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# The Impact of Neighborhood Settings on Peer Risks among Delinquent Adolescents

*The main purpose of this study was to identify the impact of neighborhood settings on peer risks experienced by delinquent adolescents. A convenience sample of 1,086 youth who came to the attention of four county juvenile courts was used for the present study. The peer risk levels were measured through use of version 1.0 of the Global Risk Assessment Device (GRAD); in addition, neighborhood information obtained from the National Census was utilized. The results of the HLM demonstrated that there were significant between-neighborhood variations in peer risks and the neighborhood economic disadvantage variable was associated with peer risks after controlling for the variables of individual characteristics. The findings of this study add to the literature on juvenile delinquency by providing empirical support for the proposed model that illustrates the significant relationship between a neighborhood setting indicator and peer risks experienced by delinquent adolescents when practicing treatment or intervention programs with delinquent adolescents.*

Over the last couple of decades research in juvenile delinquency has attempted to identify risk factors for delinquency within multiple domains of influence: individual, peer, and neighborhood (Chung, 2004; Herrenkohl, Hawkins, Chung, Hill, & Battin-

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Pearson, 2001). That is, research has tried to uncover a variety of antecedent factors that initiate and shape the trends in juvenile delinquency as well as identify predictive interpersonal and contextual risk factors for delinquency such as adverse peer environments and disadvantaged neighborhood settings (Herrenkohl, 1998; Sampson, 1997).

Delinquent adolescents often experience peer risks beyond illegal behavior and suffer from continued exposure to detrimental risks. Some of the more frequently mentioned peer risks include lack of relationships with conventional peers, friendships with deviant peers (Lipsey & Derzon, 1998; Williams, 1994), and dating relationships with peers involved in gang activity (Hill & Hood, 1999). Research also has shown that as children move into adolescence, the association with peers becomes an important factor in delinquent involvement and may be the best explanation for youth participation in both the initiation of and contribution to new delinquent adolescent behaviors (Patterson, DeGarmo, & Knutson, 2000).

Also, there has been growing interest in examining the mechanisms by which neighborhood factors operate as delinquency risk factors. The literature has contended that disadvantaged neighborhood structures characterized by high residential instability and economic disadvantage (Chung, 2004) consistently lead to negative outcomes such as delinquency. Previous studies have suggested two aspects of neighborhood structure indicators that affect individual outcomes: 1) economic disadvantage and 2) residential instability

(Chung, 2004; Leventhal & Brooks-gun, 2000). Economic disadvantages, such as the percentage of adults without a high school diploma, the percentage of households below the poverty line, and the percentage of female-headed households as well as residential instability, such as the percentage of residents who have moved within the last five years and the percentage of renter-occupied households in the community are important indicators of neighborhood structural characteristics (Stouthamer-Loeber *et al.*, 2002). However, what remains lacking is an understanding of what extent neighborhood environments influence interpersonal risk factors in this special population. This is thought to be particularly important when peer risks are considered (Burke, Loeber, & Birmaher, 2002; Taylor, Malone, Iacono, & McGue, 2002) since peer environments have a profound influence on adjustments by delinquent adolescents.

In order to study the impact of neighborhood settings on peer risks experienced by delinquent adolescents, however, the employment of traditional analysis procedures such as a standard multiple regression may be inappropriate to study the impact of neighborhood settings on peer risks experienced by delinquent adolescents because the purpose is to examine phenomena where nested data are present. In the present study, youth are nested within neighborhoods and indicate that individual level responses (e.g., peer risks) are not independent. Responses from each youth within the same neighborhood tend to be more similar to each other than responses randomly sampled from the entire population. In this context, the application of Hierarchical Linear Modeling (HLM) to the examination of neighborhood influences on current peer risks is preferred over traditional models because the HLM coefficients are more precisely and reliably estimated in a nested data structure (Raudenbush & Bryk, 2002).

However, no study to date has used the HLM approach to examine the impact of disadvantaged neighborhood settings on peer risks by concurrently considering individual characteristics such as gender, ethnicity, and the timing of onset for among delinquent adolescents. In order to accomplish this aim in the present study, Multi-level models (i.e., Level 2 model) are used in the present study to address the nested structure of individuals within neighborhoods (defined by zip codes) and examine relationships between neighborhood setting measures derived from the National Census (i.e., residential instability and economic disadvantage) and individual level variables (i.e., peer risks). Therefore, this exploratory study (after controlling for individual characteristics) tests a multi-level model of the relationships between disadvantaged neighborhood structural settings and current peer risks experienced by delinquent adolescents.

