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Data from the Project on Human Development in Chicago Neighborhoods (PHDCN)

A Prospective Study of Serious Delinquency in Adolescent Girls

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Prepared by
Dawn Obeidallah-Davis, Ph.D.
Abt Associates Inc.

Abt Associates Inc.
55 Wheeler Street
Cambridge, MA 02138

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Major Activities and Accomplishments During This Period

During the funding period, I conducted extensive analyses, including preliminary computations (e.g., assessing the internal consistency of measures, creating scales) and multi-level analyses aimed at identifying predictors of girls' delinquency. Findings based on this work have been presented at local and national conferences and have been published in peer reviewed journals.

Rationale/Aims

The overall purpose of this project was to identify factors associated with girls' aggressive and violent behavior. The increasing prevalence of adolescent girls' physical aggression is a growing concern among clinical, research, and public policy groups. In 1995[1], over 700,000 adolescent girls were arrested for committing acts of physical aggression (OJJDP, 1997). Although the average level of boys' aggressive behavior remains higher than that of girls (Epstein, Kauffman, & Cullinan, 1985; Quiggle, Garber, Panak, & Dodge, 1992), recent reports by the Office of Juvenile Justice and Delinquency Prevention (OJJDP) have suggested that the gender gap in physical aggression[2] is narrowing somewhat. Over the last decade, the number of juvenile males arrested for acts of physical aggression increased 66 percent while, during the same period, the number of juvenile girls arrested for acts of physical aggression increased 133 percent (Snyder, 1998).

The majority of research in this area, however, focuses on adolescent male delinquency (e.g., Dishion et al., 1997; Patterson et al., 1993). Those studies that do include females show that risk factors for violent behavior differ tremendously across gender (Henggeler, Edwards, & Bourduin,

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1 The year the data for the present study were gathered.

2 The OJJDP reports refer to arrests for violent crime, acts which encompass physical aggression.

1987; Loeber, 1999). Thus, information gleaned from studies of boys' delinquency may not meaningfully inform our understanding of delinquency among girls.

The negative consequences of girls' physical aggression are far-reaching. Retrospective studies suggest that girls who are physically aggressive are at an elevated risk for a multitude of short- and long-term adverse consequences, including dropping out of school, experiencing difficulty in interpersonal relationships, manifesting severe subsequent delinquency, and bearing children who are themselves at a heightened risk of experiencing poor mental and physical health outcomes (Bardone, Moffitt, Caspi, Dicson, & Silva, 1996; Kandel & Davies, 1986; Miller-Johnson, Coie, Maumary-Gremaund, Lochman, & Terry, 1999; Rao et al., 1995; Serbin, Cooperman, Peters, Lehoux, Stack, & Schwartzman, 1998; Serbin, Peters, McAffer & Schwartzman, 1991). Despite the rising rates of physical aggression committed by adolescent girls and the negative sequelae associated with girls' aggression, limited attention has been directed toward understanding the factors linked with these behaviors (see Cote Zoccollilo, Tremblay, Nagin & Vitaro, 2001; Keenan, Loeber, & Green, 1999).

The development of adolescent females' delinquent behavior involves risk factors at the individual, family, and neighborhood level. With respect to risk factors at the individual level, adolescents' age, race/ethnicity and socioeconomic status (SES) have been consistently associated with delinquent behavior (Conger et al., 1993; Dryfoos, 1990). Previous research suggests that, partly as a function of increased behavioral autonomy and increased time spent with peers (Furstenberg, 1993), older adolescents are more likely to engage in delinquent activities than their younger counterparts. In terms of SES, adolescents from low SES backgrounds engage in more delinquent acts compared to their higher SES counterparts (Simons et al., 1994; Conger et al., 1993). The majority of this earlier work, however, was conducted exclusively on white youth (e.g., Iowa Youth and Families Study, Gluek Study). Research on multi-ethnic samples reveal that non-white youth are more likely to engage in delinquent behavior than are their white counterparts (Dryfoos, 1990; Fitzpatrick, 1997). It is important to note that most of these studies are based on official reports of delinquency (e.g., Flanagan et al., 1988; Snyder et al., 1987). Official reports may reflect bias in

arrest and conviction rates, however, not in actual rates of offending. This potential bias is particularly noteworthy with respect to adolescent girls' official delinquency reports, as law enforcement agencies may be even less likely to identify and convict girls for delinquent behavior than they would boys. Thus, studies that incorporate self-reports of delinquent behavior are centrally important in providing an assessment of the full spectrum of delinquent behaviors among adolescent females (Sampson, 1992).

In considering individual level risk factors, adolescent girls' early pubertal maturation and issues of psychopathology also emerge as critical. With respect to pubertal development, several studies have shown that girls who experience pubertal maturation earlier than their peers engage in more high risk behavior than their on-time or later maturing counterparts (Brooks-Gunn, Graber & Paikoff, 1994; Hayward, Killen, Wilson et al., 1997; Graber, Brooks-Gunn & Warren, 1995; Brooks-Gunn & Reiter, 1990). Further investigations have found variation in pubertal timing as a function of race/ethnicity, suggesting that African American adolescent girls reach puberty sooner than do than their non-African American peers (Herman-Giddeons et al., 1997). However, work in this area generally fails to account for economic factors, despite the fact that economic status varies in relation to race/ethnicity. Future work should examine pubertal maturation, race/ethnicity and economic status in the prediction of girls' delinquent behaviors.

Theoretical discussions on the development of delinquency suggests that depression may play a key role, especially for adolescent females. Several empirical analyses, in fact, have shown that girls with depressed mood engage in more delinquent acts than do girls without depressed mood (Kandel & Davies, 1982; Compas & Hammen, 1994; Fleming & Offord, 1990). Additional studies are needed that examine this connection among a multi-ethnic and multi-SES sample in order to determine the generalizability of these links.

At the family level, studies have shown strong connections between parental coercive behavior (e.g., hostile parent-child interactions and nattering), and adolescents' delinquent behavior (Patterson et al., 1983; Dishion et al., 1994). These earlier investigations, however, in keeping with

the bulk of the literature, have been conducted primarily on males. Recent reports have revealed that girls who were abused as children are 2.5 times more likely to be arrested for violent behavior as adults (Widow, 1999). It is important to note that this previous study was based exclusively on official reports; thus less-extreme cases of parental abuse and earlier forms of violent behavior are not well-represented. Additional studies are needed that include self-reports of abuse and delinquent behavior in order to reduce bias associated with reporting and conviction rates and to detect these relationships in their less-severe forms.

Previous research often implicitly conceptualizes families as insulated from the communities in which they are embedded. Such thinking overlooks a growing body of research that demonstrates the influence of neighborhood characteristics on family and individual level functioning (Sampson et al., 1997; Sampson et al., 1993; Jarrett, 1994; Spencer et al., 1996; Obeidallah & Burton, 1997). Brooks-Gunn et al. (1993) showed that, over and above the influence of family characteristics, neighborhood level characteristics exerted a significant impact on youth behavior. In a model that examines the relationship between families and neighborhoods with respect to individual level outcomes, Burton and Stack (1993) suggest that adolescents growing up in supportive family environments are buffered from the potentially harmful influences of living in neighborhoods with high rates of teenage pregnancy. These studies are consistent with other examinations of the neighborhood (Sampson et al., 1997; Garbarino & Sherman, 1983). Given the accumulating evidence for the relationship between neighborhood influences and adolescents' delinquent behaviors, additional studies that incorporate multi-level contextual factors are needed.

