study. In the sections that follow, an overview of the Seattle Social Development Project (SSDP) is provided so that details of this study are understood within a broader research frame. Research questions are presented in both Chapters 3 and 4, along with analysis results. Research questions are introduced separately within each chapter in order to avoid confusion about the different components of the study and analytic techniques used.

Data for SSDP were collected from multiple sources over many years. The present study capitalizes on the longitudinal nature of SSDP by using data collected at three time points during adolescence. In this study, important questions are asked about the influence of neighborhood context on risks for violent behavior. And attempts are made to isolate risk factors for violence that are most salient during adolescence. This study contributes to the broader objectives of SSDP by building knowledge about the etiology of youth violence and by translating research findings into implications for practice.

### Design

This study is based on a secondary analysis of data from the Seattle Social Development Project (SSDP). The SSDP is a theory-driven, developmental study of health-risk behaviors among a panel of urban youths, followed prospectively since 1985. For the larger SSDP study, 18 Seattle elementary schools serving students from

predominantly high crime neighborhoods were identified and students were recruited. The population of students from which the sample was drawn included all children in the fifth grade ( $N = 1053$ ). Of these children, 808 (77%) consented to participate in the SSDP longitudinal study. As a component of the project, a preventive intervention was conducted in 1985 and 1986, consisting of school and family-focused programs (Hawkins, Catalano, Morrison, O'Donnell, Abbott, & Day, 1992; Hawkins, VonCleve, & Catalano, 1991). The emphasis of the intervention was on enhancing parenting practices in order to support children's success in school, to promote positive interactions among family members, and to teach children skills to reduce risks for substance use and other problem behaviors. Other foci included modifying and enhancing instructional and classroom management practices for teachers and training students on refusal skills. Annual assessments of children and their parents occurred through 1991. Children, but not their parents, were assessed again in 1993 and 1996. No assessment took place in 1992 when youths progressing normally in school were in the eleventh grade. Teachers were also surveyed in annual assessments through 1989.

Assessments carried out with children elicited information on their involvement in delinquency, substance use, and violence. Children were also asked about their relationships with parents, siblings, teachers, and peers. Additionally, data were gathered on children's perceptions of, and attachment to, their neighborhoods. On parent surveys, questions pertained to the structure and functioning of families and behaviors exhibited by children. Parents also reported on their own educational background and level of income. Teachers completed the Child Behavior Checklist (Achenbach & Edelbrock, 1983), which

provided ratings of children's behavior and social interactions in school.

### Sample

The SSDP sample is ethnically diverse and gender-balanced. Of the original 808 student participants, 396 (49%) were female, 372 (46%) were European-American, 194 (24%) were African-American, 170 (21%) were Asian-American, 73 (9%) were Native American or representatives of other race and ethnic groups. Fifty-two percent of the students in the sample participated in the school free-lunch program at some point between the fifth and seventh grades. Forty-two percent reported living with a single parent in 1985.

Rates of retention for SSDP across study waves are high. In 1993, 757 (94% of the original sample) youths took part in the study assessment. Similarly high participation was achieved for other assessments. No evidence of differential rates of attrition by gender or race across study waves was found. Retention rates for SSDP exceed those found in a meta-analytic study by Hansen, Tobler, & Graham (1990) on attrition in longitudinal prevention research, which suggests that potential threats to internal and external validity are likely to be minimal (Hansen et al., p.81).

For this dissertation, data from three waves of SSDP were used, corresponding to assessments completed when normally progressing students were in the ninth (average age 15), tenth (age 16), and twelfth (age 18) grades. Annual participation rates for these assessment periods ranged from 94% to 97%.

Because this study involved matching survey data with data drawn from the 1990 national census for the city of Seattle, it was necessary to exclude cases for which data from both sources were not available. Most cases were dropped because individuals were living outside of the general Seattle area in 1990, and so could not be identified with a particular block group, or because they had not been surveyed in that year and their addresses were unknown. The decision to limit the study to individuals living in and immediately around Seattle was made to increase the likelihood that neighborhoods being examined would include multiple SSDP participants. Extending the study to areas outside of Seattle would increase the number of neighborhoods containing a single participant. Additionally, there was concern about mixing neighborhoods from different geographic regions, possibly those in smaller metropolitan or more rural areas with those in a larger city like Seattle. After exclusions, 595 (74%) of the original 808 participants were included in this study. This subsample was comprised of 301 (51%) females, 252 (42%) European-Americans, 150 (25 %) African-Americans, 142 (24 %) Asian-Americans, and 51 (9%) Native Americans and "other." These numbers correspond well with those for the original sample.

Further comparison of the subsample to the group of youths excluded from this study on data collected early in SSDP provided additional information about the extent to which the 595 individuals were similar to the remainder of the sample. Assessment of group differences provides an indication of whether results derived from analyses subsequently carried out in this study are affected by the selection of participants to the subsample. This comparison focused on the proportion of youths in each group from low

income families. Attention was also paid to group differences on measures of academic achievement, hyperactivity, early antisocial behavior, and involvement with deviant peers, factors previously shown to predict violence among youths in adolescence (Herrenkohl et al., 1998). Data collected when children were in the fifth grade were used for this analysis. Probability values of .20 or less were considered to show significant group differences on a given measure.

A chi-square test of proportional differences between groups in numbers of children from low income families, i.e. children involved in the school free-lunch program in the fifth grade, was significant using the  $p < .20$  criterion,  $\chi^2(1) = 2.197, p < .14$ . A significant difference between groups was also found on the measure of early academic achievement, ( $t = 1.68, p < .09$ ), with youths in the subsample having slightly higher test scores than those excluded from the subsample. However, no statistical differences in means between groups on teacher-rated hyperactivity ( $t = 1.10, p > .27$ ), teacher-rated antisocial behavior ( $t = -.75, p > .46$ ), or child-reported involvement with deviant peers ( $t = -.47, p > .64$ ) were found. These results suggest that at least on these latter measures, those included in this study and those excluded (because they no longer lived in Seattle) could be considered similar.

### Measures

Data used in this study were drawn from four sources: interviews with youths and their parents, school records, and the national census of 1990. Census data were used to

compile measures of neighborhood disadvantage and residential stability. The process for constructing measures from the census is presented first followed by a description of constructs derived primarily from youth-report data.

#### Measures of Neighborhood Context Derived from the 1990 National Census for Seattle

Data for neighborhood context measures were drawn from the 1990 national census. Block groups in the city of Seattle represented neighborhood units ( $n = 634$ ). As defined by the U.S. Census Bureau, block groups typically contain "substantially fewer than 97 blocks" and between "250 and 550 housing units, with ideal size being about 400 housing units." In other studies using census measures, block groups and census tracts have both been used, where block groups represent the smaller unit of analysis (see Brooks-Gunn et al., 1993, Elliott et al., 1996, Sampson 1997, Sampson et al., 1997). Block groups were chosen as the focal unit in this study because they represented residential areas small enough for meaningful comparison given the geography of the city and numbers of households and individuals per unit. Information on the following neighborhood characteristics was collected: 1) number of racial/ethnic groups with 10 percent or more representation, including African-American, White, Asian, Native-American, and other (this variable was computed using data on raw numbers of residents with a given racial/ethnic group affiliation), 2) percentage of residents between the ages of 11 and 17, 3) percentage of individuals living in the same household for five years or more, 4) percentage of families with female, single parents as household heads, 5)

percentage of families living in poverty, 6) percentage of families receiving public assistance, 7) percentage of male residents over age 16, in the workforce, and unemployed, 8) percentage of male residents over age 16, in the workforce, and unemployed, 9) percentage of residences that are owner-occupied homes, 10) percentage of adults without a high school diploma. These characteristics were represented because they correspond with other studies in which measures of disadvantage and stability were used and because they appeared to tap into underlying constructs of interest for this study.

To identify block group neighborhoods occupied by SSDP participants, geocodes were assigned to youths' home addresses in 1990. Geocodes are designated to particular locations on a map and provide the basis for linking residences to block groups or census tracts. As previously mentioned, geocodes were assigned to addresses for 595 SSDP participants residing in Seattle in 1990. Youths and their families occupied 265 of the 634 block groups in the city. The number of individuals living in each block group ranged from 1 to 15. A map of the city of Seattle with SSDP participants plotted according to their 1990 block group residences is shown in Figure 2.1

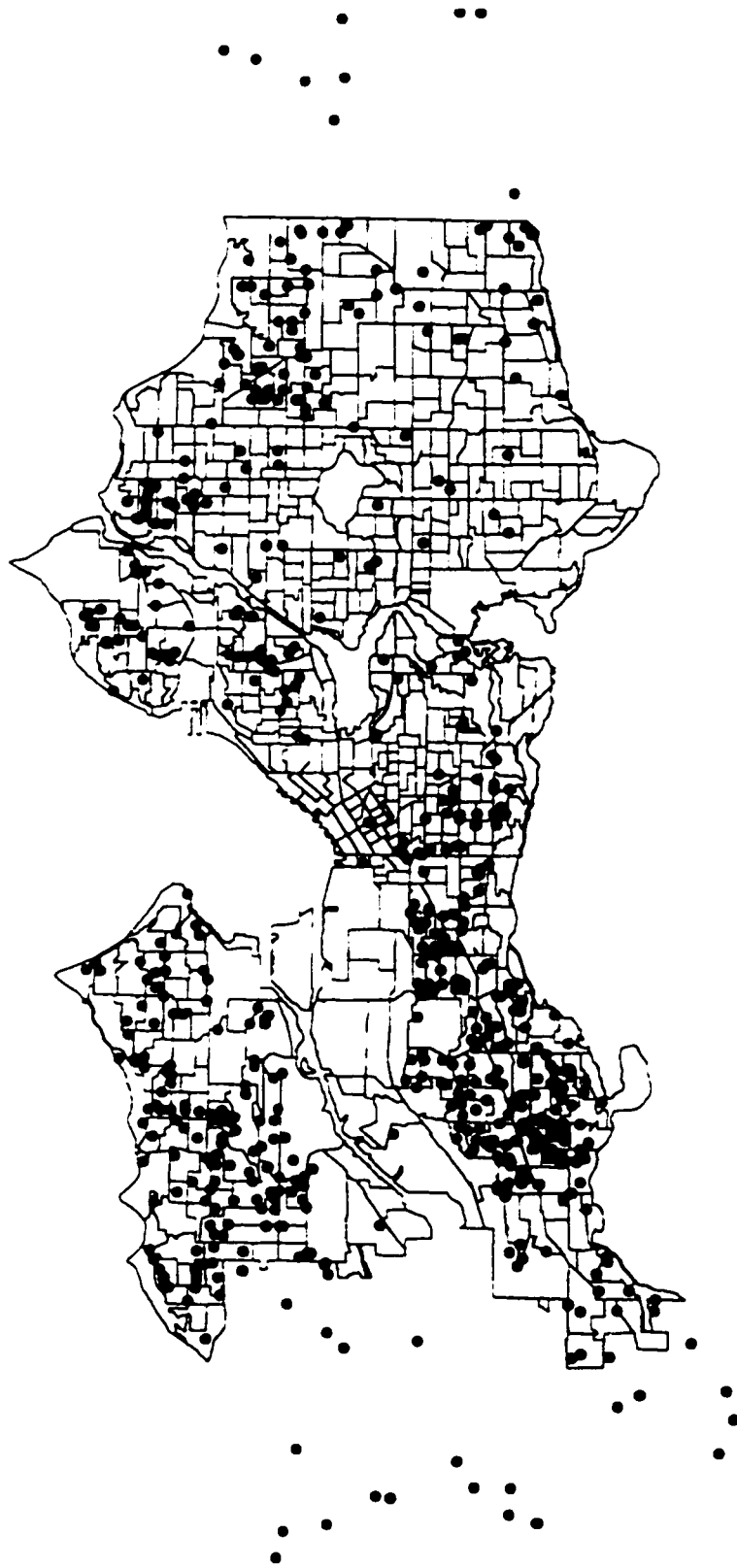


Figure 2.1 Map of Seattle with Individuals in SSDP Plotted by Block Group Residence in 1990

## Deriving Measures of Neighborhood Disadvantage and Residential Stability

**Neighborhood Disadvantage and Residential Stability:** A principal components analysis with oblique rotation was used to consolidate variables representing the neighborhood characteristics listed above. Two principal components with eigenvalues greater than 1 were extracted. Extracting factors with eigenvalues greater than 1 insures that the total variance explained by a factor exceeds the variance potentially explained by a single variable (Kachigan, 1991, p 246). The first component explained 46.5% of the variance (eigenvalue=4.65) and the second component explained 18.4% of the variance (eigenvalue=1.84). The method of rotation chosen in this analysis clarifies the composition of the factors, thereby improving interpretability, while allowing them to correlate. The factor pattern following rotation is shown in Table 2.1. Eight of the 10 census variables had loadings greater than .50 on the first factor. These included variables pertaining to the economic position of neighborhood residents, their levels of education and employment, racial status, and family composition. This factor appeared to capture the overall level of economic deprivation in neighborhoods (labeled "neighborhood disadvantage"). Two variables, those representing the percentage of individuals living in a neighborhood for five years or more and percentage of owner-occupied homes loaded highly on a second factor. This factor reflected the stability of neighborhoods and permanency of residents (labeled "residential stability"). These factors were moderately, negatively correlated (-.20). The identification of separable disadvantage and stability factors is consistent with other studies in which census measures have been used to study

violence (see Sampson, 1997. Sampson et al , 1997) Factor scores, representing a weighted combination of scores on each variable (Kachigan, 1991, p.244), for each block group neighborhood were assigned. Standardized scores on the disadvantage factor ranged from -1.51 to 5.26, with high scores indicating high levels of disadvantage. Scores on the stability factor ranged from -3.34 to 2.01, with low scores indicating high levels of instability.

Table 2.1 Factor Loadings for Census Measures Addressing Disadvantage and Stability in Block Group Neighborhoods

Variable	Factor 1 Neighborhood Disadvantage	Factor 2 Residential Stability
Percent adults without high school diploma	.859	.041
Number of racial groups with 10% or more representation	.805	.218
Percent individuals receiving public assistance income	.797	-.211
Percent youths (ages 11-17)	.757	.452
Percent families living in poverty	.625	-.419
Percent males in labor force and unemployed	.624	-.100
Percent females in labor force and unemployed	.613	-.210
Percent single parent, female-headed families	.542	-.405
Percent owner-occupied homes	-.223	.859
Percent individuals living in same residence 5 or more years	.069	.886
Eigenvalue	4.65	1.84
Percent of Variance	46.5	18.4

## Youth-Report Measures

Unless stated otherwise, measures were based on data collected when youths were in the ninth grade, age 15. Responses to many individual questions were standardized prior to constructing each composite measure. Descriptions of each measure are followed by Table 2.2. This table shows mean scores and standard deviations for each measure and Pearson correlations among measures. A full listing of items for each measure and their response categories is presented in the attached Appendix.