The research hypotheses of the current study are as follows:

1. There will be a significant between-neighborhood variance in the peer risks that delinquent adolescent's experience.
2. Neighborhood setting variables (i.e., economic disadvantage and residential instability) from the National Census will be significantly associated with the peer risks.

## LITERATURE REVIEW

### *Peer Risks among Delinquent Adolescents*

One of the most common links made in the literature on juvenile justice is the relationship between delinquency and peer relationships (Snyder & Sickmund, 1999). Studies have shown that there is strong evidence that involvement in deviant peer groups plays a critical role in youth crime generally and youth violence in particular (Thornberry, 1998). The involvement with deviant peers is seen as the strongest proximal risk factor for delinquent involvement (Dishion, Spracklen, Andrew, & Patterson, 1996).

Research also has shown that the substantial variation in the degree of committing delinquent acts depends on the level of attachment to delinquent peers and the time they spend together (Ary *et al.*, 1999). The effect of peers in delinquent behaviors is stronger when the adolescent has intensive interaction with peers who are involved in serious delinquency (Agnew, 1991). Further, the peer

group engaged in activities that will undermine the efforts of parents or other adult caregivers and the peer group becomes a singular substitute rather than a complementary alternative context for adolescent developmental needs (Ary *et al.*, 1999).

Previous delinquency studies have revealed significant differences associated with gender, ethnicity, and the timing of the onset for delinquent adolescent behavior in terms of peer risks (Hubbard, 2004; Hubbard & Pratt, 2002). Because males tend to be more involved in illegal behavior than females (Hubbard, 2004; Hubbard & Pratt, 2002), their risks have been the focus of most juvenile justice research. However, recent attention has shifted to female adolescents due to a growing awareness of different types of peer risks/needs according to gender (Hubbard, 2004). For example, male adolescents are more likely than female adolescents to suffer physical victimization from peers (Crick & Bigbee, 1998) and show a higher involvement in gang memberships. In turn, female adolescents tend to be involved in more passive forms of aggression often referred to as relational aggression (Crick & Bigbee, 1998) or emotional violence (where female adolescents manipulate the social scene to hurt or psychologically "destroy" their peers).

Hubbard and Pratt (2002) reported that, while some risk factors of delinquency for female and male adolescents (e.g., personality and antisocial attitudes) were similar, favorable peer relations were stronger predictors of delinquency for female adolescents than for males. In addition, a few studies have shown that dating relationships with criminally involved youth is one of influential risk factors for initiating and maintaining delinquent acts, especially when female adolescents are involved in dating relationships with older male adolescents (Giordano, Manning, & Longmore, 2005). Unlike a strong alliance with same sex delinquent peers that male delinquent adolescents have, female adolescents (in comparison to male counterparts) are more likely to encounter delinquent role models and participate in delinquent behavior that is reinforced by partners already involved in delinquent activities (Giordano *et al.*, 2005).

The issue of ethnicity also has gained increased attention in the literature on juvenile justice because of the disproportionate minority representation in the justice system (Hsia *et al.*, 2004). Earlier research has shown that the constructs of peer influence has components that distinguish the delinquent activities of African American youth from those of Caucasian youth (Maguin & Loeber, 1996). For example, overall peer relationships (e.g., poor relationship with conventional peers) have a significant effect on delinquent behaviors (Williams & McGee, 1994), particularly for Caucasian youth. On the other hand, relationships with same sex delinquent peers such as a deviant peer network (Williams & McGee, 1994) and gang involvement were common in African American offenders. The main characteristic of the social network for delinquent youth was gang involvement among African American adolescents. Therefore, the impact of general peer relationships on adolescent delinquency may be stronger for Caucasian youth while the prevalence rate of deviant peer relationships or gang involvement is higher for African American youth.

The importance of onset for delinquency to understand peer risks has been well established (Moffit & Caspi, 2001). The term "onset of delinquency" was originally proposed by Moffitt (1993) in order to discriminate two types of youth offenders: those who take part in delinquent acts before age of 14 (i.e., early onset or life-course persistent offenders) and those who do so later (i.e., late onset or adolescent limited offenders) (Patterson & Yoeger, 1993). The risk factors related to early-onset offending include serious family psychopathology (Moffit, 1993), as well as individual characteristics such as a difficult child temperament and cognitive and neuropsychological dysfunction (Moffit & Caspi, 2001).