Thus far, the discussion of risk factors associated with adolescent girls' delinquency primarily adheres to a main effects model of development. That is, the model implies that risk factors are independent of each other. An interaction effects model, alternatively, suggests that risk factors occur in a transactional manner, reinforcing each other (Fiese & Sameroff, 1989). To test the interaction effects model, we examined the way that contextual influences (e.g., neighborhood level factors) moderate (i.e., interact with) the relationship between individual level predictors (e.g., depressive

symptoms) and girls' delinquent behaviors. An additional area of exploration includes the way that contextual influences moderate the relationship between family level processes (e.g., parental psychological abuse) and girls' delinquent behaviors. These models are in keeping with ecological theory as they underscore the interconnectedness between adolescents' multiple domains.

Methods

Sample

Data was drawn from the Project on Human Development in Chicago Neighborhoods (PHDCN, F. Earls, P.I.), an ongoing, prospective, longitudinal study of children, adolescents, and adults in their neighborhoods. The larger study includes 343 neighborhoods, termed neighborhood clusters (Ncs) which contains all residents in Chicago. Census data on these neighborhoods were then used to create two stratification variables—racial-ethnic mix (seven levels) and the socioeconomic status (three levels)[3]. A stratified probability sample of 77 NCs representing the cross-classification of these two variables, were selected for the longitudinal study involving families and children.

We interviewed participants over two time waves of data collection. Participants for the present study resided across these 77 neighborhoods. We identified individuals eligible for participation based on their household composition. The larger project assesses children in 7 age groups: infants, 3 year olds, 6 year olds, 9 year olds, 12 year olds, 15 year olds, and 18 year olds. Of

[3] Chicago's 847 census tracts were combined to create the 343 NCs described here. Cluster analyses lead to the creation of internally homogenous NCs based on racial/ethnic mix, socioeconomic status, housing density, and family organization. The seven racial/ethnic strata are: 1) 75% or more African American; 2) 75% or more white; 3) 75% or more Latino; 4) 20% or more Latino/ 20% or more white; 5) 20% or more Latino/ 20% or more African American; 6) 20% or more African American/20%or more white; and 7) NCs not classifiable. Although the goal of this stratification system was to obtain equal numbers of NCs from each of the 21 strata (3 X 7), the number of NCs in each of the strata created by the cross-classification system was variable. Three of the 21 strata, in fact, were empty: No low SES neighborhoods contained 75% or more white residents, no high SES neighborhoods contained 75% or more Latino residents and no high SES neighborhoods contained the racial/ethnic mix of 20% or more Latino/ 20% or more African American residents.

those who were eligible, 75% participated in the study (see Earls & Buka, 1997 for additional details on the design and sampling procedure of the PHDCN). Neighborhood-level characteristics involved multiple levels of information, including the degree of collective efficacy and percent of residential mobility in a neighborhood (see Sampson, Raudenbush & Earls, 1997). For the present study, participants included 1077 girls (478 Latina, 416 African American, and 183 White) from the 9, 12, and 15 year old cohorts, drawn from the first wave of the larger study. At the time of the first assessment, these participants were between the ages of 8.6-15.8 years (M=13.5, SD=1.51). Results of one-way ANOVAs showed that race/ethnicity did not vary by age of adolescent F (2, 1074)=.57, n.s.

Adolescents and their primary caretakers were interviewed in their homes in separate face-to-face assessments. Adolescents provided information regarding pubertal development, depressive symptoms, and engagement in antisocial behavior. Primary caretakers were asked information regarding background characteristics (e.g., race/ethnicity, occupational status, household income, and educational attainment), and parent-child conflict. Each measure employed in this study is described in detail within the attached documents or in the body of this document.

Results of this study are presented by research question/section.

Results

1. Issues Regarding Pubertal Development.

Given the centrality of girls' pubertal timing and their engagement in delinquent behavior, the first step was to conduct an exhaustive analysis of pubertal maturation. To this end, I use data from the PHDCN sample of 9-, 12- and 15-year old (n=896) African American, Latina, and white females[4]. The analysis of pubertal development is based on adolescent girls' responses to the Pubertal Development Scale (Petersen et al., 1988). From the Pubertal Developmental Scale, I derived five

[4] Analyses were conducted as data were made available; thus, earlier reports do not include the complete data set.

indices of pubertal maturation and timing. Specifically, I generated the following indices: 1) age of menarche; 2) the Pubertal Development Scale (PDS; Petersen et al., 1988; range 1-5, with higher scores indicating most developed); 3) Body Mass Index (BMI); 4) Sexual Maturity Index (SMI; mean of breast and hair development); and 5) perception of pubertal timing relative to peers. A paper concerning variation in pubertal maturation across race/ethnicity, *Socioeconomic Status and The Race Toward Girls' Pubertal Maturation: Results from the Project on Human Development in Chicago Neighborhoods*, was published in The Journal of Research on Adolescence in the spring of 2001. The findings from this paper were also presented at the National Academy of Arts and Sciences, *Youth in Society Conference: Adolescent Girls and Physical Activity*, in Cambridge, Massachusetts, in November, 1998. In addition, a poster presentation on the relationship between pubertal maturation and antisocial behavior was presented at the *Society for Research in Child Development*, in Albuquerque, New Mexico, in April 1999.

Subsequent to the analyses presented in the attached document, I examined the relationship between girls' antisocial behavior and their pubertal development and timing. In these analyses, antisocial behavior is measured through two externalizing subscales of theYouth Self Report (YSR; Achenbach, 1991), that is aggression and non-aggressive antisocial behavior. Estimates of internal consistency are .85 for aggressive behavior, and .74 for non-aggressive antisocial behavior. The average score for aggressive behavior is 9.5 (sd=6.3), and 3.3 (sd=3.0) for non-aggressive antisocial behavior. Controlling for adolescents' age, I conducted a series of multiple regressions with the PDS scale as a separate predictor of aggressive and non-aggressive antisocial behavior. Contrary to expectation, no relationship was found between PDS scores and either indicator of delinquent behavior.

2. The Relationship Between Depressive Symptoms and Aggressive and Non-Aggressive Behavior.

Findings regarding the relationship between depressive symptoms and aggressive behavior and non-aggressive behavior are reported in the attached NIJ Research Preview (July, 1999),

Adolescent girls: The role of depression in the development of delinquency. In short, depressive symptoms were shown to be positively associated with girls' delinquent behavior in terms of aggressive as well as non-aggressive acts. Variations in delinquent behavior as a function of race/ethnicity and SES are also described in the NIJ Research Preview.