**Neighborhood Disorganization** This six-item scale measured students' perceptions of social problems in their neighborhoods. Youths were asked to indicate whether their neighborhoods were characterized by crime and drug-selling, gangs, poor people, undesirable neighbors, or run-down housing. Items were coded so that higher scores indicate more neighborhood disorganization. Cronbach's alpha= .88

**Weak Neighborhood Attachment**: This scale was comprised of seven items addressing the extent of youths' satisfaction with their neighborhoods, their feelings of safety, and desire to remain in their neighborhoods. Example items included: "I like my neighborhood" and "I feel safe in my neighborhood," and "I want to stay in my neighborhood no matter what." Items were coded so that higher scores indicate weaker attachment. Cronbach's alpha= .86

**Poor Family Management** This scale was comprised of six items that addressed students perceptions of their parents' competence with monitoring behavior, specifying rules, and using rewards and praise for reinforcement of good conduct. Example items included: "When I am away from home, my parents know where I am and who I am with," "My parents notice when I am doing a good job and let me know about it," and "The rules in my family are clear " Items were coded so that higher scores indicate more poor family management Cronbach's alpha= .74

**Weak Family Bonds** Four items comprised this scale, which measured youths' closeness to, and affection for, their parents. Youths were asked to indicate whether they wanted to be the kind of person their mothers (fathers) are and whether they share thoughts and feelings with them. Items were coded so that higher scores indicate weaker bonds to family Cronbach's alpha= .71

**Harsh/ Physical Discipline** This index was comprised of two items that assessed youths' reports of parents' tendencies to hit, spank, and yell at their children. Youths were asked to indicate whether these acts occurred when they misbehaved. Items were coded so that higher scores indicate more harsh or physical discipline.

**Family Conflict:** Three items comprised this scale. Youths were asked to indicate how frequently people in their households criticized each other, argued, and yelled. Items were coded so that higher scores indicate more family conflict. Cronbach's alpha= .81.

**Weak Commitment to School:** This scale was comprised of seven items addressing the extent to which youths' reportedly liked school and were committed to their education.

Example items included, "I like my teachers this year," "Most mornings I look forward to going to school," and "I do extra work on my own in class." Items were coded so that higher scores indicate weaker commitment to school. Cronbach's alpha= .78

**Poor Academic Achievement** This index included two items, one addressing youths' reported grade point average and another addressing their average scores on the California Achievement Test in grade nine. The items were coded so that higher scores indicate poorer academic achievement.

**Involvement with Delinquent Peers** This scale was based on three variables summarizing youths' first, second, and third best friends' use of beer, wine, or liquor, marijuana and other drugs. Information was also included about whether an individual's friends had done things to get them in trouble with the police. Items were coded so that higher scores indicate involvement with more delinquent peers. Cronbach's alpha= .75

**Gang Involvement:** Gang involvement was measured with a single dichotomous variable. Youths were asked to indicate whether they belonged to a gang. For validation, youths were also asked to name the gang to which they belonged. This variable was coded 1 for gang involvement and 0 for no gang involvement.

Table 2.2 Correlations, Means, and Standard Deviations for Youth-Report Measures

	Neigh Disor	Weak Neigh Attach	Poor Family Mgt	Weak Family Bonds	Harsh/Physical Discip	Family Conflict	Weak Commit to School	Poor Academic Achiev	Inv Del Peers	Gang Inv
Neigh Disor	1.0	.47**	.21**	.13**	.24**	.27**	.12**	.20**	.27**	.23**
Weak Neigh Attach		1.0	.24**	.24**	.16**	.21**	.22**	.15**	.18**	.07
Poor Family Mgt			1.0	.54**	.32**	.45**	.40**	.12**	.26**	.20**
Weak Family Bonds				1.0	.21**	.28**	.33**	.12**	.13**	.10*
Harsh/Physical Discip					1.0	.45**	.07	.19**	.15**	.16**
Family Conflict						1.0	.28**	.10*	.30**	.13**
Weak Commit to School							1.0	.24**	.32**	.08
Poor Academic Achiev								1.0	.22**	.21**
Inv Del Peers									1.0	.26**
Gang Inv										1.0
Mean	.03	.03	-.002	-.01	1.90	-.02	-.001	.05	.77	(41) 7%
SD	.79	.75	.66	.76	.62	.85	.66	.91	.75	-----

\* Proportion involved in a gang at age 15.  
 • p<.05; \*\* p<.01

## Measures of Youth Violence

Violence was measured with youths' reports at ages 15, 16, and 18. Over the years, a great deal of discussion has taken place about appropriate methods for studying antisocial behavior (Elliott et al., 1989). Many debates have centered on the relative merits of self-report measures compared to official record measures. Historically, questions have been raised about the extent to which data collected through self-reports are biased by errors in reporting involving deliberate misrepresentation of information (i.e., under and over-reporting of events) and inaccurate recall by respondents (Elliott et al., 1989). Poorly designed assessment instruments are also of concern because they may threaten the reliability and validity of data collected. Although bias in self-reports is possible, there is a general consensus that data provided by individuals about their behavior is trustworthy (Menard, 1987).

Recently, debate has focused less on the overall adequacy of self-report data in survey research than on whether general population studies using self-reports are appropriate for examining serious violent behavior (see Elliott, 1994). Critics suggest that many violent individuals are not represented in general population samples, making data inaccessible (see discussions in Elliott, 1994; Farrington, 1997; Reiss & Roth, 1993). In response to this issue, Elliott (1994) showed that high levels of serious violence do occur among youths generally and that self-reports reflect many offenses that meet criteria for arrest.

Estimates of violence based on official records may avoid potential biases introduced by inaccuracies in self-reporting, but may be affected by variability in methods of policing and inconsistencies in arrest and court processing procedures (Mulvey, Arthur, & Repucci, 1993). Moreover, official record estimates routinely underestimate the number of acts committed by a given individual and in the population as a whole (Elliott et al., 1989). Because a large number of criminal offenses, violent and non-violent alike, go unreported to authorities, prevalence estimates based on official records are likely to capture a relative minority of all offenses committed (Farrington, Loeber, Stouthamer-Loeber, VanKammen, & Schmidt, 1996, Menard, 1987), although, for lethal violence, where arrests are likely, official record estimates appear to be more accurate (Farrington, 1997). Due to the problem with underestimation, particularly for non-lethal and less serious violence, and differences in law enforcement policies, official record incidence and prevalence estimates tend to be imprecise (Menard, 1987).

Studies of crimes in general population samples using self-reports are likely to provide valuable information across different demographic groups with consistency. In a recent study, Farrington et al. (1996) addressed the predictive validity of self-report measures of antisocial behavior for European-American and African-American youths. They found that for both groups, the seriousness of self-reported antisocial behavior predicted later court referrals for index crimes. However, African-Americans had more court referrals than European-Americans relative to the seriousness of their offenses. Their findings point to another potential problem with data derived from official records based on arrest and convictions of offenders- confounding due to race. Questions

surrounding this issue have been aired for years, but consensus about the extent of discriminatory practices in law enforcement and court processing has not been reached (see discussion in Farrington et al., 1996), nor has consensus about how biased arrest and conviction measures are

With the recognition that many issues in the measurement of crimes remain unresolved and that neither self-reports nor official records are free of error, researchers have been willing to rely on both sources in epidemiological and etiological studies (Farrington, 1997). This study uses self-reports from youths about their violent behavior during adolescence. The measures used in the study to examine violence are described below.

**Violent Behavior at Ages 15, 16, and 18:** Violence at age 15, 16, and 18 was assessed with youths' reports. Each measure was based on a count of the number of different acts an individual reported he or she committed in the year before each assessment. Thus, measures used in this study were developed to reflect the variety of violent acts committed rather than overall frequency of acts. Frequency and variety measures, both of which are commonly used in criminological research, tend to be strongly correlated (Elliott et al., 1996).

Because few individuals committed more than one or two violent acts in each year, the distributions of scores on the violence variety measures were markedly skewed. Consequently, it was decided that representing violence dichotomously (i.e., where each outcome measure was coded 1 for violence and 0 for no violence) was more appropriate.

than leaving each measure in its original form. Trying to normalize highly skewed variables through logarithmic transformation or methods of truncation is often unsuccessful and may complicate the interpretation of analysis results. In this study, using dichotomous outcome variables was deemed acceptable because primary interest was in whether an individual committed at least one violent act, not necessarily whether he or she committed multiple acts.

As youths matured, the number of survey items referring to violence increased, leading to a greater availability of items in later years. At age 18, two additional items, not available at ages 15 and 16, were included in the violence measure. Supported by the logic of congeneric measurement, it is assumed that despite differences in the number of variables going into each measure, the underlying meaning of measures remained consistent across years.

In order to develop a violence measures that represented acts of comparable seriousness, thresholds for the number of acts committed were set higher for two items going into each outcome measure. "picking a fight" and "hitting someone with intent of hurting", so that an individual was not considered to have committed a violent act unless multiple acts were committed. At age 15, an individual was classified as having committed a violent act if he or she reported (1) picking a fight with someone four or more times, (2) hitting someone with the idea of hurting him or her three or more times, (3) hitting a parent, (4) using force or threats of force to get money or other possessions, or (5) hitting a teacher. These same behaviors and thresholds were used to classify individuals as having committed a violent act at ages 16 and 18. At age 18, two additional

violence items pertained to youths' involvement in beating someone badly and threatening someone with a gun. A breakdown in violence at each age by gender and race is presented in Table 2.3

**Table 2.3 Individuals Who Committed a Violent Act at Ages 15, 16, and 18 by Gender and Race**

Violence Measure	Total	Male	European-American	African-American	Asian-American	Other race
Violence at age 15	101	59 (58%)	38 (38%)	40 (40%)	11 (11%)	12 (12%)
Violence at age 16	96	48 (50%)	40 (42%)	35 (36%)	14 (15%)	7 (7%)
Violence at age 18	104	71 (68%)	40 (38%)	38 (37%)	16 (15%)	10 (10%)

Relative to their numbers in the overall sample, males were more likely than females to be classified as having committed a violent act at ages 15 and 18. At age 15, 20% percent of males in the sample were classified as having committed a violent act, compared to 14% of females. Twenty-four percent of males in the sample were classified as having committed a violent act at age 18, compared to 11% of females. These differences in proportions are expected given the strong relationship between male gender and violence typically found in etiological studies. Surprisingly, the number of male and female perpetrators of violence were equal at age 16. This reflects a drop in the proportion of males classified as having committed a violent act at that age (from 20% to 16% of males in the sample) and an increase in the proportion of females similarly

classified (from 14% to 16% of females in the sample). The increase in number of girls reporting violence (and reduction in number of boys reporting violence) may indicate a true shift in behavior or random effects due to over-and under-reporting of violence. Assuming the finding is indicative of true changes in conduct, it may indicate different peaks in prevalence of violence with age for each gender. The possibility of age and gender differences is evidenced further by the large gap in violence between males and females at age 18, where a sizeable increase in the proportion of males classified as having committed a violent act accompanies a reduction in the proportion of females similarly classified. This type of pattern was found by Elliott (1994) in his study of data from the National Youth Survey. In that study, the peak in prevalence of violence for females occurred at ages 15-16, approximately one to two years before the peak in prevalence for males (age 17). The gap between males and females increased in late adolescence. As Elliott (1994) reports, in peak years for violence among girls, nearly one in five African-American females and one in 10 European-American females engaged in serious violence. For males, overall rates were even greater. Thirty-six percent of African-American males and 25% of European-American males engaged in violence at age 18 (p.5).

Why is violent behavior as prevalent as it is for females during mid-adolescence, given that violence is typically associated with boys and adult men? Perhaps, violence increases for both females and males as antisocial behavior spreads during adolescence, becoming more specific to males as youths near adulthood. The increasing severity of consequences for violent behavior in early adulthood and entrance into adult roles (Laub & Lauritsen, 1993) may contribute to the declining proportion of girls involved in violence

at age 18, or, it may reflect a pattern of maturity in which other more socially-accepted behaviors replace more dysfunctional ones. Based on Elliott's (1994) findings, a drop-off in violence for males is also expected to occur a year or two later at ages 19-21. Elliott's (1994) analyses showed rather dramatic declines in prevalence of violence for both males and females during early adulthood, with the reduction in violence for females being more precipitous. In adulthood, the overall level of violence remained higher for males (Elliott, 1994, p. 6). Further study of gender differences in violence is ongoing in the SSDP project (see Williams, 1997).

Across ages, African-Americans were nearly equally likely to be classified as having committed a violent act as European-Americans, despite their representing a substantially smaller overall proportion of the sample of 595 youths (25% versus 42% respectively). Asian-Americans, who comprised 24% of the overall sample, were notably less likely to be classified as having committed a violent act at each age relative to African-Americans, who represented nearly the same proportion of the sample. The over-representation of African-Americans as perpetrators of violence in this sample is consistent with national statistics, whether compiled using self-reports or official records (Elliott, 1994, Hawkins et al., 1998).

## Analysis

### Missing Data

Missing data in longitudinal survey research is common (Graham, Hofer, Donaldson, MacKinnon, & Schafer, 1997). Over the course of a multi-wave panel study, responses may be lost due to sample attrition, participants' refusal to answer certain questions, inadvertent omissions, and interviewer error. Traditionally, missing data have been handled by dropping incomplete cases from analyses (listwise deletion) or by looking at selective pairings of data on the basis of availability (pairwise analysis). Research into these methods have shown that they may provide biased parameter estimates when data are not missing completely at random (MCAR) (Graham, Hofer, & Piccinin, 1994). Analytic problems also arise from the loss of statistical power that results from having many cases deleted from an analysis. Because with listwise deletion missing values on a single variable result in data being lost on all other variables in a multivariate analysis, important information may be unnecessarily discarded (Little & Schenker, 1995).

Biased parameter estimates result from handling missing data inappropriately given various patterns of "missingness." Listwise deletion, the "standard treatment of missing data in statistical packages" (Little & Schenker, 1995), assumes that there is no systematic pattern underlying data that are missing. Rarely are data MCAR (Graham et al., 1997). As Little & Schenker (1995) suggest, missing data patterns may depend on the variables one is examining. Certain questions asked on surveys, for example, are more likely to be

left unanswered than others, while related questions are likely to be skipped in combination (p.43), resulting in patterns of missing data that may or may not be identifiable (Graham et al., 1994). Furthermore, certain groups of individuals may be more likely than others to skip particular survey questions due to their wording or sensitivity, also leading to non-random missingness. Omitting cases blindly without examining missing data patterns may contribute to inferences being drawn on a select group of respondents rather than the sample as a whole.

Pairwise analysis offers an advantage over listwise deletion because data are not discarded. However, pairwise analysis is also problematic when data are not MCAR (Graham et al., 1994). With this method, cases with data on selected variables are used to estimate relationships for those variables. This method is problematic because cases used in an analysis may differ from one variable pairing to the next, leading to estimates that are specific to subgroups within a sample rather than to the full sample.

Expectation-Maximization (EM) algorithm and multiple imputation procedures are less affected by problems due to non-random missing data patterns (Graham et al., 1994). These methods, which have been more widely used in the social sciences in recent years, have been shown to provide unbiased parameter estimates by taking advantage of all available data (Graham et al., 1994). Data files used in this study were prepared using the Norm (Version 1.01) computer program developed by Schafer and Olsen (1997), which employs these methods. The Norm program uses information from available data to generate predicted values using a regression-type analysis (Graham & Schafer, 1997). An EM algorithm is used to compute maximum-likelihood covariance matrices, as well as

estimates of variances and means. With these estimates as starting values, a data augmentation procedure generates multiple estimates of a given value, previously missing, and then stores these imputed values in separate data files. These values reflect variability in predicted scores that are possible for the population under study given characteristics of the data. Any number of data sets with imputed values can be requested from Norm, but large numbers typically provide no added information and make subsequent analyses more labor-intensive (Graham & Schafer, 1997). One can be guided in the number of imputed data files necessary to achieve stable coefficients and standard errors by assessing the maximum percent missingness in the data. A larger number of imputations is appropriate for high missingness percentages. For this study, five data sets were requested and used in subsequent analyses. This number was considered to be sufficient given the low percentage of data missing on any given variable. The maximum percent missing data on a single variable, family socioeconomic status in 1990, was approximately 11%. Missing data on all other variables were below five percent.