Late onset offenders typically engage in delinquency by becoming involved with delinquent peers (Moffit & Caspi, 2001). One plausible reason behind this is the rebellious personality style of late onset offenders that makes them more likely to be involved with delinquent peers as a misguided attempt to gain a sense of maturity (Moffit, 1993). Once societal acceptance of adult status is achieved, the major motivation underlying the antisocial

behavior of this group is no longer present and their antisocial behavior dramatically decreases. Therefore, studies have indicated that early onset offenders are more likely to experience family related risks while late onset offenders are more likely to experience peer risks that lead to involvement with delinquent behavior risks. Taken together, the literature supports further research efforts on peer risks as a potential threat to delinquent adolescents.

### Neighborhood Settings and Delinquent Adolescents

Research in juvenile delinquency has shown that neighborhood setting indicators account for significant amount of variance in juvenile delinquency beyond that which is explained by individual characteristics (Chung, 2004; Herrenkohl *et al.*, 2001). In large part, youth who reside in disadvantaged neighborhoods (when compared to those living in more advantaged neighborhoods) are exposed to an increased likelihood of community violence, psychological distress, and substance abuse (Smith, Albus & Weist, 2001).

Although there have been some inconsistent results, the literature on juvenile delinquency suggests that there are gender differences in terms of the influence of neighborhoods on juvenile delinquency and risks factors (Stouthamer-Loeber *et al.*, 2002). For instance, male adolescents are more frequently involved than female adolescents in neighborhood violence and victimization; therefore, there is a higher prevalence of a neighborhood risk effect for male delinquency (Farrell & Bruce, 1997; Stoutha-mer-Loeber *et al.*, 2002). Unlike this line of studies, Perez-Smith *et al.* (2001) reported similar rates of exposure to violence according to the gender of the youth. In addition, another study argued that the neighborhood impact would be more important for female adolescents than male adolescents because female adolescents tend to have affiliations with older deviant males (e.g., dating relationships) in the same or nearby neighborhoods that may result in the onset of female delinquent adolescent behavior and precocious sexual behavior (Savin-Williams & Berndt, 1990).

There has also been evidence that African American adolescents (compared to Caucasian adolescents) frequently showed a relationship between neighborhood contexts and delinquent behaviors, and tended to reside in more seriously disad-vantaged neighborhood settings (Peeples & Loeber, 1994; Wilson, 1996). For example, African American youth have a poverty rate that is more than three times that of European American youth (National Center for Children in Poverty, 2002) and they are more likely than their European American peers to live in neighborhoods characterized by high crime rates, high unemployment rates, and poor schools (Wilson, 1996).

The frequently reported significant ethnic differences in the relationship between neighborhood settings and the prevalence of delinquency or crime may be caused by a higher probability that African American youth reside in disadvantaged neigh-borhoods rather than a stronger relationship between disadvantaged neighborhoods and delinquency among African American youth. For example, in a study where the economic status of the neighborhood was controlled, African American youth showed a similar level of delinquent behaviors, and the impact of neighborhood settings on delinquency were similar to that of Caucasian Americans when African Americans did not live in underclass neighborhoods (Peeples & Loeber, 1994).

To date, no study has examined the neigh-borhood impact on risk factors for delinquency according to the onset group. However, there was some evidence that neighborhood effects are minimal on very young children and stronger on older youths who become increasingly embedded in neighborhood social networks and activities with having longer periods of exposure to the risks of disorganized neighborhoods (Elliott *et al.*, 1996). Therefore, onset groups also need to be considered when we examine the impact of neighborhood settings on peer risks experienced by youth.

Few studies have examined the relationship between neighborhood structural characteristics and the peer risks that delinquent adolescents experience. However, research has shown that community functioning variables are associated with higher levels of negative peer group affiliations (Elliott *et al.*, 1996), and the lack of affiliation with conventional peers (Stouthamer-Loeber *et al.*, 2002). For instance,

Rankin and Quane (2002) found that collective efficacy (defined as social cohesion among neighbors combined with their willingness to intervene on behalf of a common good) was an important predictor for deviant peer group affiliations and peer deviance along with parenting style among a sample of urban adolescents. In this context, after controlling for individual characteristics, the influence of neighborhood settings on current peer risks/needs provides clear information about the impact of neighborhoods on the needs and current risk levels of juvenile offenders.

*Theoretical Framework*

Studies on juvenile delinquency have been dedicated to integrating factors from multiple domains by using large-scale studies (Chung, 2004). In this context, the present study tries to examine the impact of neighborhoods on peer environments among delinquent adolescents based on an ecological perspective (Bronfenbrenner, 1979, 1988). Bronfenbrenner (1979) suggested that the ecological environment of an individual is "a set of nested structures, each inside the next, like a set of Russian dolls. At the inner-most level is the immediate setting containing the developing person". The ecological approach considers the contextual characteristics or social systems (e.g., peer or community) in which the youth is embedded. The distal environment (e.g., neighborhood setting) is seen as a transactional setting that influences various and more proximal social systems of peer environments nested within them. From this viewpoint, it is important to consider the potential influence of the characteristics of the neighborhood when attempting to understand proximal environmental risks among delinquent adolescents.