3. The Relationship Between Depressive Symptoms and Violent Behavior.

The higher than chance co-occurrence of violent behavior and depressive symptoms prompted additional analyses to examine the sequencing of these problems. Identifying the ordering of these problems (i.e., do depressive symptoms precede violent behavior or does violent behavior precede depressive symptoms?) could have implications for the prevention and treatment of these problems. For example, if we learn that depression precedes violent behavior, then treating it will reduce violent behavior (Ben-Amos, 1992). To address this, we conducted two substudies, each described below.

Study 1: Analytic Approach

To investigate the sequencing of these phenomena, we fit the data to a Latent Variable Regression (LVR) in a 3-level HLM. LVR approximates a structural equation model within a multi-level context. In each LVR model, level 1 represented dummy variables for each item on the SRO and YSR at time one (minus one item for each model). Level 1 also included a dummy representing which scale the items were from. Level 2 represented person-level characteristics (i.e., age, race/ethnicity, gender, SES composite, and the flag indicating whether the SES variable was imputed). Level 3 represented the neighborhood level, although no specific neighborhood variables were modeled in this analysis.

In the first analysis, aggression at time two was modeled as the outcome, and depression and aggression at time one were modeled as the predictors (depression at time two was indicated as "ignored"). Similarly, in the second analysis, depression at time two was modeled as the outcome,

and depression and aggression at time one were modeled as predictors (aggression at time two was indicated as "ignored").

Correlations between aggression and depression across time showed that the relationship between these two problems was stronger at time one than it was at time two (i.e., .50 for time one, .37 for time two).

Results of the LVR model showed that aggression at time two was not predicted by time one depression or aggression (Table 1). Similarly, depression at time two was not predicted by time one depression or aggression (Table 2).[5]

Table 1
Time One Aggression and Depression Predicting Time Two Aggression

Predictor Variable	Beta (Standard Error)	P value
Aggression, time one	.38 (.44)	.394
Depression, time one	.08 (.37)	.828

Table 2
Time One Aggression and Depression Predicting Time Two Depression

Predictor Variable	Beta (Standard Error)	P value
Aggression, time one	-0.22 (0.97)	.821
Depression, time one	-.10 (0.66)	.881

Thoughts To Consider

The results suggest that depression and aggression co-occur within time point, although the strength of the relationship is diminished across time. The strength of the relationship may be diminished because reports of aggressive behavior and depressive symptoms are lower at time two, relative to time one. This is particularly evident for reports of aggression.

[5] Data were initially fit to null models, where level one represented the measurement model, and level two represented gender and age only (i.e., race/ethnicity and SES was not included). Results of the null models showed that time two depression was predicted by time one depression (B=.44 (se=.12), p <.001), although time one aggression was not related to time two depression (B=-.20 (se=.13), p=.12). A similar pattern was found for the prediction of aggression at time two, where time one aggression predicted time two aggression (B=1.05 (se=.22), p <.0001), but time one depression was not associated with time two aggression (B=.27 (se=.20), p=.18).

Results offered no evidence of sequencing of depression and aggression. We offer at least three possible explanations for this lack of support. First, it is plausible that both depression and aggression are expressions of the same underlying phenomena. For instance, dysregulation of serotonin, present in both depression and aggression, may be implicated in the proximal manifestation of these problems. From a cognitive perspective, neurotic hostility, which includes the belief that one is being mistreated, feelings of frequent anger and irritability, is predictive of depression as well as aggression. Moreover, youth who have been exposed to and victimized by violence may be at higher risk of depression as well as aggression.

Secondly, it is possible that biases associated with recall undermined the accurate estimation of the onset of depression and aggression. Indeed, previous studies have shown that individuals' responses to questionnaires are most accurate within six months of the target event; after the 6th month, the accuracy of recall is substantially jeopardized (Hagerty). The time frame for the SRO/aggression scale, however, asks respondents to recall acts of aggression committed within the past 12 months.

Thirdly, it is reasonable to suggest that we did not uncover a pattern of sequencing because our sample reflected the general, normative population of adolescents. It may be that sequencing becomes important at a more severe level of dysfunction (e.g., among those who are clinically depressed). Salience and consequentiality are likely more pronounced in cases where the problem is more severe. Thus, evidence of sequencing may be detected among those youth who are suffering from severe depression and/or engaging in severe levels of aggression. An examination of adolescents who are clinically depressed and/or engaging in more severe forms of aggression may afford us an important opportunity through which to better unpack the sequencing of these problems. Our next substudy addresses this concern by exploring the sequential ordering of depression and aggression among those youth who are clinically depressed and/or who are engaged in severe forms of aggression.

Study 2: Analytic Approach

To explore where there was sequencing among those who were severely symptomatic, we grouped boys and girls (12 & 15 year old cohorts) into one of four categories: 1) Comorbid (i.e., moderately high levels of violent behavior and moderately high levels of depressive symptomatology); 2) Moderately high levels of depressive symptoms; 3) Moderately high levels of violent behavior; and 4) Minimally symptomatic (i.e., lower levels of violent behavior and depressive symptoms). This categorization was carried out at each time point. Grouping individuals in this way was necessary in order to distinguish between those who manifest one problem versus another, those who manifest two problems simultaneously, and those who do not manifest either of these problems in a pronounced way. Exhibits 1 and 2 display patterns of symptomatology, for girls and boys, respectively.

The majority of adolescents were minimally symptomatic at each time point (over 72% and 84% at Time 1 & 2, respectively). Most of the girls in the comorbid category at time one remained in this category at time two. Most of the boys who were in the comorbid category at time one became minimally symptomatic at time two.

Exhibit 1
Percent of Girls Who Were Symptomatic at Time 1 and Time 2

	Time 1	Time 2			
Pathology Group	N (%)	Comorbid: Violent and Depressed N (%)	Depressed Only N (%)	Violent Only N (%)	Minimally Symptomatic N (%)
Comorbid: Violent and Depressed	37 (6.1)	9 (24.3)	10 (27.0)	7 (18.9)	11 (29.7)
Depressed Only	54 (8.8)	1 (1.9)	15 (27.8)	2 (3.1)	36 (66.7)
Violent Only	74 (12.1)	1 (1.4)	3 (4.1)	27 (36.5)	43 (58.1)
Minimally Symptomatic	446 (73.0)	3 (.7)	27 (6.1)	28 (6.3)	388 (87.0)

Exhibit 2
Percent of Boys Who Were Symptomatic at Time 1 and Time 2

	Time 1	Time 2			
Pathology Group	N (%)	Comorbid: Violent and Depressed N (%)	Depressed Only N (%)	Violent Only N (%)	Minimally Symptomatic N (%)
Comorbid: Violent and Depressed	18 (3.1)	2 (11.1)	3 (16.7)	4 (22.2)	9 (50.0)
Depressed Only	17 (2.9)	0 (0)	4 (23.5)	3 (17.7)	10 (58.8)
Violent Only	108 (18.7)	3 (2.8)	0 (0)	42 (38.9)	63 (58.3)
Minimally Symptomatic	436 (75.3)	2 (.5)	12 (2.8)	53 (12.2)	369 (84.6)

At time one, over twice as many girls were in the depressed category compared to boys. Most boys and girls who were depressed at time one became minimally symptomatic at time two. Of those who remained symptomatic, over 27% of girls and 24% of boys continued reporting moderately high levels of depressive symptoms.