Although its primary purpose is to impute values for continuous variables, Norm may also be used to generate values for binary and ordinal variables (Graham & Schafer, 1997). In order to derive values that coincide with a variable's original metric, a researcher must round and recode values after they have been imputed and prior to running any subsequent analyses. Once the variables have been restored to their original form, statistical tests can be performed as they would be with raw data. For this study, subsequent analyses were carried out using the Statistical Package for the Social Sciences (SPSS) (Version 7.5.1, 1996) and Hierarchical Linear Modeling (HLM), Version 4.01a

(Bryk, Raudenbush, & Congdon, 1996) programs. Coefficients and standard errors derived from these analyses were then entered back into the Norm program so that overall estimates could be computed. Averaging coefficients is straightforward and requires only taking the mean of the estimates. Averaging standard errors is more complex in that "uncertainty due to missing data" must be taken into account and reflected in the estimates (Graham & Schafer, 1997). T-ratios with associated probability values are also generated.

#### Description of Subsequent Analyses

The analyses that are presented in the following chapters involve an examination of neighborhood context variables, measured by the census and youth reports, risk factors, and violence outcome measures. The first set of analyses, described in Chapter 3, involves multi-level models of neighborhood context effects carried out with HLM (Bryk et al., 1996) to understand whether youth reports of neighborhood disorganization are valid and whether risks for violence, and actual occurrence of violence, vary between neighborhoods. Using HLM, questions are asked about the extent to which neighborhood differences on risk factors and violence measures are associated with levels of disadvantage and stability in those areas. The second set of analyses, described in Chapter 4, involves hierarchical logistic regressions using the same risk factors and violence outcomes measures, excluding the census variables. These regression models aim to assess relationships between risk factors and violence at different ages in order to generate understanding about the unique contribution of each predictor to the explanation of

violence. Attention is also given to the overall power of risk factors grouped by domain (neighborhood, family, school, and peer) in the prediction of violence. Analyses were carried out separately for violence at ages 15, 16, and 18. A final set of analyses in Chapter 4 examines the prediction of violence at ages 16 and 18 controlling for violence at age 15 in order to assess how the strength of risk factor relationships change when prior violence is accounted for (when involvement in violence at age 15 is constrained across individuals). Chapter 5 summarizes analysis findings and discusses their implications for preventive interventions.

## CHAPTER 3: MULTI-LEVEL MODELS OF NEIGHBORHOOD CONTEXT

In this section, multi-level models were used to examine neighborhood effects on violence and other factors hypothesized to be important developmentally in the onset and maintenance of violent behavior. An independent methodological objective involved an assessment of the consistency between census measures of neighborhood context and youth-reported neighborhood disorganization. Agreement between these measures provides evidence that youths' reports validly portray characteristics of the neighborhoods where they lived. Thus, results have important implications for research on neighborhood context using data from multiple sources. The test for validation of the youth-report measure is included with other model tests. The research questions addressed in this chapter are listed below

### **Research Questions:**

- 1) Is there consistency between census measures of neighborhood context and youth-reports of neighborhood disorganization?
- 2) Are neighborhood differences in youth violence identifiable? Are these differences associated with the level of disadvantage and stability in neighborhoods?
- 3) Do the risk factors for violence listed below vary at the neighborhood level? Is this variability associated with levels of disadvantage and stability in neighborhoods?
  - a. weak attachment to neighborhood
  - b. poor family management
  - c. weak family bonds

- d. weak commitment to school
- e. poor academic achievement
- f. harsh/ physical discipline
- g. family conflict
- h. involvement with delinquent peers
- i. gang involvement

Beyond assessing the validity of the youth-report measure of neighborhood disorganization, analyses in this section provide a foundation for identifying whether youths living in disadvantaged and unstable neighborhoods were more likely to engage in violence during adolescence and whether their exposure to risks that may promote violence also differed. These analyses address central questions about the extent to which youths living in certain contexts experience more family dysfunction, more difficulty in school, and more involvement with delinquent peers and gangs. To the extent that census measures predict variability between neighborhoods on these outcomes, it can reasonably be concluded that neighborhood context contributes to the etiology of violent behavior. Implications for preventive interventions rest in a clear articulation of how neighborhood context contributes, developmentally, to risk and, ultimately, to violent behavior.

## Hierarchical Linear Modeling

Multi-level models examining neighborhood influences on individual violence were developed using the HLM (Version 4.01a) software package (Bryk et al., 1996). HLM and other multi-level modeling programs have become more widely used within the social sciences due to an increasing recognition that traditional analysis procedures, such as standard multiple regression and analysis of variance, may be inappropriate for studying phenomena where nested data are present. This is particularly relevant to an examination of individuals within social contexts such as schools or neighborhoods. In studies involving repeated measures, the hierarchical structure of one's data involves the nesting of observations within individuals. Thus, multi-level modeling procedures are also appropriate (Bryk & Raudenbush, 1992). Using hierarchical linear models to examine data with a nested structure allows partitioning of variance on an outcome measure within and between nested units leading to more precise statistical estimation (see discussions and illustrations in Arnold, 1992; Bryk & Raudenbush, 1992; Elliott et al., 1996; Sampson et al., 1997). Precision is also enhanced through the use of Empirical Bayes estimation, a procedure for pooling information across higher level units to improve within-group estimation of effects (Bryk & Raudenbush, 1992). Using HLM, questions can be asked about relationships between variables at a single level and about relationships between variables at different levels in a model (Bryk & Raudenbush, 1992).

As Arnold (1992) suggests, "HLM involves performing regressions of regressions" (p. 61). This statement refers to the two-stage, simultaneously-occurring, process that is

carried out with multi-level models in which estimates from within-unit equations (level 1) are derived and then analyzed at a higher level (level 2 or level 3). To organize a model for individuals nested within neighborhoods, using violence as an outcome, the following process may be used. First, at level 1, regression equations for each neighborhood are used to predict individual violence. The outcome, violence, is modeled as a function of the mean (intercept for violence) for a given neighborhood and (possibly) other individual characteristics of interest. Within-unit models provide information about neighborhood means (intercepts), variability in intercepts, and relationships between individual characteristics and the outcome for each neighborhood. At level 2, randomly varying intercepts are modeled as a function of the grand mean and (possibly) other neighborhood characteristics. Coefficients associated with slope estimates for individual characteristics in the model may also be set to vary across neighborhoods. Variability in these estimates is modeled similarly at the neighborhood level. In this way, questions can be asked about the extent to which neighborhood characteristics explain intercept and slope differences that are detected at level 1

The application of hierarchical linear models to the examination of neighborhood influences on individual development and behavior is illustrated in Elliott et al.'s (1996) study described previously. Their intention was to identify whether variation in mean levels of prosocial competence, involvement with conventional friends, and problem behaviors reported by youths in their sample was associated with levels of organization and culture in neighborhoods. To examine these relationships, they organized multi-level models that addressed the nesting of individuals within neighborhoods. They controlled

for each individual's sex, socioeconomic status, family structure, length of residence, and age. They used parents' reports of a neighborhood's social climate, aggregated to the block group and census tract levels, to predict variability in individual-level outcomes. They first assessed whether variance in their outcome measures was identifiable at the neighborhood level by constructing models in which only an outcome measure was represented (ANOVA models). Next, covariates were added and the models rerun. Estimates provided by HLM indicated the variance between neighborhoods on each outcome remaining after individual characteristics were accounted for (ANCOVA models). Finally, neighborhood-level predictors were added and variance components re-estimated. Notable reductions in error variance on outcome variables at the neighborhood level, along with significant prediction by neighborhood measures, provides a basis for concluding that neighborhood effects do exist. Their findings were generally supportive of a link between contextual aspects of neighborhoods and developmental outcomes for adolescents.

Although HLM provides the option to assess differences in relationships between predictors and an outcome across higher-level units, e.g., to examine variability in slope, relatively large within-group sample sizes are needed to derive stable estimates. In the Elliott et al. (1996) study, these parameters were fixed to be equal across neighborhoods because there were a small number of individuals per residential area. Variables at the individual level were used only as covariates. Models used to assess variability in means, such as those in the Elliott et al. (1996) study, are called random-intercept models. Random-intercept models were estimated in this dissertation study.

The sequence followed by Elliott et al. (1996), in which unconditional models were estimated prior to models with covariates and level 2 (neighborhood) predictors, was also followed here. Analyses are presented below under headings referring to ANOVA, ANCOVA, and Full models. As in the Elliott et al. (1996) study, small numbers of individuals per block group neighborhoods precluded an examination of slope differences in level 1 variables between neighborhoods

#### ANOVA Models

A useful first step in multi-level analyses involves partitioning variance on an outcome variable within and between groups without other variables to provide a starting point for future comparisons. This procedure is analogous to a one-way analysis of variance with random effects. By taking this step, one can discern whether between-group differences do, in fact, exist and whether further analysis of the data is warranted. Should a researcher identify significant differences between groups, he or she can go on to ask more specific questions about factors that differentiate groups on those variables. The general notation for this unconditional level 1 (individual-level) model is:

$$Y_{ij} = B_{0j} + r_{ij}$$

Where  $Y_{ij}$  is a score for individual  $i$  in neighborhood  $j$

$B_{0j}$  is the average score (intercept) for all individuals in neighborhood  $j$

$r_{ij}$  is the residual for individual  $i$  in neighborhood  $j$ <sup>1</sup>

The model for level 2 is

$$B_{0j} = G_{00} + U_j$$

Where  $B_{0j}$  is the average score (or intercept) for neighborhood  $j$

$G_{00}$  is the grand mean

$U_j$  is the residual for neighborhood  $j$ <sup>2</sup>

In this study, unconditional two-level models were developed for youth-reported neighborhood disorganization, as well as for violence at ages 15, 16, and 18 and each of the other variables previously described. The logic behind this method was to identify variables for which further testing of neighborhood context was appropriate.

As previously noted, variables representing violence and gang involvement were dichotomous, represented by dummy variables. Individuals who engaged in violence or who belonged to a gang were coded as ones and others were coded as zeros. HLM allows researchers to model binary outcomes in a fashion similar to continuous variables. However, interpretation of results involves probabilities (log odds) rather than raw score values. Thus, significant variation at level 2 reflects differences in the predicted odds for violence or gang involvement between neighborhoods. In later analyses, by including

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<sup>1</sup>Note. Residuals measure the extent to which individual  $i$  varies from the mean of group  $j$ ; residuals are assumed to be normally distributed.

<sup>2</sup> Note.  $U_j$  measures the extent to which neighborhood  $j$  varies from the grand mean for that outcome variable; residuals are assumed to be normally distributed.

these outcomes with other level 2 variables, questions can be asked about factors associated with neighborhoods that increase the odds for violence. In HLM, Bernoulli models are used to examine binary outcomes. The notation for an unconditional Bernoulli model is:

$$\text{Prob}(Y_{ij} = 1 | B_j) = P_{ij}$$

$$\log [P_{ij} / (1 - P_{ij})] = B_{0j}$$

Where  $P_{ij}$  is the log odds for violence or gang involvement of individual  $i$  in neighborhood  $j$

$B_{0j}$  is the mean odds for violence in neighborhood  $j$

The model for level 2 is

$$B_{0j} = \gamma_{00} + U_{0j}$$

Results for unconditional models are shown in Table 3.1. This table presents each model's within and between-group variance estimates, reliability estimates, and chi-square values. As noted previously, because multiple data sets were used in each analysis carried out in this study (due to requirements for handling missing data), values that appear in Table 3.1 are overall estimates derived from averaging results across analysis runs. Reliability estimates, variance components, and chi-squares values should be interpreted as approximations rather than precise estimates.

As shown, significant between-neighborhood variations in youths' perceptions of neighborhood disorganization, weak neighborhood attachment, harsh/ physical discipline, family conflict, poor academic achievement, and involvement with delinquent peers were identified. Other variables tested as outcomes in unconditional models showed no variance at the neighborhood level beyond chance expectations. Unexpectedly, no systematic variance between neighborhoods was found for violence at ages 15, 16, or 18. It is quite likely that the small number of individuals per neighborhood made it difficult to detect differences between neighborhoods on these outcomes. In fact, finding differences at the neighborhood level on the six outcome variables listed above is remarkable. The proportion of total variance potentially explainable within each model (i.e. the proportion of total variance that is parameter variance) ranged from a high of 37% for neighborhood disorganization to 13% for involvement with delinquent peers. In Bryk & Raudenbush's (1992) terminology, these values reflect parameter "reliability." Of the variance that is potentially explainable, approximately 15% of variance in neighborhood disorganization, 9% of variance in weak neighborhood attachment, 3% of variance in harsh/ physical discipline, 7% of variance in family conflict, 6% of variance in poor academic achievement, and 4% of variance in involvement with delinquent peers was between neighborhoods. Results in Table 3.1 reflect the fact that most of the variance in outcome means was at the individual level. However, for youth-reported neighborhood disorganization and weak neighborhood attachment, in particular, a sizeable amount of variance was between neighborhoods. Further tests of neighborhood effects on violence and other variables shown to be statistically invariant across neighborhoods were carried

out and are described under the Full Models heading.

Table 3.1. Variance Estimates, Reliabilities, and Chi-Square Values for Unconditional Models

Variable	Within Neighborhood Variance	Between Neighborhood Variance	Reliability <sup>1</sup>	Chi-Square <sup>1</sup> (df=264)
Neighborhood Disorganization	47	15	37	449.34 **
Weak Neighborhood Attachment	46	09	28	377.77 **
Poor Family Management	43	01	05	264.66
Weak Family Bonds	58	00	00	231.13
Harsh/ Physical Discipline	35	03	16	315.76 *
Family Conflict	65	07	18	323.89 *
Weak Commitment to School	43	01	04	259.80
Poor Academic Achievement	77	06	14	315.87 *
Involvement with Delinquent Peers	52	04	13	311.57 *
Gang Involvement		39	05	200.49
Violence at Age 15		20	06	232.03
Violence at Age 16		15	05	243.39
Violence at Age 18		11	03	242.51

<sup>1</sup> Chi-square values and reliability estimates are approximations based on averages.