It can be presumed that the impact of major proximal environmental influences, such as peer groups, is dependent on the characteristics of the communities or the neighborhoods in which youth reside (Gorman-Smith, Tolan, & Henry, 2000). Therefore, peer environments are very important systems that would mediate neighborhood influences on individuals (i.e., delinquent adolescents). In addition, individuals are influenced by the ongoing qualities of the social systems in which the individual lives or participates in as well as the extent and nature of the interaction between these systems (Bronfenbrenner, 1979, 1988). Therefore, the adjustment issues of juvenile offenders can be tied to the connections between the proximal environments (e.g., peer environments) and the distal environment (e.g., neighborhood).

A lack of consideration of neighborhood differences and their potential impact on peer environments may lead to overly simplistic explanations (Gorman-Smith *et al.*, 2000) of peer related risks experienced by delinquent adolescents. However, few studies have examined these associations from an ecological perspective in order to explain the contextual effects among delinquent adolescents even though studies on neighborhood effects have shown that there is a strong association between neighborhood settings and peer groups (Tolan, Gorman-Smith, & Henry, 2003). In keeping with an ecological perspective, after controlling for youth gender, youth age, youth ethnicity, household composition, and the onset of delinquency in the two- level HLM models, the present study tries to fill a gap in the study of neighborhood influences on the life of delinquent adolescents by considering the impact of neighborhood factors on peer risks.

METHODS

*Sample*

The sample for this study included 1,086 adolescents coming into contact with juvenile county courts of a large mid-western metropolitan area in the US. At the time of assessment, these youth were between 13-17 years old ($M$ = 15.3, $SD$ = 1.3). The sample of 377 female (35%) and 709 male adolescents (65%) included 407 Caucasian (37%), and 679 African American (63%) youth. The majority (56%) of these youth came from single parent households. The rest of this group consisted of two biological parent households (10%), grandparent-headed households (7.5%), stepparent households (10%), and other types of households (25.5%). The "other" types were composed of foster families, same sex partners, and

other household arrangements. Regarding the annual household income for the final sample, 60% refused to report income, 32% resided in homes with an income under $34,999, 5% resided in homes with income in the $35,000 - $54,999 range, and only 3% of the youth resided in homes with income in the $55,000 and above income-bracket.

*Instruments*

Data used in this study were drawn from youth reported responses on the Global Risk Assessment Device (GRAD: Gavazzi, Slade, Buettner, Patridge, Yarcheck, & Andrew, 2003) and the 2000 National Census. GRAD is an Internet-based instrument that can rapidly and reliably measure potential threats to the overall development and well-being of adolescents entering the juvenile justice system (Gavazzi *et al*., 2003). There are 132 items represent 11 different risks/needs domains that include prior offenses, family/parenting problems, peer relationships issues, substance abuse, educational and vocational concerns, leisure activities, accountability, mental health issues, psychopathy, exposure to traumatic events, and health-related risk behaviors. Youth rate how true each item is now or within the past 6 months using the following scale: 0 = No/Never; 1 = Yes/A couple of times; 2 = Yes/A lot. Therefore, a higher score indicates that a youth is at a greater risk in terms of each domain.

Only youth reports on the peer domain scores along with demographic information collected by this tool were included in the data analyses for the present study. The peer domain that linked the criminal activities of adolescents included 15 items representing friendships with delinquent peers (i.e., gang affiliation), dating relationships with criminally involved youth, and poor relationships with conventional peers. An example of items in the peer risk domain of the youth version of GRAD is as follows: "Do you have friends who have been in trouble with the law?"

Previous work has reported on the psychometric properties of the GRAD, including a solid factor structure and reliability coefficients (Gavazzi *et al*., 2003). Gavazzi, Lim, Yarcheck, and Eyre (2003) also reported the predictive validity of this battery in a

sample containing 224 families of adolescents who were assessed by intake workers in a juvenile court and subsequently referred for services. Results revealed the youth referred to mental health services had higher risk scores than youth who were not referred on all domains of risk contained in this battery (Gavazzi *et al*., 2003). Cronbach alpha coefficients ranged from .87 (Prior Offenses) to .97 (Family/Parenting) in previous studies.