Over 12% of girls and nearly 19% of boys reported moderately high levels of violent behavior at time one. Similar to patterns of depression, most boys became minimally symptomatic at time two (58.3%). Of those boys that remained symptomatic, the majority of them remained violent at time two. Girls who were violent at time one, however, were as likely to become minimally symptomatic as they were to remain violent.

What happened to the girls and boys who were comorbid at time one?

Most of the girls and boys in the comorbid category at time one became asymptomatic at time two. The remainder of girls were relatively equally distributed across the other categories of pathology, although slightly more girls were found in the depression category than in the other categories. Those boys who did not become asymptomatic at time two were mostly found in the violent or depressed categories.

What happened to those who were depressed at time one?

At time one, over twice as many girls were in the depressed category compared to boys. Most boys and girls who were depressed at time one became asymptomatic at time two. Of those who

remained symptomatic, over 27% of girls and 24% of boys continued reporting moderately high levels of depressive symptoms.

What happened to those who were violent at time one?

Over 12% of girls and nearly 19% of boys reported moderately high levels of violent behavior at time one. Similar to patterns of depression, most boys who were violent at time one became minimally symptomatic at time two (58.3%). Of those boys that remained symptomatic, the majority of them remained violent at time two. Girls who were violent at time one, however, were equally distributed across minimally symptomatic and violent categories at time tw .

We conducted a series of two-level HLM analyses to determine whether those in certain psychopathology groups at time one were likely to be in the same or other groups at time two (e.g., were those who were comorbid at time one more likely to be comorbid at time two). The analytic reference group was being minimally symptomatic at time one. In all analyses, we controlled for the effects of age, gender, race/ethnicity, family SES, and parental cohabitation status. Results are presented separately for each outcome (see Exhibit 3).

Model 1: Comorbid Status at Time Two

None of the background characteristics (e.g., gender, age) was associated with manifesting comorbidity at time two.

Results showed that those who were violent at time one were more likely to be comorbid at time two compared to those who were minimally symptomatic at time one. Thus, violent behavior preceded depressive symptoms in those cases where violent behavior continued over time. In addition, those who were comorbid at time one were more likely to be comorbid at time two than those who were violent, depressed or minimally symptomatic at time one. No differences were found between those who were minimally symptomatic at time one and those who were depressed at time one in terms of their likelihood of manifesting comorbidity at time two.

Model 2: Depression at Time Two

Girls were more likely to be depressed at time two than were boys. No differences were detected with respect to adolescents' age, race/ethnicity, family SES, or parents' cohabiting status and depression at time two.

No links were found between those who were violent at time one and those who became depressed at time two, suggesting that violence does not precede depression if the violent behavior itself does not persist. Compared to those who were minimally symptomatic, adolescents who were were comorbid or depressed at time one were more likely to be depressed at time two. The likelihood of manifesting moderately high levels of depressive symptoms at time two did not differ among those who were comorbid or depressed at time two.

Model 3: Violence at Time Two

Boys were more likely to be aggressive at time two than were girls. African Americans were more likely to be aggressive at time two than were whites. No other differences in background characteristics were found.

Results showed that those who were depressed at time one were no more likely to be violent at time two than those who were minimally symptomatic at time one. Compared to those who were depressed or minimally symptomatic at time one, those who were violent at time one were more likely to be violent at time two. Those who were comorbid at time one were more likely to be violent at time two than were those who were minimally symptomatic at time one. A trend was detected suggesting that those who were initially comorbid were slightly more likely to be violent at time two compared to those who were depressed at time one. An additional trend suggested that those who were violent at time one were slightly more likely to be violent at time two than were those who were comorbid at time one.

Model 4: Minimally Symptomatic at Time Two

No background characteristics distinguished between those who were more or less likely to become minimally symptomatic at time two.

Those who were minimally symptomatic at time one were more likely to remain in this state than those who were comorbid, depressed, or violent at time one. Those who were comorbid at time one were less likely to be minimally symptomatic at time two compared to those who were depressed or violent at time one. No differences were detected between those who were depressed or violent at time one and their minimally symptomatic status at time two.

Exhibit 3
Results of 2-level HLM Examining Relationships Between Psychopathology Status at Time 1 and Status at Time 2

Fixed Effects	Model 1 Outcome: Comorbid T2 Coefficient (SE)	Model 2 Outcome: Anx/Depressed T2 Coefficient (SE)	Model 3 Outcome: Violent T2 Coefficient (SE)	Model 4 Outcome: Minimally symptomatic T2 Coefficient (SE)
Intercept	-5.29(.96)****	-2.80 (.46)****	-2.76(.33) ****	1.98(.27) ****
Gender	-0.47(.51)	-0.75 (.29) **	0.59(.18) **	-0.12(.15)
Age	-0.06(.16)	0.03 (.09)	0.03(.06)	-0.04(.05)
SES	0.06(.19)	-0.15 (.11)	-0.07(.07)	0.08(.06)
Latin	0.81(.86)	0.17 (.45)	0.13(.33)	-0.26(.26)
Black	-0.07(.92)	-0.31 (.48)	0.61(.31) *	-0.34(.26)
Parental Cohabitation	-0.25(.57)	-0.01 (.32)	-0.23(.21)	0.19(.18)
Comorbid T1	3.84(.59) ****[ab]	1.85 (.38) ****[c]	0.92(.37) *[ef]	-2.39(.31) ****[hi]
Anx/Depressed T1	0.64(1.11)[a]	1.89 (.34) ****[d]	-0.07(.49)[eg]	-1.24(.28) ****[h]
Violent T1	1.56(.71)*[b]	-.80 (.62)[cd]	1.64(.20) ****[fg]	-1.41(.19) ****[i]

Note:
[a] Post-hoc tests showed that those who were comorbid at T1 were more likely to be comorbid at T2 than were those who were depressed at T1 ($p < .01$).
[b] Post-hoc tests showed that those who were comorbid at T1 were more likely to be comorbid at T2 than were those who were violent at T1 ($p < .001$).
[c] Post-hoc tests showed that those who were comorbid at T1 were more likely to be depressed at T2 than were those who were violent at T1 ($p < .01$).
[d] Post-hoc tests showed that those who were depressed at T1 were more likely to be depressed at T2 than were those who were violent at T1 ($p < .01$).
[e] Post-hoc tests showed a trend suggesting that those who were comorbid at T1 were slightly more likely to be violent at T2 than were those who were depressed at T1 ($p < .10$).
[f] Post-hoc tests showed a trend suggesting that those who were violent at T1 were slightly more likely to be violent at T2 than were those who were comorbid at T1 ($p < .10$).
[g] Post-hoc tests showed that those who were comorbid at T1 were more likely to be violent at T2 than were those who were depressed at T1 ($p < .01$).
[h] Post-hoc tests showed that those who were comorbid at T1 were less likely to be minimally symptomatic at T2 than were those who were depressed at T1 ($p < .01$).
[i] Post-hoc tests showed that those who were comorbid at T1 were less likely to be minimally symptomatic at T2 than were those who were violent at T1 ($p < .01$).