\*\*p < .01. \* p < .05

## ANCOVA Models

After identifying significant between-neighborhood variance on youth reports of neighborhood disorganization, neighborhood attachment, harsh/ physical discipline, family conflict, academic achievement, and involvement with delinquent peers in unconditional ANOVA models, covariates were added at level 1 and variance estimates were again computed. Covariates added to each model were sex (females coded 0 and males coded 1), race (represented by three dummy variables, where European-Americans, African-Americans, and Asian-Americans were compared separately to others; 1=positive for that racial status and 0= other), and family socioeconomic status (represented by a composite of parents' reported income and level of education in 1990). To enhance interpretability, each covariate was centered around its respective grand mean. In so doing,  $B_{0j}$  represents the adjusted mean on each outcome variable for neighborhood  $j$  after the effects of individual characteristics were partialled out. Including these variables in each model provides an estimate of the variance within and between groups adjusted for the effect of each covariate. The general notation for the ANCOVA models at level 1 is:

$$Y_{ij} = B_{0j} + B_{1j} (\text{SEX}) + B_{2j} (\text{European-American race}) + B_{3j} (\text{African-American race}) + B_{4j} (\text{Asian-American race}) + B_{5j} (\text{SES}) + r_{ij}$$

Where:  $Y_{ij}$  is a score for individual  $i$  in neighborhood  $j$

$B_{0j}$  is the adjusted mean on each outcome for neighborhood  $j$

$B_{1j}$  is the adjusted slope for male gender

$B_{2j}$  is the adjusted slope for European-American race

$B_{3j}$  is the adjusted slope for African-American race

$B_{4j}$  is the adjusted slope for Asian-American race

$B_{5j}$  is the adjusted slope for SES

$r_{ij}$  is the residual for individual  $i$  in neighborhood  $j$

The model for level 2 is

$$B_{0j} = G_{00} + U_j$$

$$B_{1j} = G_{10}$$

$$B_{2j} = G_{20}$$

$$B_{3j} = G_{30}$$

$$B_{4j} = G_{40}$$

$$B_{5j} = G_{50}$$

Where  $B_{0j}$  is the adjusted mean for neighborhood  $j$

$B_{1j}$  through  $B_{5j}$  are fixed coefficients<sup>3</sup>

$G_{00}$  is the adjusted grand mean

$U_j$  is the residual for neighborhood  $j$

---

<sup>3</sup> Note. Slopes are constrained to be equal across neighborhoods; this is indicated by the omission of an error term,  $U_j$ , in the equations for  $B_{1j}$  through  $B_{5j}$ .

After controlling for individual characteristics, significant between-neighborhood variability remained only for measures of neighborhood disorganization, weak neighborhood attachment, and family conflict. Thus, variance between neighborhoods on measures of harsh/ physical discipline, poor academic achievement, and involvement with delinquent peers diminished to non-significance with these additional variables in each model, suggesting that previously unexplained variance was accounted for. Coefficients and conditional error variance estimates for models pertaining to neighborhood disorganization, family conflict, and weak neighborhood attachment are presented in Table 3.2. The proportion of true variance between neighborhoods for each outcome variable was reduced by 33% (to .10) for neighborhood disorganization, by 33% (to .06) for weak neighborhood attachment, and by 14% (to .06) for family conflict. Although these percentages are smaller than those in previous ANOVA models, a significant proportion of variance between-neighborhoods remained to be explained. For all three measures, SES was a significant level 1 covariate. For neighborhood disorganization alone, Asian-American race was a significant covariate, and for family conflict alone, European-American race was a significant covariate.

Table 3 2 Coefficients, Conditional Variance Estimates, and Reliabilities for ANCOVA Models

Neighborhood Disorganization		Weak Neighborhood Attachment		Family Conflict	
Parameter	Coefficient (SE)	t-statistic	Parameter	Coefficient (SE)	t-statistic
G00 Grand Mean	-.01 (.04)	1.5	G00 Grand Mean	-.01 (.04)	3.0
Level 1 Covariates			Level 1 Covariates		
G10 Sex	.08 (.06)	1.34	G10 Sex	-.12 (.07)	1.74
G20 Asian-American Race	-.40 (.12)	3.33**	G20 Asian-American Race	-.11 (.15)	78
G30 African-American Race	.21 (.12)	1.76	G30 African-American Race	.19 (.15)	1.29
G40 European-American Race	-.06 (.11)	51	G40 European-American Race	.27 (.14)	1.97*
G50 SES	-.20 (.04)	4.39**	G50 SES	-.11 (.04)	2.78*
Conditional Error Variance Estimates		Chi-Square* (df=264)	Conditional Error Variance Estimates		Chi-Square* (df=264)
Within	.44		Within	.64	
Between	10	388.93**	Between	.06	313.52*
Reliability*	.31		Reliability*	.15	

\* Chi-square values and reliability estimates are approximations based on averages • p < .01, \*\* p < .05

## Summary of Findings Derived from ANOVA and ANCOVA Models

Analyses presented to this point indicate that systematic variance between neighborhoods (after controlling for individual characteristics) exist only on measures of neighborhood disorganization, weak neighborhood attachment, and family conflict. Variance between neighborhoods on the other variables identified in the ANOVA models, harsh/ physical discipline, poor academic achievement, and involvement with delinquent peers was accounted for by individual-level covariates. Thus, further testing with those outcome variables was not required in this sequence. In the models that follow, the census measures of neighborhood disadvantage and residential stability were added as predictors at level 2 in an effort to explain variance between neighborhoods that remained on those three measures

### Full Models

The final step in the HLM analyses involved adding predictors at level 2 representing neighborhood disorganization and residential stability, as measured by the census. These variables were hypothesized to explain between-neighborhoods differences on each outcome variable, youth-reported neighborhood disorganization, weak neighborhood attachment, and family conflict, that remained after the effects of individual characteristics were removed. The general notation for the level 1 equation remained the same:

$$Y_{ij} = B_{0j} + B_{1j} (\text{Sex}) + B_{2j} (\text{European-American race}) + B_{3j} (\text{African-American race}) + B_{4j} (\text{Asian-American race}) + B_{5j} (\text{SES}) + r_{ij}$$

At level 2.

$$B_{0j} = G_{00} + G_{01} (\text{Neighborhoods Disadvantage}) + G_{02} (\text{Residential Stability}) + U_j$$

$$B_{1j} = G_{10}$$

$$B_{2j} = G_{20}$$

$$B_{3j} = G_{30}$$

$$B_{4j} = G_{40}$$

$$B_{5j} = G_{50}$$

Where  $B_{0j}$  is the adjusted intercept for neighborhood  $j$

$B_{1j}$  through  $B_{5j}$  are adjusted slope estimates fixed to be equal across neighborhoods

As previously suggested, a notable reduction in conditional error variance at the neighborhood level with the inclusion of level 2 predictors (along with significant regression coefficients) indicates important explanatory effects of those variables. Neither level 2 predictor was related to youth-reported family conflict. However, as shown in Table 3.3, the census measure of neighborhood disadvantage was a significant predictor of both youth-reported neighborhood disorganization and weak neighborhood attachment.

Table 3.3 Coefficients, Conditional Variance Estimates, and Reliabilities for Full Models

Neighborhood Disorganization		Weak Neighborhood Attachment	
Parameter	Coefficient (SE)	Parameter	Coefficient (SE)
Level 2		Level 2	
G00 Grand Mean	-.07 (.03)	G00 Grand Mean	-.08 (.03)
G01 Disadvantage	.28 (.04)	G01 Disadvantage	.17 (.04)
G02 Stability	-.03 (.03)	G02 Stability	-.07 (.03)
Level 1 Covariates		Level 1 Covariates	
G10 Sex	.10 (.06)	G10 Sex	-.03 (.06)
G20 Asian-American Race	-.50 (.12)	G20 Asian-American Race	-.24 (.12)
G30 African-American Race	.07 (.11)	G30 African-American Race	-.09 (.13)
G40 European-American Race	.04 (.11)	G40 European-American Race	-.12 (.11)
G50 SES	-.13 (.04)	G50 SES	-.07 (.04)
Conditional Error Variance Estimates	Chi-Square* (df=262)	Conditional Error Variance Estimates	Chi-Square* (df=262)
Within	.43	Within	.47
Between	.04	Between	.03
Reliability*	.17	Reliability*	.10
			284.74

\* Chi-square values and reliability estimates are approximations based on averages \*\* p < .01, \* p < .05

Residential stability was a significant predictor of weak neighborhood attachment, but not neighborhood disorganization. With the inclusion of the level 2 predictors in each model, clear reductions in error variance between neighborhoods were found for these youth-report measures. Between-neighborhood variance in neighborhood disorganization dropped by an additional 60% from the ANCOVA model. For weak neighborhood attachment, the reduction in between-neighborhood variance from the ANCOVA model was approximately 50%. For both measures, no significant variance between neighborhoods remained after the census variables were added to the models.

The relationship between the census disadvantage measure and the youth-report measure of neighborhood disorganization is particularly noteworthy from the standpoint of the methodological objective discussed at the beginning of this chapter. HLM analyses showed that youths' reports of neighborhood disorganization differ systematically between neighborhoods and that variation in reports is associated with level of disadvantage measured by the census. These findings suggest that the youth-report measure does, in fact, capture information about neighborhood disadvantage and, thus, can be used as a surrogate measure of neighborhood context.

The lack of a relationship between residential stability and neighborhood disorganization suggests that, alone, mobility among residents is not indicative of a breakdown in social functioning reflected in the youth-report measure. Apart from economic factors, the influence of high residential turnover on disorganization may be less pronounced. Further study of the contribution of different aspects of context to the organization and functioning of neighborhoods is necessary.

Both disadvantage and stability census measures were predictive of weak neighborhood attachment reported by youths. Youths living in impoverished neighborhoods with high mobility were less emotionally attached and less positively-oriented to those areas. Weak neighborhood attachment may increase risk for violent and non-violent crimes by promoting a disregard for neighborhood residents and facilities, which can work against prosocial constraints on behavior. Poor attachment may also be indicative of low cohesion among residents and a breakdown in informal control networks (Sampson, 1997, Sampson et al., 1997)

#### Further Tests of Neighborhood Context on Violence and Gang Involvement

There may be cases in which specific variables added to a multi-level model will show significant predictive effects despite initial statistical tests (based on multiple degrees of freedom) indicating no between-group variance exists. Therefore, each of the previously identified outcome variables (i.e. those that were excluded after running ANOVA models) were analyzed once again in full models including covariates and level 2 predictors. This was done to determine whether neighborhood effects may have been masked in previous analyses by the small number of individuals per block group area. This follow-up test is more sensitive and may show significant results when differences between groups are hard to identify. This analysis was supported by theory linking neighborhood context to increased risk and occurrence of violence. It was hypothesized that although previous analyses did not identify differences between neighborhoods on violence and

other variables, neighborhood disadvantage and stability, measured by the census, could still be predictive in these models. Stated differently, predictive relationships might be found despite there being little variance between neighborhoods to predict.

The results of these analyses, shown in Table 3.4, partially support this hypothesis. Neighborhood disadvantage, measured by the census, was predictive of violence at all three ages (15, 16, and 18), although clear relationships were only identifiable when non-significant level 1 covariates and residential stability (which was not predictive) were removed and models re-estimated. A relationship between gang involvement at age 15 and neighborhood disadvantage was also found. Residential stability failed to significantly predict variance in these outcome measures. These results tentatively support the hypothesis that youths living in disadvantaged neighborhoods do face increased risk for violence and for gang involvement. Importantly, greater potential for violence appears to be associated largely with level of disadvantage rather than with residential instability.

Table 3.4. Effect of Neighborhood Disadvantage on Violence and Gang Involvement <sup>a</sup>

Variable	Adjusted Coefficient for Neighborhood Disadvantage <sup>a</sup>	Standard Error	t-value	Odds Ratios (Compares scores at the 90th and 10th percentiles)
Violence at Age 15	.48	.10	4.80 **	2.97
Violence at Age 16	.31	.09	3.30 **	2.02
Violence at Age 18	.37	.10	3.59 **	2.32
Gang Involvement	.61	.12	5.00 **	3.99

<sup>a</sup> Coefficients for violence at each age represent relationships between the predictor and the outcome variable when non-significant covariates and residential stability were removed.

\*\* p < .01

The strength in prediction of neighborhood disadvantage on violence at each age is represented using odds ratios (column 4 of Table 3.4). These odds ratios reflect a point comparison between scores at the 90th and 10th percentiles in the distribution of scores on the neighborhood disadvantage measure. Representing effects in this way provides an illustration of the likelihood of violence associated with living in highly disadvantaged neighborhoods compared to the likelihood of violence associated with living in the least disadvantaged areas. These odds ratios are adjusted for other variables in the models. As shown, at each age the odds for violence associated with living in a high disadvantage neighborhood were more than two times greater than the odds associated with living in low disadvantage neighborhood. At age 15, a near tripling of the odds for violence was associated with living in a high disadvantage neighborhood. Additionally, the likelihood of gang involvement was also elevated in the most disadvantaged neighborhoods. In fact, the odds for gang involvement associated with living in a high disadvantage neighborhood were nearly four times greater than the odds associated with living in a low disadvantage neighborhood.

## CHAPTER 4 · LOGISTIC REGRESSION ANALYSES OF RISK FACTORS FOR YOUTH VIOLENCE

### Logistic Regression Analyses of Predictors of Youth Violence

The analyses in Chapter 3 showed consistency between the 1990 census measure of neighborhood disadvantage and youth-reported neighborhood disorganization. Previous analyses also indicated that the power to detect differences on individual outcome measures at the neighborhood level may be reduced by the small number of youths per block group in this data set. Thus, neighborhood effects are likely underestimated in the multi-level models. For this reason, a different analysis procedure was used to achieve the remaining research objectives of this study. The youth-report measure of neighborhood disorganization was used as a proxy for neighborhood context and standard logistic regression models were carried out.

The primary objectives for these analyses were: 1) to determine the extent to which risk factors for violence measured at age 15 differ in their strength of prediction for violence measured at three ages: 15, 16, and 18, 2) to determine the extent to which risk factors in different domains (neighborhood, family, school, and peer) contribute uniquely to the prediction of violence when variables are entered hierarchically by blocks, and 3) to examine whether the effect of neighborhood disorganization on youth-reported violence is mediated by other predictors theorized to have more proximal effects on that outcome.

The first two objectives pertain to the dynamic prediction of youth violence and to the relative importance of predictors in multivariate models. Examining how the strength

of predictors varies for violence at different ages should reveal which factors produce immediate effects and which factors produce enduring effects on behavior. Further, by assessing which factors stand out as predictors of violence in multivariate models, information is gained about the most powerful influences on violence at each age. Information is also provided about potential mediator relationships. Findings derived from these analyses are useful for developing foci for preventive interventions. Research questions relevant to the analyses (divided into three sections in this chapter) are presented below. Section 1 addresses the first research question. Section 2 addresses questions 2-4. And Section 3 addresses question 5.

### **Research Questions**

- 1) Is there variation or stability in the predictive strength of risk factors for violence at ages 15, 16, and 18?
- 2) Do risk factors in a each domain (neighborhood, family, school, and peer) contribute significantly to the prediction of violence when they are entered in a hierarchical fashion informed by theory?
- 3) To what degree do factors in the family, school, and peer domains show unique predictive effects on violence in multivariate analyses?
- 4) Is the effect of neighborhood disorganization on youth violence fully or partially mediated by risk factors in other domains hypothesized to have more proximal effects on violence?
- 5) Are the unique effects of risk factors on violence at ages 16 and 18 maintained when

violence at age 15 is treated as an additional covariate<sup>7</sup>

## Section 1. Baseline Relationships for Risk Factors and Violence at Ages 15, 16, and 18

*1) Is there variation or stability in the predictive strength of risk factors for violence at ages 15, 16, and 18?*

To address this research question, each of the previously identified neighborhood, family, school, and peer variables were entered separately into logistic regression models with covariates in order to determine their baseline prediction of violence controlling for demographic characteristics. Covariates included gender (females coded 0 and males coded 1), family SES (represented by a composite of parents' reported income and level of education in 1990), and race (represented by two dummy variables, where African-Americans and Asian-Americans were compared separately to others). A third race variable previously described (a dummy variable representing European-American status) and a variable representing the number of years a youth had lived in a block group neighborhood (ranging from 1-3 according to home addresses in 1990 through 1992) were excluded because they showed no consistent relationship with violence at any age considered here.