Data for neighborhood settings were drawn from the 2000 National Census and linked to zip codes that were used as the focal area unit in this study. Zip codes were chosen as the focal unit in this study because they appeared to tap into underlying constructs of interest for this study and represented residential areas for meaningful comparison given members of households and individuals per unit (see Brooks-Gunn *et al*., 1993; Elliott *et al*., 1996; Sampson, 1997; Sampson *et al*., 1997).

Previous studies suggested that there are two aspects of community structure thought to affect neighborhood social functioning or individual outcomes: 1) Economic Disadvantages and 2) Residential Instability (Chung, 2004; Herrenkohl, 1998; Leventhal & Brooks-gun, 2000). Data were obtained at the zip code level to indicate neighborhood levels of economic disadvantage (i.e., percentage of adults without a high school diploma, percentage of households below the poverty line, and percentage of female-headed households) and residential instability (i.e., percentage of residents who have moved within the last five years and the percentage of renter-occupied households in the community).

These two components of neighborhood settings were retrieved from the results of the principal component analysis. This procedure was necessary to consolidate variables representing neighborhood characteristics given that there was the possibility of multicollinearity among the five neighborhood setting indicators. Therefore, there could be a problem of over-fitting in the main data analyses model caused by redundant data when those five variables would be concurrently included in the data analyses. Therefore, the five neighborhood indicators were analyzed in a principle component analysis using

varimax rotation to obtain factor scores of each indicator. According to the result of the principle component analysis, the first component explained 52% of the total variance (eigenvalue = 2.6) and the second component explained 33% of the total variance (eigenvalue = 1.7), and therefore this solution accounted for 84% of the total variance in five neighborhood setting indicators derived from the National Census. In order to create two neighborhood setting variables (i.e., economic disadvantage and residential instability), factor score coefficients for these two factors were utilized, such that factor scores were assigned that represented a weighted combination of scores on each variable and for each neighborhood zip code level. Standardized scores on the economic disadvantage factor ranged from -1.49 to 2.95 with high scores indicating high levels of economic disadvantage in the neighborhoods and scores on the residential instability factor ranged from -1.8 to 4.2, with high scores indicating high levels of residential instability in the neighborhoods.

### Analytic Procedure

As the main data analyses, Hierarchical Linear Models (i.e., multi-level models) were constructed using the HLM program of Bryk, Raundenbush, and Congdon (1996). Because the present study focused on neighborhood settings as well as individual level outcomes, the data represented two hierarchical levels of analysis: individuals within neighborhoods (Level 1) and neighborhoods themselves (Level 2). As such, the present study addressed the nested structure of individuals within neighborhoods (defined by zip codes) and examined the effects of neighborhood setting variables derived from the 2000 National Census, after controlling for Level 1 variables (including gender, ethnicity, and the timing of onset for delinquency). Two-level linear models with peer risks as outcome variables along with gender, ethnicity, and the timing of onset for delinquency at Level 1 and neighborhood setting at Level 2 were modeled. In addition, the current age of the youth and household composition at Level 1 was included to control the impact of these variables on outcome variables.

### RESULTS

In order to explore the characteristics of the sample, an analysis of the demographics were performed first. First, chi-square analyses regarding the household composition variable showed that early onset offenders (54% versus 48%) and African American youth (58% versus 37%) were significantly more likely to reside in mother-headed households in comparison to late onset offenders and Caucasian youth ($\chi^2$ (1) = 45.09, $p$<.001 and $\chi^2$ (1) = 3.85, $p$ = .05, respectively), even though there was no gender difference in terms of the household composition.

The comparisons of different subgroups associated with gender, ethnicity, and delinquency onset groups on another main demographic variable (i.e., the current age of the youth) were performed. A series of $t$-tests revealed significant age differences according to ethnic and onset groups. Caucasian youth ($M$ = 15.5, $SD$ = 1.3) and late onset offenders ($M$ = 15.7, $SD$ = 1.1) were significantly older than their counterparts ($M$ = 15.2, $SD$ = 1.3 for African American youth; $M$ = 14.7, $SD$ = 1.4 for early onset group). That is, mean age differences were significant for ethnic groups ($t$ = 3.89, $p$<.001) and onset groups ($t$ = -13.59, $p$<.001), respectively. However, there was no statistically significant mean age difference according to the gender of the youth, ($t$ = -1.50, ns; $M$ =15.2, $SD$ = 1.3 for female offenders and $M$ = 15.4, $SD$ = 1.3 for male offenders).