Conclusions

Results showed there was some evidence of sequencing: Violent behavior preceded depressive symptoms, but *only* when the individual continued engaging in violence at a moderately high level. One implication of this finding is that treating violent behavior may result in a subsequent reduction of depressive symptoms. Violent behavior did not precede depression among those individuals who desisted in their violent behavior.

Depressive symptoms did not precede violent behavior, suggesting that depression may not increase the risk of acting violently. This is consistent with Kovac et al.'s (1988) study that showed that the treatment of depressive symptoms was not associated with a reduction in conduct disorder.

In addition, we detected a relatively stable group of individuals who manifest both depressive symptoms and violent behavior simultaneously at both time points. The stability of comorbidity across time highlights the importance of intervening with those who manifest early violence in order to reduce the likelihood of them becoming subsequently depressed, and falling into this relatively stable category of individuals who manifest both problems consistently over time. Those who were initially comorbid were more likely than those who were minimally symptomatic to manifest depression alone or violent behavior alone. What distinguished between those who manifested comorbid symptoms, depression only or violence only? Except in a few cases (i.e., boys more violent and girls more depressed than their opposite sex counterparts; African Americans more likely to be violent than whites), background characteristics were generally not associated with the development of symptomatology.

Not surprisingly, there was stability in symptomatology among those who were depressed at time one or violent at time one. Results also showed that the risk of depression at time two was relatively equal for those who were comorbid and those who had moderately high levels of depressive symptoms at time one.

In general, most adolescents were minimally symptomatic at each time point.

4. Adolescent Girls' Aggressive Behavior: Links With Individual Level, Family Processes and Neighborhood Contexts.

This study examined engagement in physical aggression among a sample of multi-ethnic adolescent girls. The conceptual framework guiding this work draws from an ecological perspective (Bronfenbrenner, 1979; 1986, 1989; Cicchetti & Aber, 1998), as well as from the literature on cultural contexts (Barbarin, 1999; Collins, 1991; Garcia Coll et al., 1998; Wyche, 1993). At the most general level, ecological theory proposes that personal and environmental characteristics interact to shape individual's behavior (Bronfenbrenner, 1979, 1986; Cicchetti & Aber, 1998; Mischel, Cantor & Feldman, 1996). For example, neighborhood characteristics can influence individual's behavior through providing opportunities for youth to engage in deviant behavior. The cultural context literature takes into account the historical, cultural, and economic circumstances that combine to guide minority youth's responses to events in their lives.

In addition, the current examination is embedded within a paradigm that is sensitive to issues of gender and development. Several studies of aggression have included both boys and girls (e.g., Caspi, Henry, McGee, Moffitt & Silva, 1995; Loeber, Farrington, Stouthamer-Loeber, Moffitt, & Caspi, 1998; Weiss & Catron, 1994). Although comparative analyses between boys and girls further our understanding of the differences between gender, such studies do not necessarily provide information on girls' levels of aggression relative to other girls. Thus, comparative studies do not offer benchmarks from which to consider the seriousness or severity of gender-specific aggression (see Cote et al., 2001). Furthermore, comparative examinations often do not explore risks that may be particularly germane to girls' experiences (e.g., greater likelihood of reporting depressive symptoms, early menarcheal timing), risks which potentially underlie individual differences in girls' physical aggression.

The Importance of Studying Girls' Physical Aggression

In the current investigation, physical aggression is defined as acts that are undertaken with the intention of physically harming another person. Within this definition, less severe forms (e.g.,

slapping, punching) as well as more severe forms of physical aggression are considered (e.g., attacking someone with a weapon). In keeping with this focus, we do not assess other behavioral conduct problems, such as relational or indirect social aggression (Cairns, Cairns, Neckerman, Ferguson, Gariepy, 1989; Crick, 1995, 1997; Crick & Grotpeter, 1995; Oesterman et al., 1999), externalizing behavior (Weiss & Catron, 1994 Loeber, Farrington, Stouthamer-Loeber, & Van Kamman, 1998), antisocial behavior (Andrews, Foster, Capaldi, & Hops, 2000; McGee et al., 1990), or conduct disorder (Bardone, Moffitt, Caspi, Dickson & Silva, 1996; Robins & Price, 1991).

Despite the frequent presence of aggressive behavior among adolescents exhibiting conduct disordered, externalizing, and delinquent behaviors, these broader categories of conduct problems encompass a substantially wider range of activities, including non-violent problematic behaviors such as being truant, destroying property, abusing substances, and acting disrespectfully. For example, in DSM-IV, youth can be diagnosed as conduct disordered *without* engaging in physically aggressive behavior. To be classified as conduct disordered, only three of the following four characteristic behaviors need to be present: 1) violation of rules; 2) non-aggressive conduct that destroys property; 3) deceitful behavior or theft; and 4) aggressive behavior that causes or threatens physical harm (DSM-IV, 1994). Similarly, externalizing and delinquent behaviors include aggressive behavior, but also included are many non-aggressive acts (e.g., underage drinking, being loud, graffiti writing). Examination of these broader categories in an investigation of aggressive behavior confounds aggressive behavior with larger constructs of conduct problems, thereby obscuring the specification of variables associated with aggressive behavior in particular (see Tremblay, 2000). Further, conduct disorder is an especially problematic category in the study of girls because it may contain a sex bias at the level of diagnostic criteria (Keenan, et al., 1999).

Aggressive Behavior and Depressive Symptoms

When examining aggressive behavior in adolescent girls, the presence of depressive symptoms is an important risk factor to investigate. First, previous research has found evidence

linking the presence of depressive symptoms with aggressive behavior (e.g., Rihmer, Pestality, Pihlgren, & Rutz, 1998; Sanchez & Meier, 1997; Van Praag, 1996). Second, it is well-established that depressive symptoms are a major problem among adolescent girls, with adolescent girls reporting at least twice the number of depressive symptoms as do adolescent boys (Bandura, Pastorelli, Barbaranelli, & Caprara, 1999; Nolen-Hoeksema & Girgus, 1994; Peterson, Compas, Brooks-Gunn, Stemmler, Ey, & Grant, 1993; Peterson, Sargiani, & Kennedy, 1991). Some studies have offered hypotheses regarding potential mechanisms that connect depressive symptoms and physical aggression (Quiggle et al., 1992; Rihmer et al., 1998; Sanchez & Meier, 1997; Van Praag, 1996). Previous work suggests that less competent responses in the face of stress are characteristic of both aggression (e.g., Dodge, 1986; Quiggle et al., 1992), and depression (Kaslow et al., 1988; Quiggle et al., 1992). These studies have emphasized the role of cognitive (Dodge, 1986; Dodge & Neauman, 1981; Dodge, Price, Coie, & Christopoulos, 1990) as well as social cognitive processing patterns (Quiggle, et al., 1992). Specifically, depressed as well as aggressive youth are more likely to attend to negative cues in their environment, are more likely to endorse hostile attributions (Berkowitz, 1990; Quiggle et al., 1992) and are less likely to engage in effective resolution of interpersonal conflict (Dodge et al., 1990; Quiggle et al., 1992). Similarly, Berkowitz (1990) notes that negative affect, a part of depressive symptoms, activates recollections of, thoughts about, and reactions associated with anger and aggression.