Regression coefficients, standard errors, and odds ratios are presented in Table 4.1 through Table 4.3 for analyses corresponding to violence measured at ages 15, 16, and 18. In order to illustrate the magnitude of relationships using odds ratios for continuous predictor variables, scores at the 90th and 10th percentiles in each distribution were

selected. These scores were used to represent the relative risk for violence of individuals at a high level of the predictor compared to those at a low level of the predictor. The odds ratio for gang involvement, which is represented by a dichotomous variable, reflects the elevated risk for violence associated with being involved in a gang (coded 1 on a 0-1 variable)

As shown, with the exception of weak family bonds and weak neighborhood attachment (both non-significant in the prediction of violence at age 16), all of the variables were related to violence at each of the three ages. For violence at age 15, involvement with delinquent peers was a very strong predictor. Youths involved with highly delinquent peers at age 15 had odds for violence almost nine times greater than others. Risk for violence of youths who reported they belonged to a gang was also noticeably high. The odds for violence of gang members were over seven times greater than the odds for others in the sample not involved in a gang. Other particularly strong predictors of violence at age 15 included neighborhood disorganization, poor family management, harsh/ physical discipline, family conflict, and weak commitment to school.

Table 4.1. Relationships between Predictors and Violence at Age 15 Adjusted for Covariates (gender, SES, Asian-American race, and African-American race)

Variable	Coefficient (SE)	Odds Ratios <sup>a</sup>
Neighborhood Disorganization	81 (.15) **	5.57
Weak Neighborhood Attachment	43 (.15) **	2.26
Poor Family Management	82 (.17) **	3.73
Weak Family Bonds	56 (.15) **	2.79
Harsh/ Physical Discipline	86 (.19) **	3.63

Table 4.1 (continued).

Variable	Coefficient (SE)	Odds Ratio <sup>a</sup>
Family Conflict	.66 (.13) **	4.03
Weak Commitment to School	.81 (.17) **	3.74
Poor Academic Achievement	.50 (.13) **	2.68
Involvement with Delinquent Peers	1.21 (.16) **	8.83
Gang Involvement	2.00 (.36) **	7.39

<sup>a</sup> Odds ratios reflect a point comparison between individuals at approximately the 90th and 10th percentiles in the distribution of scores on that variable, except for gang involvement which is dichotomous. Larger odds ratios indicate higher risk for violence.

\*\* p < .01

Gang involvement at age 15 was again associated with very high risk for violence at age 16. The odds for violence at age 16 for gang members were nearly six times greater than the odds for the remainder of the sample. Harsh/ physical discipline by parents at age 15 ranked as a very strong predictor of violence at age 16 as well, with youths who experienced a high level of harsh/ physical discipline at age 15 having odds for violence nearly four and a half times greater than those who experienced a low level of harsh/ physical discipline. Being involved with highly delinquent peers at age 15 was associated with an odds ratio of 4.15, also indicating very elevated risk for violence at age 16. Further, youths who lived in a highly disorganized neighborhood at age 15 were at notably higher risk for violence at age 16 compared to those who lived in a less disorganized neighborhood, as indicated by an odds ratio of 3.07. Weak commitment to school, poor family management, family conflict, and poor academic achievement were also strong predictors of violence at age 16. Generally, the pattern of relationships involving predictors and violence at age 16 resembled the pattern for violence at age 15.

However, the strength of most relationships diminished in this longitudinal analysis. Differences in the pattern of risk factor relationships for violence at age 16 included the relatively strong effect of harsh/ physical discipline and the non-significant effects of weak neighborhood attachment and weak family bonds.

Table 4.2 Relationships between Predictors and Violence at Age 16 Adjusted for Covariates (gender, SES, Asian-American race, and African-American race)

Variable	Coefficient (SE)	Odds Ratios <sup>a</sup>
Neighborhood Disorganization	53 ( 15) **	3.08
Weak Neighborhood Attachment	24 ( 16)	1.57
Poor Family Management	52 ( 16) **	2.30
Weak Family Bonds	22 ( 14)	1.50
Harsh/ Physical Discipline	1.00 ( .19) **	4.48
Family Conflict	46 ( 14) **	2.64
Weak Commitment to School	62 ( 17) **	2.73
Poor Academic Achievement	51 ( 14) **	2.73
Involvement with Delinquent Peers	79 ( 15) **	4.15
Gang Involvement	1.79 ( .35) **	5.99

<sup>a</sup> Odds ratios reflect point comparison between individuals at approximately the 90th and 10th percentiles in the distribution of scores on that variable, except for gang involvement which is dichotomous. Larger odds ratios indicate higher risk for violence.

\*\* p < .01

Gang involvement at age 15 also predicted violence at age 18, as it had for violence at ages 15 and 16, but less strongly. The odds for violence associated with being involved in a gang at age 15 dropped from 7.39 at age 15 and 5.99 at age 16 to 2.36 at age 18. In contrast, involvement with delinquent peers at age 15 remained strongly predictive of violence at age 18 (odds ratio= 4.15). Living in a highly disorganized

neighborhood at age 15 was also associated with notably elevated risk for violence at age 18, as was being exposed to high levels of poor family management and harsh/ physical discipline and having poor academic achievement. All were associated with odds ratios of 3.0 or greater. Poor academic achievement replaced weak commitment to school as the school factor that appeared to be most strongly related to later violence.

Table 4.3 Relationships between Predictors and Violence at Age 18 Adjusted for Covariates (gender, SES, Asian-American race, and African-American race)

Variable	Coefficient (SE)	Odds Ratios *
Neighborhood Disorganization	.54 (.14) **	3.14
Weak Neighborhood Attachment	.36 (.15) *	1.98
Poor Family Management	.70 (.16) **	3.09
Weak Family Bonds	.26 (.14) °	1.61
Harsh/ Physical Discipline	.76 (.19) **	3.13
Family Conflict	.44 (.13) **	2.53
Weak Commitment to School	.34 (.17) *	1.74
Poor Academic Achievement	.56 (.13) **	3.01
Involvement with Delinquent Peers	.79 (.16) **	4.15
Gang Involvement	.86 (.35) **	2.36

\* Odds ratios reflect point comparison between individuals at approximately the 90th and 10th percentiles in the distribution of scores on that variable, except for gang involvement which is dichotomous. Larger odds ratios indicate higher risk for violence. ° This variable is marginally significant ( $p < .07$ ). \*\*  $p < .01$ . \* $p < .05$

## Section 2 Hierarchical Logistic Regressions Examining Violence at Ages 15, 16, and 18

*2) Do risk factors in a each domain (neighborhood, family, school, and peer) contribute significantly to the prediction of violence when they are entered in a hierarchical fashion informed by theory?*

*3) To what degree do factors in the family, school, and peer domains show unique predictive effects on violence in multivariate analyses?*

*4) Is the effect of neighborhood disorganization on youth violence fully or partially mediated by risk factors in other domains hypothesized to have more proximal effects on violence?*

In this next set of analyses, risk factors were entered hierarchically in blocks according to domains. Analyses examined the overall contribution of each block to the prediction of violence and assessed each variable's unique effect. The order for entering blocks into each model followed the earlier described theory about the progression of social influences leading to violent behavior in adolescence. This theory implied that school and peer influences are most proximally linked to the occurrence of violence among youths. Neighborhood and family influences, although important, may be further removed from the actual commission of violent acts. To reflect this pattern, demographic variables were included as covariates in Step 1, and neighborhood, family, school, and peer factors were entered subsequently in that order. Although this ordering clearly oversimplifies the dynamic interaction among social mechanisms promoting violence, it provides a useful structure for addressing the overall explanatory contribution of variables in different domains and provides a framework for examining mediational processes. In the neighborhood domain, only youth-reported neighborhood disorganization was included. Based on preliminary analyses, weak neighborhood attachment was excluded as a predictor from these models because it appeared not to explain additional variance in the

occurrence of violence at any age beyond that explained by youth-reported neighborhood disorganization.

Tables 4.4 through 4.6 present information about the added contribution of predictor blocks and the strength of relationships between each risk variable and violence at age 15, 16, and 18. As shown, each block contributed significantly to the prediction of violence at each age, as represented by increases in the model chi-square values. A significant chi-square value indicates that the inclusion of predictors on a given step improved the overall fit of the model to the data. In Step 1, the chi-square value represents the fit of the model with only demographic variables compared to the null model.

As shown in Table 4.4, neighborhood disorganization had a strong unique effect on violence at age 15 that persisted through the final step in the model. Of the family variables that were added to the model in Step 3, harsh/physical discipline and family conflict were marginally significant. Harsh/physical discipline remained marginally significant in the final step of the analysis. Weak commitment to school and poor academic achievement had unique effects on violence at age 15 when they were entered together in Step 4. Weak commitment to school at age 15 remained significant in Step 5.

**Table 4 4 Hierarchical Logistic Regression for Violence at Age 15**

Variable	Step 1		Step 2		Step 3		Step 4		Step 5		
	B	SE	B	SE	B	SE	B	SE	B	SE	
Demographics											
Neighborhood											
Family											
School											
Peer											
Male gender	51	23	02	49	24	04	50	25	05	48	28
As-Amtr race	-1	28	38	-1	03	39	01	-1	04	29	01
AI-Amtr race	36	26	16	09	27	75	19	29	50	02	29
SSES	-45	15	<.01	-23	16	15	-19	17	28	-16	18
Neigh disor				80	15	<.01	63	16	<.01	64	16
Poor fam mgt				29	23	21	20	19	30	12	24
Weak family bonds				42	22	06	45	23	05	45	23
Harsh/physical discipl				29	17	09	23	18	18	23	18
Family conflict				57	21	01	57	21	01	45	22
Weak commit to school				29	14	04	29	14	04	19	15
Poor academic achiev				78	18	<.01	78	18	<.01	78	18
Involv del peccs				112	45	01	112	45	01	112	45

Giang involvement  
 \* estimates based on averages across analysis runs

In that final step, involvement with delinquent peers and gang involvement were added and both variables were significant. Notably, with the exception of male gender, which was marginally significant, none of the demographic variables entered in Step 1 remained significant in Step 5. This suggests that while race and socioeconomic status may be related to violence, their influence appears to be mediated through processes of socialization in the neighborhood, family, school, and peer group.

As shown in Table 4.5, neighborhood disorganization, measured at age 15, was predictive of violence at age 16 even after demographic characteristics were controlled. Its effect was retained through Step 4, prior to accounting for peer influences. In the family domain, harsh/ physical discipline at age 15, was the only variable with a unique predictive effect, entered in Step 3. Its significant relationship with age 16 violence persisted through Step 5, the final step in the analysis. In Step 4, weak commitment to school at age 15 and poor academic achievement both predicted violence at age 16 after controlling for all demographic, neighborhood, and family variables. Weak commitment to school remained significant in the final step of the analysis. Further, involvement with delinquent peers and gang involvement (measured at age 15) showed persisting, unique effects on violence at age 16. And as in the previous analysis, the predictive effects of the demographic variables (including male gender in this analysis) entered in Step 1 were mediated by neighborhood, family, school, and peer variables.



Table 4.6 shows the results of the hierarchical logistic regressions for risk factors at age 15 predicting violence at age 18. Unlike the analyses for violence at ages 15 and 16, male gender was a strong and persistent predictor of violence at age 18. This is an important difference that may relate to changes in the prevalence of violence for males and females. Other than male gender, demographic characteristics were not significantly related to violence in the final step of the analysis. Neighborhood disorganization measured at age 15 was also a unique predictor of violence at age 18 through Step 4. However, it dropped to marginal significance ( $p < .09$ ) in the final step of the analysis when peer influences at age 15 were controlled. Both poor family management and harsh/physical discipline at age 15 predicted violence at age 18 when they were entered in Step 3. In Step 4, harsh/physical discipline dropped to non-significance after controlling for school factors. In contrast, poor family management remained significant through Step 5. Poor academic achievement at age 15 predicted violence at age 18 in both Steps 4 and 5. Weak commitment to school at age 15, however, was not uniquely predictive of violence at age 18. Of the peer variables, only involvement with delinquent peers at age 15 had a unique predictive effect when it was entered in the last step with gang involvement, a noted difference from the previous two analyses where gang involvement was a unique predictor in Step 5.

**Table 4.6 Hierarchical Logistic Regression for Violence at Age 18**

Step	Variable	-2 log likelihood for null model <sup>a</sup> = 505.75		Step df		Improvement in Chi-Square <sup>a</sup>		p		
		B	SE	B	SE	B	SE			
	Demographics									
	Neighborhood									
	Family									
	School									
	Peer									
	Results Step 1									
	Male gender	.97	.25	.01	.96	.26	.01	1.02	.27	<.01
	As-Amer race	-.81	.34	.02	-.75	.37	.04	-.39	.38	.30
	Al -Amer race	.31	.26	.23	.23	.28	.41	.18	.30	.56
	SES	-.39	.15	.01	-.26	.16	.12	-.19	.18	.30
	Neigh disor				.55	.16	<.01	.38	.17	.02
	Poor fam nigt				.57	.22	.01	.53	.23	.02
	Weak family bonds				-.15	.18	.42	-.13	.19	.48
	Harsh/physical discip				.46	.22	.03	.35	.22	.12
	Family conflict				.04	.16	.83	.07	.17	.69
	Weak commit to school				-.07	.20	.75	-.20	.21	.34
	Poor academic achiev				.38	.14	.01	.35	.15	.02
	Involv del peers							.59	.19	<.01
	Gang involvement							-.22	.40	.59

<sup>a</sup> estimates based on averages across analysis runs

## Summary of Findings from Hierarchical Regression Models

Findings presented in Tables 4.3 through 4.5 pertain to the overall contribution of predictors entered in blocks according to domains: neighborhood, family, school, and peer. They also address unique effects of each predictor on violence at ages 15, 16, and 18. For violence at these three ages, each block, entered hierarchically, significantly improved the fit of the regression models to the data. This suggests that whether or not risk factors within each domain demonstrate unique relationships with each outcome measure, in combination they provide useful information about the occurrence of violence. Substantively, these analyses show the importance of studying risk factors across multiple domains, rather than within a single domain, in order to improve understanding about developmental factors underlying violence. Looking narrowly at a small subset of risk factors may lead to poorly specified models from which questionable inferences about etiology may be drawn.

With reference to the unique effects of predictors on violence, several findings are noteworthy. With the exception of male gender, across hierarchical analyses, demographic variables entered in Step 1 were fully mediated in their prediction of violence. These findings are important because they demonstrate that once factors pertaining to youths' socialization are accounted for, relationships between race and SES and violence are consistently reduced to non-significance. Thus, for example, while being African-American may be associated with an increased risk for violence according to univariate tests, violent behavior is determined to a greater extent by whether or not

youths are exposed to negative influences in their neighborhoods, families, schools, and peer groups. Although research has shown that individual characteristics other than race and SES, such as childhood hyperactivity and low intelligence, increase risk for violence (Farrington, 1997; Hawkins et al., 1998), the present analyses indicate that social factors play an important role in the etiology of violence.

The finding that male gender is a unique predictor of violence at age 18 may reflect a change in prevalence of violence for males and females from ages 15 and 16. Elliott (1994) found that violence peaks in prevalence later developmentally for males than for females. For females, desistance occurs earlier and more precipitously. This may explain why the proportion of males and females involved in violence at ages 15, 16, and 18 differed markedly in this study. Further examination of gender differences in patterns of violence onset, maintenance, and desistance is necessary to advance understanding of this issue.