The current age of the youth and household composition variables also were included in the main data analyses as control variables since there were significant mean age differences and household composition differences according to ethnic groups and onset groups that were the main study variables in the present study. The reliability coefficients of the peer GRAD (Cronbach's $\alpha$ = .72) domain was considered to be sound in terms of internal consistency.

### Hierarchical Linear Modeling Analyses (HLM)

The Level 1 unit of analysis consisted of 1,086 delinquent adolescents, while the Level 2 unit of analysis consisted of 90 neighborhoods linked to zip codes. In developing these models, the peer risks

variables operated as outcome variables. Youth gender, youth ethnicity, and youth onset group affiliation as Level 1 indicators and economic disadvantage and residential instability as Level 2 variables were also included in the proposed models. Finally, the current age of the youth and household compositions were included as control variables for the models.

*ANOVA Models*   When using multilevel modeling procedures, the researcher needs to test a series of models that typically moves from an unrestricted model to more restricted models. Three models were estimated and compared for this current study. The first was the unrestricted (or unconditional) model, which involved partitioning variance on outcome variables (i.e., peer related risk) within and between groups (i.e., neighborhood) without other Level 1 variables. This model was estimated in order to examine the variability in these outcome variables, as well as to discern whether a further analysis of the data was warranted. The results for the unconditional models (that include within - and between - group variance estimates, reliability estimates, and chi-square values for peer related risk variables) are presented in Table 1. Here, a significant between-neighborhood variation was found in the youth's experiencing friendships with delinquent peers ($\chi^2 = 122.20$ with $df = 89$, $p<.05$) and dating relationships with criminally involved youth ($\chi^2 =125.10$ with $df = 89$, $p<.01$). However, there was no significant between-neighborhood variation in the poor relationships with conventional peers ($\chi^2 = 97.12$ with $df = 89$, $p<.05$).

Based on the covariance estimates, the proportion of the total variance that occurs between neighborhoods is 3% (i.e., the intra-class correlation) for a relationship with a delinquent peers risk variable and 4% for dating relationships with a criminally involved youth risk variable. In order to examine peer related risks more comprehensively, the next model included gender of the youth, ethnicity, and delinquency onset grouping variables as Level 1 predictors and the current age of the youth, and household composition as control variables.

*ANCOVA Models*   Covariates were added at Level 1 because significant between-neighborhood variances were found with regard to friendship with delinquent peers and dating relationships with the outcome variables of delinquent adolescents; in addition, variance estimates again were computed for these two outcome variables only. Level 1 covariate variables added to each model were the gender of the youth (females coded 0 and males coded 1), ethnicity of the youth (Caucasians coded 0 and African Americans coded 1), and the timing of the onset for delinquency grouping (late onset coded 0 and early onset coded 1), and household composition (female-headed household coded 1 and other types of household composition coded 0), and current age of the youth.

The coefficients and conditional error variance estimates for the ANCOVA models pertaining to friendships with delinquent youth risk and dating relationships with criminally involved youth risk outcome variables are presented in Table 2. The coefficient for gender had a negative value and female adolescents displayed significantly higher risks on exposure to dating relationships with

Table 1. *Variance Estimates, Reliability and Chi-Square Values for the One-Way ANOVA Models of Peer Risk Variables*

|  |  | Conventional Peers | Delinquent Peers | Dating relationships |
|---|---|---|---|---|
| Fixed Effect: Coefficient (se) |  | 1.64 (0.03) | 1.45(0.03) | .83(.03) |
| Reliability |  | .09 | .26 | .21 |
| Random effect (Variance Component) | $u$ | 0.007 | 0.010 | 0.016 |
|  | $r$ | 0.742 | 0.441 | 0.454 |
| *df* |  | 89 | 89 | 89 |
| Chi-square |  | 97.12 | 122.20 | 125.10 |
| *p* |  | ns | 0.01 | 0.007 |

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

| | | Peer Related Risks | |
|---|---|---|---|
| | | Delinquent Peers | Dating relationships |
| Fixed Effect: Coefficient (se) | | | |
| $B_0$ (adjusted mean) | | 1.33 (.05)*** | .85 (.05)*** |
| Gender | | .02 (.04) | -.18 (.04)*** |
| African American | | .10 (.05)* | .08 (.05) |
| Early Onset | | .16 (.05)** | .10 (.04)* |
| Current age | | .01 (.02) | .09 (.02)*** |
| Household composition | | -.02 (.04) | .03 (.04) |
| Reliability ($B_0$) | | .103 | .142 |
| Random effect (Variance Component) | $u$ | .005 | .009 |
| | $r$ | .719 | .443 |
| *df* | | 89 | 89 |
| Chi-square | | 110.98 | 111.11 |
| *P* | | .05 | .05 |

Note. N = 90, 1012
*$p$<.05, **$p$<.01, ***$p$<.001

criminally involved youth. In terms of ethnicity, African Americans were a significant covariate for friendship with delinquent peers (e.g., gang involvement). That is, African American offenders reported higher risk scores on friendship with delinquent peer risks. In addition, the onset group was a significant Level 1 covariate variable for the outcome variables. The coefficients for the onset groups all had positive values that indicated that early onset offenders showed significantly higher risks on friendships with delinquent peers and dating relationships with criminally involved youth in comparison to late onset counterparts in the present sample.