Depressed youth, additionally, tend to have higher levels of irritability and anger than do non-depressed youth (Kovacs et al., 1994), feelings which are implicated in the development of aggressive behaviors. Some authors have hypothesized that depression may result from a defensive reaction against impulses to act aggressively (Gunderson & Elliot, 1985). Studies of the central nervous system show that depression and aggression are each associated with the dysfunctional transmission of serotonin (Bjork, Dougherty, & Moeller, 1997; Rihmer et al., 1998; Sanchez & Meier, 1997;Van Praag, 1996).

The majority of the studies that explore this link between depression and physical aggression have been conducted on males (e.g., Fava, Rosenbaum, Pava, McCarthy, Steingard, Bouffiedes, 1996; Garbarino, 1999, Capaldi, 1991; Lewis et al., 1986; Kundu & Basu, 1999; Puig-Antich, 1982; Van Praag, 1996), although some studies have included girls (e.g., Quiggle et al., 1992; Borst & Noam, 1993). In their investigation of 9-12 year old boys and girls, Quiggle and colleagues (1992) examined the social cognitive patterns associated with depressive symptoms and aggressive behavior. Save one model, however, boys and girls were combined in their analyses. Hence, while a relationship between aggression and depressive symptoms was found, their findings do not provide information regarding *girls'* patterns of aggressive behavior. Studying the link between depression and aggression specifically in girls is critical because girls' greater likelihood of developing depressive symptoms may have implications for how they manifest aggressive behavior.

Ecological and cultural context paradigms, furthermore, suggest that SES and racial/ethnic factors may influence girls' experience of depressive symptoms and, in turn, the relationship between those symptoms and aggressive behavior. Most studies in this area have not included samples that were racially mixed or had variation in SES. While Quiggle et al.'s (1992) sample included youth from lower and middle income families, they did not examine whether the relationship between aggression and depression varied in connection with SES. Further, their sample was all white, which precluded any examination of how race/ethnicity might impact this relationship. With a racially-mixed sample, Bjork et al. (1997) explored the links between depressive symptoms and aggressive behavior. Results revealed a gender difference, with a strong positive relationship between females' depressive symptoms and aggressive behavior (Bjork et al., 1997). However, despite the racially-mixed composition and varied SES of the sample, the authors neither explored how this relationship varied by race/ethnicity nor accounted for racial/ethnic or SES differences in their analysis.

Links Between Conduct Problems and Depression.

As noted earlier, other forms of conduct problems are not the central focus of the current work. However, given the small number of studies that explore the connection between depressive

symptoms and aggressive behaviors among adolescent girls, it is important to review the research that has explored depressive symptoms and other conduct problems.

Many studies have demonstrated connections between adolescent depression and the broader constructs of conduct disorder, externalizing, antisocial or delinquent behavior (Cairns, Peterson, & Neckerman, 1988; Capaldi, 1991; Cole & Carpentieri, 1990; Kadzin, Esveldt-Dawson, Unis & Rancurello, 1983; Kandel & Davies, 1986; Kashani et al., 1987; Loeber & Keenan, 1994; McGee et al., 1990; Serbin, Peters, McAffer & Schwartzman, 1991; Puig-Antich, 1982). Several of these studies have included females (e.g., Bardone, Moffitt, Caspi, Dickson, & Silva, 1996; Borst & Noam, 1993; Caron & Rutter, 1991; Gjone & Stevenson, 1997; Harrington, Fudge, Rutter, Pickles, & Hill, 1991, Kovacs et al., 1991; Loeber & Keenan, 1994; Robins & Price, 1991; Sack et al., 1993; Serbin et al., 1998; Zoccollillo, 1991, 1992). Results of Harrington et al.'s (1991) examination of the relationship between depressive symptoms and conduct disorder showed a strong connection. In fact, follow-up assessments revealed that adolescents who experienced both depression and conduct disorder were at an elevated risk of being diagnosed with antisocial behavior during adulthood as compared to those individuals who experienced only conduct disorder during adolescence.

Although Harrington's study imparts relevant information, they did not include gender as a variable in their statistical models, which makes it unclear whether gender differences were present. Similarly, Biederman et al. (1995) found that depressive symptoms and conduct disorder co-occurred in a sample of white boys and girls, however, they too did not account for differences related to gender. Furthermore, given that the sample consisted of only white youth, these studies could not provide insight regarding the role of race/ethnicity on this relationship.

Additionally, these studies did not tease out aggressive behavior from the broader construct of conduct problems. This is the case as well with studies that explore the link between depressive symptoms and conduct disorder among girls exclusively (Bardone et al., 1996). As such, we have limited insight regarding the specific role that *aggressive behavior* played in this relationship.

Similar to studies of conduct disorder and depressive symptoms, there has been consistent evidence that internalizing and externalizing symptoms co-occur at a rate higher than that expected by chance alone (Cicchetti & Toth, 1991; Gould, Bird, & Jaramillo, 1993; Leadbeater et al., 1999; Loeber, Farrington, Stouthamer-Loeber, & Van Kamman, 1998; Wangby, Bergman, & Magnusson, 1999; Weiss & Catrone, 1994). In their examination of the contributions of genetic and shared environments, Gjone and Stevenson (1997) found that patterns of internalizing and externalizing behaviors differed across gender, necessitating separate structural equation models for girls and boys. In the context of other work in this area (e.g., Bjork et al., 1997), this study suggests that these patterns are gender-specific. Nonetheless, studies that examine the specific connection between depressive symptoms and aggressive behavior among girls are needed.

Links Between Substance Abuse and Depression and Aggression.

Problematic substance use has been identified as a risk factor in studies of both depression (Coelho, Rangel, Ramos et al., 2000; Kashani, 1985; Kessler, Nelson, McGonagle, Swartz & Blazer, 1996; Rao, Daley & Hammen, 2000) and aggression (Brady, Myrick & McElroy, 1998; Giancola, Mezzich, Clark & Tarter, 1999; Hien & Hien, 1998; Knox & Tromanhauser, 1999; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Robins, 1986; Stiffman, Dore & Cunningham, 1996; White, Loeber, Stouthamer-Loeber & Farrington, 1999), and has particular relevance for adolescent girls. Rao et al.'s (2000) five-year prospective analysis of adolescent females demonstrated that the co-occurrence between substance abuse and major depressive disorder was considerably higher than that expected by chance alone. Others have offered similar evidence, supporting the DSM-IV's suggestion that depression and substance abuse co-occur (DSM-IV, 1994). In their investigation of female offenders, Hien & Hien (1998) argue that substance abuse and female violence are also tightly connected. In addition, Brady et al. (1998), utilizing evidence from neurobiology and pharmocotherapy, demonstrated a strong relationship between substance use, impulsivity, and pathological aggression. Given that problematic substance use has been implicated in the development of depressive symptoms as well as aggression, it is possible that problematic

substance use may, in fact, underlie this relationship. Therefore, failure to include problematic substance in the present analyses may yield spurious connections between depressive symptoms and aggressive behavior.