As proposed previously, during mid-adolescence, violence may become an extension of a general antisocial pattern that reflects rebellion against authority, self-centeredness, and extreme vulnerability to peer pressure for boys as well as girls (Spivak, Prothrow-Stith, and Hausman, 1988). Moffitt's (1993) theory of life-course persistent and adolescent limited offending underscores the salience of peer influences on violence, and antisocial behavior more generally, during adolescence. She proposes that primarily prosocial youths are drawn into antisocial behavior by other more deviant youths during adolescence. For most, by the end of adolescence, antisocial patterns are relinquished and more prosocial patterns are reinstated. As youths transition out of adolescence, taking

on adult roles and responsibilities, there is an increasing likelihood that their behavior will conform to prosocial standards (Laub & Lauritsen, 1993)

Hierarchical regression analyses revealed that neighborhood disorganization was a strong predictor of violence. In the analysis for violence at age 15, neighborhood disorganization persisted as a unique predictor through the final step in the five step sequence, indicating that its influence on behavior was not mediated by other factors in the model. For violence at age 16 and 18, the effect of neighborhood disorganization fell to non-significance or marginal significance in Step 5, indicating some level of mediation. It is possible that neighborhood disorganization has an immediate influence on violence by providing greater opportunities for youths to engage in antisocial acts. Lax formal and informal enforcement of laws and handgun availability are aspects of the opportunity structure of disorganized neighborhoods that may promote violence.

In the family domain, variables pertaining to weak family bonds and family conflict at age 15 were not uniquely predictive of violence at any of the ages examined, after controlling for other factors. However, harsh/ physical discipline by parents at age 15, which combined items addressing parents tendency to yell and scream at their children and spank or hit them for punishment, was a unique predictor of violence at age 16, remaining significant after accounting for neighborhood, school, and peer influences. Poor family management at age 15 was significant in Step 5 of the analysis for violence at age 18. These findings suggest that families continue to influence youths' behavior during adolescence. Through the use of physical, potentially abusive, discipline practices parents may teach adolescent children that violence is acceptable and that it can provide a means

for achieving control over others. Difficulties between a parent and a child may also cause the child to seek others for support. Becoming attached to peers who engage in antisocial conduct may offer social support while intensifying and reinforcing negative beliefs and behaviors. A failure on the part of parents to monitor children's behavior results in increased opportunities for involvement with antisocial peers and for that involvement to go unnoticed (Reid, 1993)

The fact that family bonds appear to be less central to the etiology of violence during adolescence may be understood in two ways. First, it may be the case that strong emotional ties between youths and their parents are more salient to development in early childhood (Hawkins & Catalano, 1996). As children enter adolescence, their relationships with parents shift during a process of individuation. Youths seek autonomy from their parents and other adult figures, while striving to develop their own identities (Dryfoos, 1990). Negotiated successfully by the family, this process may result in a positive transformation of parent-child relationships and the acquisition of new skills and competencies for an adolescent. However, during the transition to young adulthood, adolescents may distance themselves emotionally from their parents, while building relationships with peers (Dryfoos, 1990). Thus, bonds between parents and children may be weakened naturally during development, having no direct influence on antisocial behavior. Rather, effects on behavior may stem more directly from youths' socialization within peer groups.

A second explanation for why weak family bonds did not predict increased risk for violence in these analyses involves a potential problem with measurement specificity in the

family bond construct, an issue raised generally in the research literature (see Hawkins et al., 1998). Perhaps, in order to find effects of family bonds on behavior in adolescence, a distinction must be drawn between bonding to prosocial versus antisocial parents.

Bonding to parents who condone or encourage violence, for example, may have a different influence on behavior than bonding to parents who actively discourage violence. Conceivably, strong bonds to antisocial parents would increase risk for violence, while strong bonds to prosocial parents would lower risk for violence. Without making this distinction, it is difficult to discern whether there truly is no effect of bonding or whether results are confounded in the analysis.

Weak commitment to school at age 15 uniquely predicted violence at ages 15 and 16 in the final step of each analysis. Further, poor academic achievement at age 15 was a unique predictor in the final step of the analysis for violence at age 18. Together these results suggest that school experiences are important in the etiology of violence and that youths who fail to develop an interest in their education and in doing well academically may not benefit from the positive socialization that schools can provide. For youths who drop out of school prematurely, problems may be compounded by difficulties finding work and holding down steady employment (Dryfoos, 1990; McLanahan, 1983). Consequently, these youths are stripped of opportunities for developing and refining skills, enhancing self-efficacy, and establishing financial security, further jeopardizing a successful transition into adulthood.

Though variables in the school domain predicted violence at different ages, it is noteworthy that the strength of individual school-related predictors varied with age of

outcome measurement. The change in status of the weak school commitment and poor academic achievement variables in the final analysis for violence at age 18 (poor academic achievement was significant, but weak school commitment was not) raises questions about the extent to which mechanisms underlying school influences on behavior vary. For instance, it may be the case that youths who perform poorly on academic tasks face greater risk for violence in subsequent years because their potential for school failure and dropout is substantially increased. Long-term ramifications for youths who indicate a disliking for school may not be as pronounced if their discontentment is brief or expressed out of frustration with a particular teacher or class. Yet, short-term risk for violence may be increased by diverting youths' attention away from school activities and increasing vulnerability to negative peer influences. The present analyses do not explain these differences in the priority of school commitment and academic achievement in predicting violence at later ages. The results do point to interesting questions for further consideration.

Being involved in a gang at age 15 was highly predictive of violence at ages 15 and 16. These findings corroborate earlier analyses of SSDP data (Battin et al., 1998; Hill et al., 1996) and results from studies showing the importance of gang influences on violence and other forms of antisocial behavior (see Spergel, 1984; Thornberry, 1998; Thornberry et al., 1993). In part, gangs may increase risk for violence by establishing norms supporting antisocial behavior, by providing a context in which antisocial behaviors are modeled and reinforced, and by creating opportunities for involvement in violent and non-violent crimes. While patterns of behavior may be shaped during a youth's involvement in

a gang, strong carry-over effects on behavior may not necessarily occur (Hill et al., 1996). After leaving a gang, an individual's involvement in violent crimes appears to drop significantly (Hill et al., 1996). This is particularly noteworthy given that in the SSDP data, individuals were involved in gangs for short periods, typically a year or less (Hill et al., 1996).

The present data support the assertion that gang influences on behavior are direct and dependent on gang membership. Being involved in a gang was not predictive of violence at age 18, holding other factors constant. Involvement with delinquent peers, on the other hand, was predictive of violence at age 18 (in Step 5), suggesting that apart from gangs, well established friendships with antisocial youths may increase risk for violence in later years. It may be that involvement with delinquent peers, relative to gang associations, influences the values and beliefs an individual holds toward violence in a more profound way, extending risk for violence over longer periods. It may also be the case that once an individual forms relationships with delinquent peers he or she will be more likely to develop ties to others who hold antisocial beliefs and values, placing that individual in constant contact with negative social influences.

### Section 3. Logistic Regressions of Violence at Age 16 and 18 Controlling for Violence at Age 15

*5) Are the unique effects of risk factors on violence at ages 16 and 18 maintained when violence at age 15 is treated as an additional covariate?*

In this final set of logistic regressions, violence at age 15 was added as a covariate to models examining violence at ages 16 and 18. These analyses provide a basis for determining whether the unique effects for variables in the final step of the previous analyses are maintained when earlier violence is partialled out. This is a more stringent test of predictive relationships that isolates later violent behavior from violence that occurred one and three years earlier. Hence, estimates reflect change in risk during the three year period under examination. Results from these models are shown in Table 4.7 and Table 4.8. In these tables, odds ratios are again presented for variables with significant unique effects. As in previous analyses, odds ratios were computed by comparing scores at the 90th percentile and 10th percentiles in the distribution of scores on each variable.

After controlling for violence at age 15, harsh/ physical discipline and gang involvement predicted violence at age 16. Weak commitment to school was marginally significant ( $p < .08$ ). Involvement with delinquent peers, however, dropped to non-significance when violence at age 15 was controlled ( $p < .15$ ). The odds for violent behavior were more than three times greater for those who received a high level of harsh/ physical discipline at age 15 compared to youths in the sample who received a low level of harsh/ physical discipline. The odds for violence at age 16 for youths with very weak commitments to school at age 15 were almost two times greater than the odds for youths more strongly committed to school. Gang members at age 15 were more than two and a half times more likely to engage in violence than were others even after controlling for violence at age 15, again, suggesting the immediacy of the effects of gang membership on

violence.

The reduction in the magnitude of the coefficient for each predictor with significant unique effects on violence at age 16 from Step 5 of the previous analysis was approximately 19 % for weak commitment to school and gang involvement. The coefficient for harsh/ physical discipline dropped by approximately 6 %. These percentages indicate that the strength of relationships between predictors and the violence outcome measure were not substantially altered by adding the age 15 violence variable as a covariate.

Table 4 7 Unique Effects of Predictors on Violence at Age 16 Controlling for Violence at Age 15

Variable	Coefficient (SE)	Odds Ratios <sup>4</sup>
Male Gender	- .16 ( .26)	
Neighborhood Disorganization	.14 ( .17)	
Poor Family Management	-.15 ( .25)	
Weak Family Bonds	-.13 ( .20)	
Harsh/ Physical Discipline	.73 ( .24) **	2.99
Family Conflict	-.04 ( .20)	
Weak Commitment to School	.38 ( .22) °	1.85
Poor Academic Achievement	.21 ( .16)	
Involvement with Delinquent Peers	.26 ( .18)	
Gang Involvement	.95 ( .42) *	2.59
Violence at Age 15	1.22 ( .31) **	3.39

<sup>4</sup> Odds ratios reflect point comparison between individuals at approximately the 90th and 10th percentiles in the distribution of scores on that variable, except for gang involvement which is dichotomous. Larger odds ratios indicate higher risk for violence.

° This variable is marginally significant ( $p < .08$ ).

\*\*  $p < .01$ ; \*  $p < .05$

Variables with unique predictive effects on violence at age 18 also remained fairly consistent from Step 5 of the previous analysis. Male gender remained strongly predictive of violence at age 18. The odds for violence for males were 2.66 times greater than the odds for females. Poor family management remained significant. Controlling for other predictors, as well as violence at age 15, youths exposed to a high level of poor family management at age 15 had odds for violence at age 18 over two times greater than those exposed to a low level of poor family management. Having poor academic achievement at age 15 was also significantly related to later violence in this analysis. Individuals with very poor academic achievement had odds for violence nearly twice the odds for higher achievers. And youths involved with highly delinquent peers at age 15 had odds for later violence two and a half times greater than those not involved with delinquent peers.

Modest changes in the magnitude of the coefficients for predictors in this model from the last step of the hierarchical regression analysis where violence at age 18 was examined were also noted. The coefficient for poor family management remained virtually the same (an increase of 2%), whereas, for other variables small reductions were found. The coefficient for involvement with delinquent peers dropped by 12% and coefficients for male gender and poor academic achievement were reduced by 4% and 3%, respectively.

Table 4.8 Unique Effects of Predictors on Violence at Age 18 Controlling for Violence at Age 15

Variable	Coefficient (SE)	Odds Ratios <sup>a</sup>
Male Gender	.98 (.27) **	2.66
Neighborhood Disorganization	.26 (.18)	
Poor Family Management	.47 (.24) *	2.12
Weak Family Bonds	-.12 (.19)	
Harsh/ Physical Discipline	.32 (.23)	
Family Conflict	.00 (.18)	
Weak Commitment to School	-.25 (.21)	
Poor Academic Achievement	.34 (.15) *	1.95
Involvement with Delinquent Peers	.52 (.20) **	2.55
Gang Involvement	-.39 (.44)	
Violence at Age 15	.64 (.30) *	1.90

<sup>a</sup> Odds ratios reflect point comparison between individuals at approximately the 90th and 10th percentiles in the distribution of scores on that variable, except for gang involvement which is dichotomous. Larger odds ratios indicate higher risk for violence

\*\*  $p < .01$ , \*  $p < .05$

#### Summary of Results for Logistic Regressions of Violence at Age 16 and 18 Controlling for Violence at Age 15

The results of the regression models presented above provide evidence about the prediction of violence at ages 16 and age 18 setting equal individuals' status on violence at age 15. As noted, modest changes in the strength of relationships between previously identified predictors of violence were observed. The only variable reduced to non-significance with the inclusion of the age 15 violence measure was involvement with delinquent peers predicting violence at age 16. Weak commitment to school predicting

violence at age 16 dropped to marginal significance. These findings advance understanding about developmental factors in adolescence related to the onset and maintenance of violent behavior. Implications of these findings, and other findings generated in earlier analyses, for preventive interventions are discussed in Chapter 5.

## CHAPTER 5 DISCUSSION

This study combined measures from the 1990 census of Seattle with youth and parent-report measures from participants in the Seattle Social Development Project. Analyses for this study, grouped in two sets, included multi-level models of neighborhood and individual-level variables and logistic regressions of individual-level predictors of violence

Multi-level models were constructed using the HLM program of Bryk et al. (1996). These models addressed the nesting of individuals within neighborhoods and examined neighborhood effects with measures from the 1990 national census of Seattle. Logistic regression models were constructed in SPSS (Version 7.5.1, 1996). In these analyses, census measures were excluded in order to avoid merging together data across levels without accounting for their nested structure. Combining census and youth-report measures in single-level models requires that neighborhood data be assigned to individuals, which may lead to parameters being misestimated. A summary of findings, along with a discussion of the implications of these findings for preventive interventions, is provided below

### Summary of Findings for Multi-Level Models

First, results from the HLM analyses revealed the consistency between the census measure of neighborhood disadvantage and the youth-report measure of neighborhood disorganization. This is an important methodological finding that confirms the validity of

the youth-report measure. Second, despite the fact that neighborhood variability existed for a number of violence risk factors, only youth-reported levels of neighborhood attachment and gang involvement were related to the neighborhood census measures. Third, analyses found relationships between neighborhood disadvantage, measured by the census, and violence among youths at ages 15, 16, and 18. However, because these findings were based on minimal variability between neighborhoods on the violence outcome measures, they are tentative

In models in which violence was examined as an outcome, it appeared that neighborhood disadvantage was more strongly related to violence than was residential stability. This was not anticipated given prior research on neighborhood influences and theory. Residential instability in a neighborhood, absent economic disadvantage, does not appear to predict high risk for violence for a given individual. Additional research on this issue is warranted given its relevance to developmental theory and prevention.

As noted in Chapter 3, in order to study neighborhood effects on individual violence in multi-level models, it is necessary to have adequate representation of data both at the individual and neighborhood levels. HLM analyses carried out in this study were limited by the small number of individuals in each block group unit. Also problematic was the fact that relatively few sample members were involved in violence. Thus, low statistical power may have obscured effects of neighborhood context on some outcome variables. Research on neighborhood influences and violence involving large epidemiological samples is ongoing (see Sampson et. al., 1997). Findings from these studies should provide data that will inform theory and contribute to the development of

prevention programs and policies.

### Summary of Findings for Logistic Regression Models

Logistic regressions were used to examine risk for violence (at ages 15, 16, and 18) using variables, all from youth-report, representing the neighborhood, family, school, and peer domains. Variables included in these models were based on the conceptual framework guiding this study, which identified relationships among distal and proximal developmental factors related to violence. On the basis of theory, variables were entered hierarchically by blocks according to their domain of influence. Examination of the overall contributions of each variable block and of the unique effects of each risk factor to the prediction of violence were carried out. Results of the analyses revealed that each block contributed significantly to the overall prediction of violence at ages 15, 16, and 18. Variables with unique effects for violence at age 15 included neighborhood disorganization, weak commitment to school, involvement with delinquent peers, and gang involvement. For violence at age 16, harsh/ physical discipline by parents, weak commitment to school, involvement with delinquent peers, and gang involvement were unique predictors. Male gender, poor family management, poor academic achievement, and involvement with delinquent peers were unique predictors of violence at age 18.