The current age of the youth was a significant variable for the dating relationships with the criminally involved youth risk variable only, while household composition was not a significant control variable for any outcome. That is, older youth reported higher dating relationships-related risks than younger youth.

*Final HLM Full Models* The final step in the HLM analyses involved adding predictors at Level 2 representing neighborhood economic disadvantages and residential instability as measured by the National Census. Here, at Level 1, the outcomes were modeled as a function of the mean (intercept) and gender, ethnicity, onset group, and current age of the youth. Within-unit models provided information about neighborhood means (intercepts), variability in intercepts, and relationships between individual characteristics and outcome variables. At Level 2, randomly varying intercepts are modeled as a function of the grand mean and two neighborhood characteristics. Two neighborhood setting variables previously noted as important in the literature were selected for inclusion: disadvantaged neighborhood and residential instability. Coefficients associated with slope estimates for individual characteristics in the model were fixed across neighborhoods. As previously suggested, a notable reduction in conditional error variance at the neighborhood level with the inclusion of Level 2 predictors indicates the important explanatory effects of those variables.

As shown in Table 3, the effects of the Level 1 variable were similar to those of Level 1 variables in the ANCOVA model. That is, onset group was the only significant Level 1 variable for friendship with delinquent peer risk while gender, onset group, and current age were significant individual characteristic

Table 3. *Coefficients, Conditional Variance Estimates, and Reliabilities for Full Models*

| | Peer Related Risk | |
|---|---|---|
| | Delinquent Peers | Dating relationships |
| Fixed Effects: Coefficients (se) | | |
| Intercept ($G_{00}$) | 1.42 (.02)*** | .79 (.03)*** |
| *Economic Disadvantage* ($G_1$) | .08 (.02)** | .08 (.03)** |
| *Residential Instability* ($G_2$) | .01 (.03) | .03 (.03) |
| Gender ($B_1$) | .02 (.04) | -.18 (.03)*** |
| African American ($B_2$) | .04 (.05) | .04 (.06) |
| Early Onset ($B_3$) | .12 (.06)* | .10 (.04)* |
| Current age ($B_4$) | .00 (.02) | .09 (.02)*** |
| Reliability ($B_0$) | .05 | .12 |
| Random effect (Variance Component) | | |
| $u$ | .002 | .006 |
| $r$ | .44 | .44 |
| *df* | 87 | 87 |
| Chi-square | 105.44 | 103.66 |
| *P* | *ns* | *ns* |

Note. N = 90, 1012
Indented and italicized variables indicate Level 2 variables.
*p<.05, **p<.01, ***p<.001

variables for dating relationships with criminally involved youth. In addition, the National Census measure of neighborhood economic disadvantage was a significant predictor of friendship with delinquent peers, and dating relationships with criminally involved youth. However, residential instability was not predictive of any outcome variable. Results of the two level hierarchical linear models indicated that higher levels of economic disadvantage were related to greater levels of higher levels of friendship with delinquent peers ($t = 33.71$, *p*<.001), and higher levels of dating relationships with criminally involved youth risk ($t = 29.87$, *p*<.001).

With the inclusion of the Level 2 predictors in each model, clear reductions in error variance between neighborhoods were found for these youth reported peer related risks. Between-neighborhood variance in friendship with delinquent youth risk was dropped by an additional 60% from the ANCOVA model. Finally, the reduction in between-neighborhood variance from the ANCOVA model was approximately 33% for dating relationships with

delinquent youth. The HLM analyses showed that the report of peer risks for youth differed systematically between neighborhoods and that variation in reports was associated with the level of the neighborhood economic disadvantage measures constructed from the National Census.