Aggressive Behavior and Pubertal Maturation

In addition to depression, the timing of pubertal maturation is another important variable to consider when studying aggressive behavior, particularly in girls. Several studies have converged to show that girls who mature earlier than their peers are more likely to engage in delinquent, norm-violating, or aggressive behavior (Caspi et al., 1993; Caspi & Moffitt, 1991; Graber et al., 1997; Stattin & Magnusson, 1990). Interpretations offered to explain this connection draw from the early-timing hypothesis, wherein girls who mature early experience greater stress and less support than their on-time or later-maturing peers (Caspi & Moffitt, 1991). Other explanations include the notion that girls who reach pubertal maturation earlier than their peers are more likely to associate with older boys who, in turn, are more likely to act in delinquent or aggressive ways. Girls may then model this behavior and consequently act out themselves (Caspi et al., 1993). Furthermore, girls who are early maturers are more likely to have higher levels of depressive symptoms than are their on-time peers (Graber et al., 1997).

Drawing on the off-time hypothesis, some studies note that girls who do not mature on-time (i.e., either early or late maturers) are at risk of negative outcomes (Brooks-Gunn & Warren, 1985). The off-time hypothesis posits that any deviations from the norm are stressful for youth and may thus result in poorer experiences. The findings of the pubertal maturation literature, however, are somewhat inconsistent, with some studies showing that girls who are later maturers are actually less likely to engage in delinquent behavior compared to their on-time or early maturing peers (Flannery, Rowe & Gulley, 1993).

By and large, previous studies connecting pubertal maturation to behavioral and psychosocial outcomes assess samples of predominantly white girls (with notable exceptions by Hayward et al., 1997 and Siegel et al., 1999). As such, existing studies may be limited in their capacity to inform the

connections between pubertal maturation and aggression among non-white girls. Given the ethnic diversity in the present sample, we are in an excellent position to examine aggressive behavior among those girls who have reached menearcheal age at the time of the study.

Examining Girls' Aggression from an Ecological/Contextual Perspective

The role of race/ethnicity.

As is apparent from this review of the relevant literature, the role of race/ethnicity has not been thoroughly addressed. Previous studies tend to examine depression and aggression among predominantly white samples (e.g., Bardone et al., 1996; Quiggle et al., 1992). Those studies that do include racially-mixed samples tend not to explore variation that might be attributed to racial/ethnic differences (e.g., Bjork et al., 1997). As a result, the understanding of inter- and intragroup variability in girls' aggression among ethnically diverse populations is severely limited.

Previous investigations of adolescent mental health highlight the unique cultural and economic circumstances typically associated with minority youth (Burton & Stack, 2000; Garcia Coll, Laberty, Jenkins, McAdoo, Crnic, Wasik, & Garcia, 1996; Spencer et al., 1997). Ethnographic research on minority youth, especially African Americans and Latinos, suggests that experiences of discrimination, marginalization, segregation, and poverty may converge to create circumstances that could encourage adaptive, but not necessarily developmentally optimal responses. For example, McDermott and Spencer (1997) showed that African American youth exhibited more impulsivity and oppositional defiant behavior than did non-African American youth. They posit that this pattern may reflect youths' perceptions experiences of environmental risks, which then call for such responses (also see Spencer, 1995). Additionally, contexts of chronic stress sometimes require self-protective behavior (Ogbu, 1988), which can include aggressive responses.

In the present study, we examine the contribution of race/ethnicity, primary caregiver's marital status, and family socioeconomic status. Furthermore, variations in socioeconomic status must also be accounted for, especially in light of studies that show that minority families have disproportionately less resources than white youth (Wilson, 1998; McLoyd, 1990).

The role of neighborhood level characteristics.

The effects of socioeconomic disparities and racial inequalities/segregation may emerge most clearly within the context of neighborhoods (Shaw & McKay, 1931; Sullivan, 1996). Over the past several decades, the potential influence of neighborhood characteristics has been increasingly recognized as important factors to consider in examining youth behavior (Allison et al., 1998; Earls & Buka, 1999; Elliott, Wilson, Huizinga, Sampson, Elliott, Rankin, 1996; Sampson, Earls & Raudenbush, 1997; Wilson, 1987). Neighborhood environmental stressors – such as substandard housing, high unemployment, pervasive poverty, and residential instability – can adversely affect the responses of those living in such communities (Coulton & Pandey, 1992; Kochman, 1992; Spencer, McDermott, Burton & Cole, 1996; Sampson & Groves, 1989; Sampson et al., 1997; Tienda, 1991).

Studies of the effect of neighborhood characteristics on residents' behavior has yielded mixed results, with some studies suggesting that effects are negligible (see Jencks & Maier, 1993), and others showing that neighborhood characteristics exert direct as well as indirect influences on outcomes (Brooks-Gunn et al., 1993; Sampson et al., 1997). For example, growing evidence suggests that neighborhood characteristics are associated with residents' rates of depression (Dubrow, Edward, & Ippolito, 1997; Obeidallah, 1996; Simons et al., 1996), and aggression (Kupersmidt et al., 1995; Sampson et al., 1997). Despite the inconsistent results found in past research, exploring the potential contribution of neighborhood characteristics here offers another way to contextualize adolescents' day-to-day experiences. Furthermore, by not partitioning individual differences into contextual effects and individual effects, we may be led to the erroneous conclusion that differences found at the individual level reflect components of the individual or family, when these effects may actually reflect contextual variation at the neighborhood level (Johnston, Sampson & Raudenbush, 2001)

Community social organization theory (Sampson, 1992; Shaw & McKay, 1942) suggests that neighborhood structural factors are associated with residents' experiences and outcomes. Two central components of community social organization are economic impoverishment and residential instability. Several neighborhood studies draw connections between low resource/high disadvantaged

neighborhoods and poor outcomes for residents (Brooks-Gunn et al., 1993; Furstenberg & Hughes, 1997). While some studies have shown that residential mobility is associated with positive outcomes for some groups(e.g., Coulton et al., 1998), the majority of studies have drawn links between residential instability and negative experiences.

McLanahan and Sandefur (1994) posit: "[r]esidential stability ...measures the potential for long-standing connections between the child's family and other adults in the community ...in order to take full advantage of whatever a community offers, a child must know and trust his neighbors and teachers, and they must know and care about him" (p. 122). Indeed, residential instability may undermine shared consensus and social relationships (Coleman, 1988; McClanahan & Sandefur, 1994; Parsons, 1949; Elliott & Huizinga, 1990), isolate families, and disrupt neighborhood social networks (McClanahan & Sandefur, 1994). As a consequence, high rates of residential mobility, have been shown to adversely affect youth outcomes (Crane, 1991; Ensminger, Lamkin & Jacobson, 1996; Furstenberg & Hughes, 1997; Obeidallah, 1996). Moreover, negative correlates of residential instability may be particularly difficult for minority youth who have historically and culturally emphasized the importance of connectedness and community (Stack & Burton, 1993).