These results suggest that certain predictors (e.g. neighborhood disorganization, weak school commitment, and gang involvement) show strongest effects when they are measured concurrently with, or in close proximity to, the violence outcome measure.

Gang involvement, as one example, may have a more immediate influence on violence that stems from an establishment of antisocial norms and opportunities promoting deviance, as well as the direct modeling of negative behaviors by peers. Further research on the temporal positioning of risk factors in relation to violent behavior and the mechanisms through which their influence is exerted is indicated.

The final set of regression models tested the effects of age 15 risk factors on violence at ages 16 and 18 when violence at age 15 was controlled. These analyses provided an examination of the unique effects of predictors when prior behavior was held constant across all individuals in the sample. Results resembled those for the final step in previous hierarchical regressions (variables with unique predictive effects remained fairly consistent), although, on average, the strength of relationships between predictors and the outcome variables diminished moderately. In the final regression model for violence at age 16, the variable representing involvement with delinquent peers at age 15, which was a unique predictor of violence at age 16 in Step 5 of the previous hierarchical regression analysis, dropped to non-significance.

### Implications for Preventive Interventions

Whether measured with census data or with youth reports, neighborhood context appears to contribute to violence among youths. Thus, prevention efforts must address neighborhood risk factors directly or build individuals' resistance to those factors. Sampson (1994) advocates for addressing the structural and social conditions in

neighborhoods that promote violent crimes. Consistent with this approach, attention may be given to building social cohesion among residents through programs like the neighborhood block watch (Brewer et al., 1995), improving housing conditions, and reducing discriminatory policies that isolate the most disadvantaged families in high crime urban areas (Sampson, 1994). Changing policies to distribute public housing facilities across residential areas has potential to lower violent crimes by deconcentrating poverty and providing more equal access to resources for families in need (Sampson, 1994). Other community crime control measures include intensifying and expanding policing efforts and restricting the sale of weapons (Brewer et al., 1995). Minimizing opportunities for street gangs to gather in inner city areas and for their activities to go unmonitored, an important objective for law enforcement, may improve public safety. Increasing social support for parents and children by building ties among families may strengthen parents' own monitoring of youths' behavior and foster collective efforts to reduce problems in the community. Many of these strategies are consistent with the community and situational prevention approaches described by Tonry & Farrington (1995).

Hawkins, Catalano, & Associates (1992) have developed an innovative prevention framework, called Communities that Care (CTC), that offers strategies for reducing youth violence (and other health-risk behaviors) at the community level (which may involve individual neighborhoods and larger geographic areas). CTC is organized around a risk and protective factor model that emphasizes the importance of building intervention programs through community mobilization. Including key community leaders in the planning, design, and implementation of programs is necessary. The process supported

by CTC involves assessing the risk and protective factors in a given community, developing a strategic plan for intervening, implementing the intervention, monitoring its progress, and evaluating its effectiveness. These steps are carried out under the supervision of a community board and assisted by trained professionals. The approach has been used to develop comprehensive prevention efforts in the United States and in the United Kingdom (Communities that Care UK, 1997).

In practice, community prevention programs may be difficult to implement and study in efficacy trials (Hawkins, Arthur, & Olson, 1998). This is especially true for controlled studies in which random assignment and experimental-versus-control comparisons are needed (see relevant discussions in Tolan & Brown, 1996; Brown & Liao, 1996). Prevention at the community level may also be difficult to justify to policy-makers and potential funders who are more apt to think about interventions as being person-focused and small scale. Yet, in spite of these challenges, steps have been taken to move the field of prevention toward community approaches because of their potential to reach large numbers of children and families and to effect changes across socializing institutions (Hawkins et al., 1998; Hawkins et al., 1992). The Communities that Care strategy of Hawkins et al. (1992), discussed above, is at the forefront of this movement.

Findings from this study (and others) indicate that peer influences on violence are powerful during adolescence. Involvement with delinquent peers and/or gang involvement were highly predictive of violence at ages 15, 16, and 18 in hierarchical regression models in which neighborhood, family, and school factors were controlled. The consistency in findings across studies suggests that for prevention efforts to be successful

in reducing risk for violence they must address peer influences in and outside of schools. One approach involves working to keep youths from joining gangs. According to Howell & Hawkins's (1997) review of effective violence prevention programs, only two projects that identify deterrence from gangs as a specific objective have been systematically evaluated. One program in Chicago, evaluated by Thompson & Jason (1988), involved classroom education and after-school activities. The classroom component included a 12 week curriculum designed to teach eighth grade students about the consequences of joining gangs and methods for resisting gang influences. Schools implementing the curriculum were located in high crime areas. Recreational activities, tutoring, and job training were offered to students in after-school sessions, implemented upon completion of the classroom instruction. A short-term follow-up indicated that participants in the program were somewhat less likely to join gangs compared to other youths. However, results were marginally significant (Howell & Hawkins, 1997, p. 91).

The Gang Resistance and Education Training program (G.R.E.A.T.), evaluated by Esbensen & Osgood (1997), also involved a classroom component with middle school students. Police officers instructed children on conflict resolution skills and provided them with information about perpetrators and victims of crime, as well as alternatives to gang involvement. Other topics covered in the nine week program included goal-setting and personal responsibility. As reported by Esbensen & Osgood (1997), youths who completed the program were identified as having more negative attitudes towards gangs and more positive attitudes towards police officers. Participants also reported having greater commitment to school and being involved with prosocial peers (Howell &

Hawkins, 1997) Findings from both of these projects are encouraging, but long-term follow-up and replication across sites is necessary to confirm their effectiveness. The need for replication is particularly important given a general lack of success in earlier gang prevention efforts (Battin et al., 1998)

From the position of social control theory (Hirschi, 1969) and the social development model (Catalano & Hawkins, 1996), the most effective mechanism for building resistance to deviant peers in and outside of gangs involves strengthening youths' bonds to their families and prosocial peers and adults. Bonding to school and community groups is also important. Strong bonds provide a vehicle for the transmission of prosocial values and beliefs that may protect youths from negative influences and promote conformity. Being committed to school often accompanies motivation to succeed academically. High academic achievement (and positive recognition from teachers and parents) may prompt a child to attend school regularly and stay in school until completion, reducing risk for violence. Effective schooling not only fosters subject knowledge, it also enhances problem-solving and critical thinking skills, reinforces prosocial norms, and promotes good work habits (Catalano & Hawkins, 1996), all of which are important in youth development. The relevance of school factors to violence prevention is supported by results from this study. Having a weak commitment to school and poor academic achievement predicted violence in regression models when family and peer influences (as well as prior violence) were controlled.

According to scholars, preventive interventions targeting school factors have potential to reduce risk for violence at the elementary school, middle school, and high school levels (Brewer et al., 1995, Howell & Hawkins, 1997, Wasserman & Miller, 1998, Weissberg & Greenberg, 1998). School-based programs may involve changing behavior management and instructional practices to reduce misbehavior and enhance student involvement in classroom activities. They may also involve working with students to increase mastery on academic tasks and promote social-interaction and problem-solving skills. Some programs are more context-focused, addressing the general organization of classrooms and schools. Many examples of promising school programs are available, including those developed by Kellam and colleagues in Baltimore (Baltimore Prevention Study, Kellam & Rebok, 1992, Kellam, Rebok, Ialongo, & Mayer, 1994), Hawkins and colleagues in Seattle (Seattle Social Development Project, Hawkins et al., 1992, 1991), and Conduct Problems Prevention Research Group (Fast Track, Conduct Problems Prevention Research Group, 1996, 1992). The School Development Program of Comer and colleagues (Cauce, Comer, & Schwartz, 1987; Comer, Haynes, Joyner, & Ben Avie, 1996) and Positive Action Through Holistic Education of Gottfredson and colleagues (Gottfredson, 1987, 1986; Gottfredson, Gottfredson, & Hybl, 1993) stand out as innovative school organization efforts. These programs are described briefly below.

The program implemented in the Baltimore study involved a behavior management system, the Good Behavior Game, focused on using rewards for positive behavior and group affiliations to curb aggression among first grade children. One and five years after the program was completed, reductions in aggressive behavior were noted for students

who had been rated most aggressive at baseline by their teachers (Howell & Hawkins, 1997, p 58).

Intermediate and long-term effects were found in the Seattle Social Development Project (SSDP) of Hawkins and his colleagues. Elementary students in Seattle were exposed to interactive teaching methods and cooperative learning in small groups, designed to enhance school bonding and academic achievement, reduce misbehavior in the classroom, and facilitate positive interactions among students. Students were also trained in skills to resist negative peer influences. As an additional component of the program, parents were taught skills for managing their children's behavior and supporting their success in school. Early results indicated that children who participated in the intervention were less likely to have initiated delinquency and substance use and were more bonded to school (Brewer et al., 1995, Hawkins et al., 1992). By age 18, students who participated in the intervention were significantly less likely than controls to have a record for violent delinquency (Hawkins, Catalano, Kosterman, Abbott, & Hill, 1998; Howell & Hawkins, 1997)

The Fast Track project (currently ongoing), like SSDP, has multiple components involving individual children, their families, peer groups, and communities (Weissberg & Greenberg, 1998). In schools, the program focuses on reducing children's long-term risk for behavior problems through training on social skills, self-control, and emotional awareness, as well as academic tutoring. This project also targets elementary school children, particularly those at high-risk for later problems due to early aggression. Preliminary results suggest that the project has been successful in promoting gains in

students' social interaction skills and reading competency. Discernable effects on behavior are hypothesized to emerge as children proceed through adolescence (Howell & Hawkins, 1997, p.64).

The School Development Program (SDP) and Positive Action Through Holistic Education project (PATHE) are interesting because they go beyond individual classrooms to schools as a whole in creating contexts that support clear standards for behavior and positive social interaction, as well as high levels of academic achievement. The SDP, which involved elementary students, brought together parents, students, teachers, and school administrators who formed committees responsible for governing the school's operation. Committees identified the needs of students and teachers, planned and monitored academic goals, and instituted policies to improve the social climate of the school. Committees also monitored students' academic progress and handled concerns brought by students and teachers. Emphasis was placed on involving parents in multiple aspects of children's schooling. Implemented initially in two schools in 1968, the original program was shown to have positive effects on students' attendance and academic achievement. Improvements in students' self-competence were also noted (Weissberg & Greenberg, 1998, pp. 47-48). Follow-up studies on similar programs are ongoing.

The PATHE project had a similar structure and orientation. Parents, students, teachers, and school administrators, as team members, contributed to the development and reorganization of school policies and programs to enhance learning and reduce misbehavior. In addition to addressing educational goals, curricular issues, and instructional practices by teachers, teams attended to discipline procedures and rules.

Implemented at the middle school and high school levels, the program showed positive effects on delinquency and drug use as well as school suspensions. Students' commitment to school also improved, as did staff morale (Weissberg & Greenberg, 1998, p. 48).

The SSDP and Fast Track interventions both involved parent training components. Researchers argue that parents can play a primary role in reducing negative peer involvement by employing effective family management and discipline practices (Patterson et al., 1989, Snyder et al., 1986). Monitoring youths' behaviors and social interactions appropriately, while building an alliance with them in maintaining high standards for success in school may foster positive youth development. In this dissertation study, harsh/physical discipline by parents measured at age 15 was predictive of violence at age 16 after controlling for demographic characteristics, as well as neighborhood, school, and peer influences (and violence at age 15). Poor family management at age 15 was similarly predictive of violence at age 18. These results, coupled with results from other longitudinal studies (see Hawkins et al., 1998), suggest that family influences are important in the etiology of violence from childhood through adolescence (Catalano & Hawkins, 1996). Reducing conflict between parents and children and teaching parents non-physical, proactive methods for extinguishing misbehavior, while setting clear standards for acceptable conduct, when children are young may improve parents' ability to exert influence on youths' social interactions and behavior in later years. By increasing communication and minimizing physical punishment, while using effective family management, youths may also learn skills for contending with disagreements outside of the home without the use of physical force.

One of the potential dangers inherent in focusing heavily on parent training in the prevention of violence for older children is that parents may be led to feel solely responsible for the outcomes achieved through intervention. Programs operating from a deficits model that emphasize weaknesses in family functioning, ignoring strengths, are particularly problematic (McLoyd, 1998) because they deplete individual members of the motivation to make necessary changes, increasing potential for failure. Difficulties are also encountered when social and economic factors are not addressed in the process of family interventions (McLoyd, 1998). Middle-class parents in dual and single-parent households face tension stemming from work and child care responsibilities. Parents of families living in poverty encounter this same tension and additional strain brought on by insufficient resources and lacking institutional supports (Huston et al., 1994). With a growing number of families living in poverty, many of which are headed by single-parents (Danziger & Danziger, 1993), attention must be given to moving beyond traditional parent training interventions to more ecologically-grounded approaches. This requires an emphasis on building social supports for parents and children in their communities, helping parents gain access to health and child care services, and insuring eligible families receive public assistance (McLoyd, 1998). Identifying these tasks not as peripheral, but as central to the mission of family interventions is necessary. Providing home-based, as opposed to clinic-based, services may increase program participation and long-term involvement in interventions for families with very few resources (Reid, 1993; Wasserman & Miller, 1998). Evaluation studies of home visitation programs that emphasize case management, therapeutic, and outreach services indicate the potential of these programs to improve

family functioning and foster positive outcomes for children in poverty (see Olds, Eckenrode, Henderson et al., 1997, Olds, Henderson, Kitzman et al., 1998).

Generally, preventive interventions involving parent training have shown promise for reducing risks for violence and other health and behavior problems among youths (Brewer et al., 1995). The most effective programs are likely to be those tailored to the needs of families and sensitive to ethnic and cultural backgrounds (Brewer et al., 1995; Yoshikawa, 1994). This requires awareness of differences in the organization of families, roles of family members, patterns of interaction, and language use (Cowan, Powell, & Cowan, 1998; Gibbs & Huang, 1989). This also requires an understanding of how individuals vary in their beliefs about the positions of family, school, and religious organizations in the socialization of children (Gibbs, 1989).

Overcoming barriers to recruitment and retention of families in intervention programs involves attention to ethnic and cultural issues as well. Specifically, individuals within certain population-based groups identified for intervention may hold beliefs and values that can affect participation. For example, as a consequence of discrimination in the provision of social services to African-Americans, parents may be more hesitant to accept help from individuals outside of their immediate communities and to distrust human service professionals, particularly those of another race (McGoldrick, 1982).

Recognizing that changes to the way family prevention efforts are developed and implemented are necessary to achieve their full potential for reducing youth problem behaviors, several examples of promising programs currently exist. The Prenatal/ Early Infancy project of Olds and colleagues (Olds et al., 1997; 1998) and Healthy Start project

in Hawaii (Hawaii State Department of Health, 1992) for children up to age six have both received attention in the literature. The Multisystemic Therapy (MST) approach of Henggeler and colleagues (Borduin & Henggeler, 1990; Henggeler, Melton, & Smith, 1992) is a promising program for adolescents that has also gained recognition. Because of the focus in this study on older youths and because the program has had noted success, discussion will be limited to the MST approach. Readers are referred to reviews by Brewer et al. (1995), Howell & Hawkins (1997), and Wasserman & Miller (1998) for further discussion of the other programs mentioned above.