## DISCUSSION

Results of the HLM indicated (as hypothesized) that there were significant between-neighborhood variations in friendships with delinquent peers and dating relationships with criminally involved youth. The proportion of the total variance that occurs between neighborhoods is 3% (i.e., the intra-class correlation) for a relationship with delinquent peers risk variable, and 4% for dating relationships with criminally involved youth risk variables, which is consistent with previous studies (Elliott *et al.*, 1996; Leventhal & Brooks-Gunn, 2000). According to Leventhal and Brooks-Gunn (2000), neighborhood effects are small

to moderate, yet consistently account for about 5% of the variance in the outcomes for adolescents across studies.

The final HLM model showed that the neighborhood economic disadvantage was significantly related to youth reports of GRAD peer risks even when controlling for salient demographic characteristics (i.e., gender of the youth, ethnicity of the youth, current age of the youth, and onset for delinquency grouping of the youth) factors. The results of the two level hierarchical linear models indicated that higher levels of economic disadvantages were related to higher levels of friendship with delinquent peers ($t = 33.71$, $p<.001$), and higher levels of dating relationships with criminally involved youth risk ($t = 29.87$, $p<.001$). This result is consistent with previous research in that disadvantaged neighborhood characteristics are related to increased likelihood of affiliation with deviant peers (Smith *et al.*, 2001). The residence in economically disadvantaged neighborhoods seems to be coupled with serious peer related risks in this special population. In addition, Bronfenbrenner (1989) noted that one type of ecological risk (i.e., economically disadvantaged neighborhood) may well compound the effects of other ecological risks (i.e., poor peer environments), producing multiplicative negative effects on youth. Therefore, many serious and violent adolescents live in both poor peer environments and disadvantaged neighborhoods.

Clinicians and educators need to consider how neighborhood economic characteristics serve to facilitate or reduce peer risks when they work with delinquent adolescents. In this context, community based treatment programs that try to reduce the known risk factors within the peer contexts (Chung, 2004) are more necessary for delinquent adolescents residing in economically disadvantaged neighborhoods. For example, Multisystemic Treatment (MST), a comprehensive community-based therapeutic model that addresses the multifaceted needs of delinquent adolescents who exhibit serious antisocial behaviors, can be one plausible community based program (Henggeler *et al.*, 1996) for delinquent adolescents living in economically disadvantaged areas.

Apart from economic factors, the influence of a high residential turnover on peer risks was less pronounced even though the direction of the relation between residential instability and peer risks were in the expected direction. The lack of a relationship between residential instability and peer risks suggest that mobility among residents is not indicative of these risks. We speculate that the weak relationship between residential instability and peer risks can be caused by the usage of neighborhood structural variables as indicators of neighborhood environments.

Unlike neighborhood functioning variables such as collective efficacy, neighborhood structural features were indirectly related to individual outcomes via the impacts on community social processes. In addition, several neighborhood studies involving adolescent samples have not found a consistent link between structural disadvantages and the levels of peer relationships, but have indicated a generally consistent link between neighborhood social organization variables and the types of relationships that adolescents have with their peers (Chung, 2004). For example, collective efficacy (Rankin & Quane, 2002), levels of informal control, social integration, and informal networks (Elliott *et al.*, 1996) in neighborhoods as indicators of a disadvantaged neighborhood were significantly associated with deviant peer group affiliation, involvement with conventional friends, and problem behaviors such as delinquency. Unfortunately, the present study did not actually consider the processes by which neighborhoods influence peer risks, even though the effect of neighborhood disadvantage on individual outcomes could be mediated by the organizational structure and culture of the neighborhood. There is also the need to use data from multiple measures for research on the neighborhood context in the future studies.

There appears to be the significant impact of a neighborhood economic disadvantage on peer risks, even though residential instability was not predictive of these risks. Continuing to examine other types of risks and needs beyond peer risks experienced by delinquent adolescents is needed to improve the effectiveness of treatment programs and develop subgroup specific treatment programs in the juvenile

justice system.

## CONCLUSION

The present study was designed to understand peer risks experienced by delinquent adolescents. This study examined the impact of neighborhood settings on the risks for delinquent adolescents. Data was collected through the use of Version 1.0 of the Global Risk Assessment Device (GRAD) with a convenience sample of 1,086 youth who came to the attention of four county juvenile courts in Ohio, along with the 2000 National Census data of 90 zip code areas linked to the current residence of those youth. The peer risks reported by the youth included poor relationships with conventional peers, friendship with delinquent peers, and dating relationships with criminally involved youth. The present study empirically examined the relationship between neighborhood settings and individual outcomes with a large sample of delinquent adolescents. The findings of this study advance our knowledge of the impact of neighborhood structures on peer related risks among delinquent adolescents. From a methodological point of view, this study successfully examined neighborhood structural effects on the lives of delinquent adolescents through the use of Hierarchical Linear Modeling.

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