Multisystemic Therapy is a program for adolescents already involved with the juvenile justice system. As such, its emphasis, which goes against the tenor of primary prevention, is on intervening with youths already manifesting relatively severe behavior problems. MST is directed at reducing family conflict and promoting positive parent-child interactions using a family preservation model (Wasserman & Miller, 1998). After referral, family therapists work intensively with parents and adolescents to build or restore open communication and promote cohesion among family members. The entire intervention is typically completed in a matter of a few months, with its success based on improvements in family functioning and reductions in recidivism for youths in the program compared to controls. A number of outcome studies of the MST approach suggest that youths exposed to the intervention have less future involvement in the juvenile justice system than others receiving standard services (see Borduin & Henggeler, 1990; Henggeler et al., 1992 and further discussion in Howell & Hawkins, 1997). As Howell & Hawkins (1997) note, the effect of the program may be relatively long-standing. Recent

studies suggest that youths apprehended for violent crimes and exposed to the MST intervention were less likely to be re-arrested for similar crimes up to four years later (Howell & Hawkins, 1997, p 89)

### Reducing Early Onset Violence

According to empirical studies, some of the most persistent adolescent and adult criminal offenders have extensive histories of antisocial behavior beginning in childhood (Farrington, 1997, Loeber, 1990, Loeber & Hay, 1990) One indication of this chronic pattern is the demonstrated link between early aggression and later serious violent behavior (Hawkins et al , 1998) In the National Youth Survey, Elliott (1994) found that 45 % of children who initiated violence before age 11 continued to be violent into their early 20s Twenty-five percent of those who initiated violence between ages 11 and 12 went on to be violent in adulthood In the Rochester Youth Development Study, Thornberry, Huizinga, & Loeber (1995) found that 39 % of children who initiated violence before age 9 were violent in adolescence Thirty percent of those who initiated violence at age 10-12 also engaged in violence in later years In the Woodlawn study in Chicago, McCord & Ensminger (1995) found that children rated by their teachers as aggressive in first grade were more likely than other children to be convicted for a violent offense by their late 20s

Identifying that childhood aggression relates to later violence reflects only part of the developmental sequence underlying violent offending for many adolescents and young adults. It appears that in the process of transition from childhood to adolescence many youths who go on to commit serious violent offenses engage in a wide range of delinquent acts. Farrington (1997) suggests that this sequence illustrates a pattern of diversification in antisocial behavior. Youths who engage in violent crimes typically have records for other law violations (Farrington, 1997). In his study of males in London, Farrington (1997) found that individuals convicted of a violent crime by age 21 had three times as many convictions for nonviolent crimes (p 8)

Although individuals who exhibit conduct problems early appear to be at increased risk for violence that persists into adulthood, studies do suggest that during adolescence many youths, not just those with histories of antisocial behavior, engage in violence and other forms of delinquency and crime. Moffitt (1993) proposes that there are, in fact, two distinct types of youth offenders- those who take part in delinquent acts from a very early age and those who exhibit behavior problems during adolescence for a first time. She describes these two groups as life-course persistent offenders and adolescent limited offenders. According to Moffitt's theory, adolescent limited offenders engage in delinquency via a contagion effect in which primarily prosocial youths mimic the behaviors of more persistently antisocial peers whose status increases during adolescence. Serious and persistent offenders have a predisposition to antisocial behavior rooted in neuropsychological impairments.

The extent to which Moffitt's theory accurately portrays the dynamic of violent offending is under study. However, the findings she and others have derived to date indicate that for some, very early intervention may have the greatest efficacy. Programs focused on providing health care services to pregnant women and newborns (see Barnard, 1992, Kitzman, Olds, Henderson et al., 1997), strengthening parent-child attachment during infancy and early childhood (see Barnard, 1992, Yoshikawa, 1995), and promoting school readiness (Weissberg & Greenberg, 1998, Yoshikawa, 1995) have demonstrated success in reducing risks and enhancing protection during the first stages of a child's life. Future consideration should be given to these types of programs for reducing early-onset violence.

#### Programs Over the Course of Development

Although developing strategies to prevent violence from occurring a first time is optimal, there may be times when early intervention is not possible or proves ineffective. Recognizing that prevention can occur from birth through adolescence is important. The MST approach of Henggeler and his colleagues is one example of a comprehensive intervention strategy targeting high-risk adolescents that has shown positive effects in reducing chronic violence.

In the last set of analyses carried out in this dissertation study, relationships between age 15 predictors and violence at ages 16 and 18 were examined, controlling for prior violence. Findings from these regression models are important for intervention

because they highlight potential program targets during adolescence for youths with and without prior histories of violence. Building protection against negative peer influences, improving school bonding and academic achievement, and reducing family management and negative discipline all appear to be worthwhile objectives for interventions involving older youths.

### Comprehensive Prevention Strategies

A final generalization that can be drawn from this study for the prevention of violence rests in the comparison of risk factors across domains. As noted previously, in hierarchical regressions, risk factors in each domain (neighborhood, family, school, and peer) contributed significantly to the prediction of violence when they were entered in order by blocks. In final models, predictors tended to span domains rather than be isolated in a single domain. These results suggest that the etiology of violence involves a combination of social influences that may be linked systematically in a progressive pattern of antisocial learning and conditioning. As noted elsewhere (see Brewer et al., 1995; Herrenkohl et al., 1998; Wasserman & Miller, 1998), it appears that programs having the greatest potential to reduce the incidence and prevalence of violence are those that target multiple risk and protective factors in comprehensive interventions. Recent evidence supports the effectiveness of multi-component programs, such as SSDP, Fast Track, and MST, in lowering violence risk and enhancing protection and confirms their superiority over programs more narrowly focused (Brewer et al., 1995; Hawkins & Howell, 1997;

Wasserman & Miller, 1998) Using controlled trials and extended longitudinal designs to study long-term outcomes will provide evidence regarding programs' overall effectiveness (Brown & Liao, 1996). Studying cost-benefit ratios for preventive interventions should illuminate gains beyond those normally reported in outcome studies (see examples in Greenwood, Model, Rydell, & Chiesa, 1996, Plotnick, 1994), giving reason to argue in favor of prevention as a cost-efficient crime reduction method.

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## **Appendix: Youth Report Measures**

### **Neighborhood Disorganization**

Please tell me how much these things describe your neighborhood.

- 1) run down housing (such as broken windows, boarded windows, or lots of trash)
- 2) crime
- 3) poor people
- 4) drug selling
- 5) gangs
- 6) rowdy or undesirable neighbors

Original responses categories: 1= A lot, 2 = Pretty Much, 3 = Not Much, 4 = Not at All.

### **Weak Neighborhood Attachment**

Think about the neighborhood you have spent the most time in during the past year. I'll read some statements and I'd like you to tell me how true each statement is for you.

- 1) I like my neighborhood
- 2) I enjoy spending time with kids in my neighborhood
- 3) I feel safe in my neighborhood
- 4) If I had to move, I would miss my neighborhood
- 5) I want to stay in my neighborhood no matter what
- 6) I'd like to get out of my neighborhood
- 7) I'm satisfied with my neighborhood

Original response categories: 1= YES!, 2 = yes, 3 = no, 4 = NO!

### **Poor Family Management**

Please tell me how true each statement is for you.

- 1) When I am away from home my parents know where I am and who I am with.
- 2) My parents know when I am doing a good job and let me know about it.
- 3) My parents put me down.
- 4) The rules in my family are clear.
- 5) My parents praise me for my school achievements.
- 6) When you misbehave do your parents take time to calmly discuss what you have done wrong?

Original response categories: 1= YES!, 2 = yes, 3 = no, 4 = NO!

### **Weak Family Bonds**

- 1) Would you like to be the kind of person your mother is?
- 2) Would you like to be the kind of person your father is?

Original response categories: 1 = YES!, 2 = yes, 3 = no, 4 = NO!

- 3) Do you share thoughts and feelings with your mother?
- 4) Do you share thoughts and feelings with your father?

Original response categories: 1 = All of the Time, 2 = Fairly Often, 3 = Sometimes, 4 = Never or Almost Never

### **Harsh/ Physical Discipline**

When you have misbehaved do your parents:

- 1) hit or spank you?
- 2) yell, shout, or scream at you?

Original response categories: 1 = YES!, 2 = yes, 3 = no, 4 = NO!

### **Family Conflict**

- 1) How often do people in your (family/(household) criticize each other?
- 2) How often do you and your (family/household) argue?
- 3) How often do people in your (family/ household) yell at each other?

Original response categories: 1 = Almost Always, 2 = Fairly Often, 3 = Sometimes, 4 = Seldom, 5 = Almost never

### **Weak Commitment to School**

Think about the school you (currently/ most recently) (attend/ attended). Please tell me how true each of the following statements about school are for you.

- 1) I like school.
- 2) I like my teachers this year.
- 3) Most mornings I look forward to going to school.
- 4) I like my classes this year.
- 5) When I have assignments to do I keep working until they are finished.
- 6) I like my social studies teacher this year.
- 7) I do extra work on my own in class.

Original response categories: 1 = YES!, 2 = yes, 3 = no, 4 = NO!

**Poor Academic Achievement (Youth Report and California Achievement Test Scores)**

1) Putting them all together, what were your grades like this school year?

Original response categories: 1 = Mostly A's, 2 = Mostly B's, 3 = Mostly C's, 4 = Mostly D's, 5 = Mostly E's or F's

2) California Academic Achievement Test Score

Original response categories: continuous measure

**Involvement with Delinquent Peers**

Thinking of your very best friend [second best friend, third best friend], please tell me how true each of the following questions is for (him/ her).

1) Does this person do things that get them into serious trouble with teachers or other adults?

Original response categories: 1 = YES!, 2 = yes, 3 = no, 4 = NO!

2) Has this person tried beer, wine, or liquor without a parent knowing about it?

3) In the past year has your best friend [second best friend, third best friend] used beer, wine, or liquor?

4) In the past year has your best friend [second best friend, third best friend] done anything that could have gotten him or her in trouble with the police (like stealing, selling drugs, vandalism, etc.)?

Original response categories: 1 = Yes, 2 = No

**Gang Involvement**

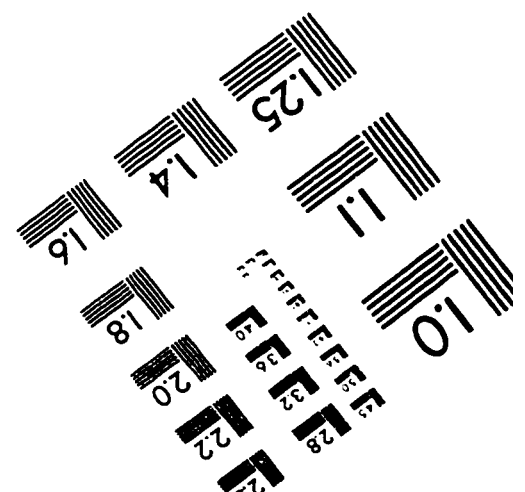
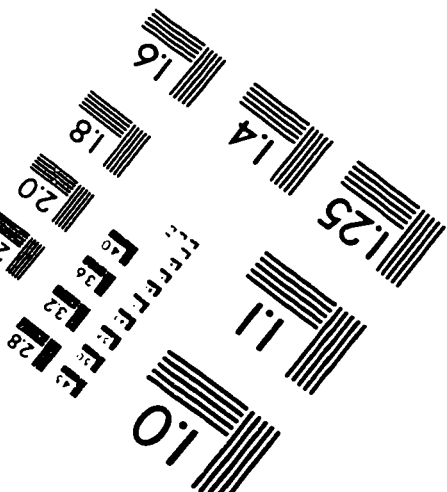
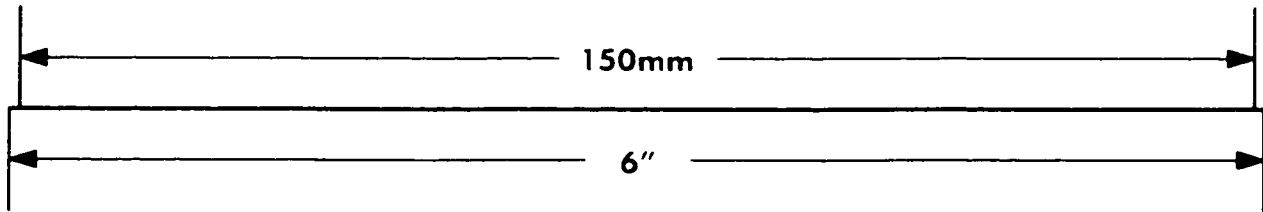
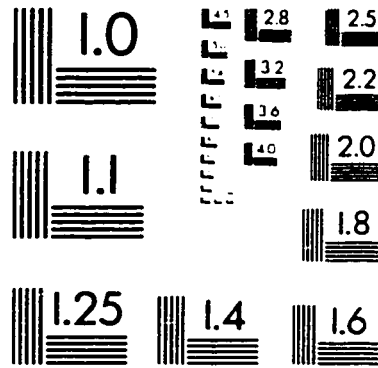
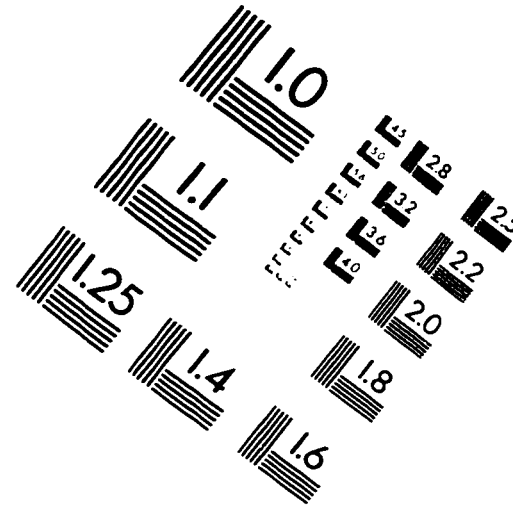
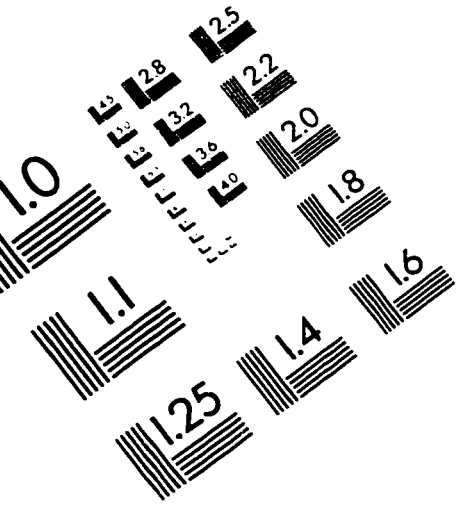
1) Do you belong to a gang?

Original response categories: 1 = yes, 2 = no

## Biographical Note

Todd Ian Herrenkohl earned a Bachelor of Arts degree from Lehigh University in 1991 and Masters in Social Work from Simmons College School of Social Work in 1993. After graduating from Simmons College, he worked as a clinical social worker in a mental health setting. He entered the doctoral program in Social Welfare at the University of Washington in 1995. From September, 1996 to June, 1998, he worked as a research assistant with the Social Development Research Group.

# IMAGE EVALUATION TEST TARGET (QA-3)



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