The effects of neighborhoods may not only be direct, but also interact with individual- and family-level characteristics in the prediction of aggressive behavior. It is possible that the effects of neighborhood characteristics may have different meanings (and be associated with different outcomes) for girls of different race/ethnicity and/or socioeconomic status. As noted by Korbin, Coulton, Chard, Platt-Houton & Su (1998), "neighborhood structure may have differential effects on ethnic groups because the dynamics of residential choice and location are more constrained for minorities than for Whites of European origin due to housing discrimination and prejudice" (p. 218).

Summary

Overall, recent reports suggest that girls' aggressive behavior is on the rise, yet the majority of studies in this area suffer from several limitations. First, most of the existing studies fail to examine

girls' aggression altogether (e.g., Capaldi, 1991; Kundu & Basu, 1999; Van Praag, 1996), groups males and females without accounting for the potential gender differences among them (e.g., Harrington et al., 1991; Biederman et al., 1995), or examines girls' aggression only in comparison to boys' aggression (e.g., Quiggle et al., 1992). This effectively obscures the identification of gender-specific risk factors associated with aggression, such as depressive symptoms and maturational status. Secondly, many studies that examine girls' conduct problems do not explore physically aggressive behavior in particular. Because broader constructs of conduct problems encompass a far wider array of activities, such studies cannot be considered an adequate substitute for studies of aggression specifically. Third, most of the existing research in this area does not consider the potential effects of race/ethnicity and/or SES on the factors associated with aggressive behavior. Thus, the extent to which these previous studies are generalizable to the experiences of minority for economically diverse youth are unclear. In addition, consideration of girls' physical aggression with the contexts of their neighborhoods is largely unexplored.

The present work seeks to advance our understanding of physical aggression committed by girls through assessing the prevalence of physical aggression and its relationship with depressive symptoms and pubertal maturation among a population-based sample of racially-mixed adolescent girls. The racial/ethnic and SES mix of our sample allows us to determine the links between these components and girls' aggression and disentangle the effects of SES and race/ethnicity on girls' aggression. Furthermore, because the relationship between physical aggression and depressive symptoms is complex, we explore the contribution of other individual, family, and neighborhood characteristics.

Procedure

Adolescents and their primary caregivers were interviewed in their homes in separate face-to-face assessments by well-trained professional research assistants who were from ethnically diverse backgrounds. Interviews were private to facilitate participants' disclosure of personal information.

Among the three-hour battery, adolescents provided information regarding engagement in aggressive acts and levels of depressive symptoms. Primary caregivers were asked for information regarding background characteristics (e.g., race/ethnicity, SES), and their daughter's levels of depressive symptoms.

Primary caregivers reported on the race/ethnicity of their daughter and on their family's demographic characteristics, including information about the total annual household income, primary caregiver's educational attainment, occupation, and marital status. Occupational prestige codes were determine from primary caretaker or their partners' job title. Annual household income, primary caregiver's educational attainment, and occupational prestige were then factor analyzed to create an SES composite score. Lower scores on the composite indicate lower family SES. Scores were imputed for families that were missing up to two of the indicators. In all analyses, we modeled a variable that indicated whether or not the score was imputed. Exhibit 4 displays descriptive information for the study.

Questionnaire Measures

Assessment of Psychosocial Indicators. The Self Report of Offending (SRO; Earls & Reiss, 1994) is a scale designed to measure adolescents' engagement in anti-social behavior. This interview includes six items covering engagement in physically aggressive activities over the past 12 months. Responses were coded as 1 if the adolescent had engaged in the act and 0 if she had not. Responses were then summed to create an index of physical aggression (Range=0-6). Items on this scale include "Have you hit someone with whom you do not live? Have you hit someone with whom you do live? Have you thrown an object at someone to hurt them? Have you carried a hidden weapon? Have you attacked someone with a weapon? Have you been in a gang fight?" Endorsement of items on this scale is presented in Exhibit 5. Those adolescents who endorsed having hit someone with whom they live, but endorsed no other item, were not included in the summary score (n=38). Internal consistency as estimated by Cronbach's alpha was .74.

The extent to which girls experienced symptoms of depression during the weeks prior to the interview was assessed through the Parent Report-Form of the Child Behavior Check List (CBCL, Achenbach, 1991b). The Parent-Form of the CBCL includes an anxious/depressed subscale with 14-items, including items regarding feelings of worthlessness, fearfulness, and sadness. Response options were 0=not true; 1=somewhat or sometimes true; and 2=very true or often true. Responses were summed to capture the degree of symptom severity (Range=0-25). Based on data gathered from a nationally representative sample, Achenbach (1991a, 1991b) set a borderline threshold for clinical depression (i.e., a score of 16 or higher). In the current study, 6.8% (n=46) had reached or exceeded the borderline threshold for clinical depression. The estimate of internal consistency measured via Cronbach's alpha was .82.

To assess adolescents' level of dependence on substances during the past 12 months, adolescents were evaluated based on their answers to six items from the National Institute of Drug Abuse (1991) scale. Respondents indicated yes (=1) or no (=0) to each item, referring to the recent problematic use of marijuana, alcohol, cocaine, and heroin. Responses were summed across the six items to arrive at one score capturing the level of substance dependency/abuse (Range=0-6). The items included questions "did you spend a great deal of time getting these substances, using them, or getting over their effects? Have you used any of these substances much more often or in larger amounts than you intended to? Have you experienced tolerance for any of these substances, so that using the same amount of it had less effect than before? Have you often been under the effects or after-effects of any of these substances in situations where your physical safety was threatened? Did your use of any of these substances cause you to have emotional problems, or to have problems with your family or friends, work, school, or with the police? Have you wanted to cut down or stop using any of these substances?" Responses to the problematic substance use items were extremely skewed, with very few individuals endorsing items at the extreme end of the distribution (Kurtosis=10.87). As such, responses to this scale were dichotomized, so that individuals who endorsed two or more items

were considered to be experiencing some indication of problematic substance use (=1) and all others were not considered to be suffering from problematic substance use (=0).

Age of menarche was measured by asking girls whether or not they had begun menstruating, and if so, the month and year of the event. This date was then subtracted from the birth date to arrive at the age of each girl's first menarche. Those who could not recall the exact month and year of menarcheal onset indicated the age at which they began menstruating. Fewer than 22% of the participants chose the latter option. Girl's maturational status was based on where her menarcheal age fell on the distribution of scores. Responses were trichotomized to reflect the categories of early maturers, on-time maturers, and late maturers.

Nearly 50% of the girls in the 12-year-old cohort had not yet reached menarche. To avoid biasing results, analyses of the pubertal timing were conducted exclusively for the 15-year-olds, most of whom were menarcheal at the time of the interview. Thus the total number of girls included in the separate analysis was 286.

Neighborhood Level Assessment. Neighborhood level characteristics were derived from the 1990 Census. Six neighborhood level variables were factor analyzed to represent the index of concentrated disadvantage (see Sampson et al., 1997 for details). These are: 1) percentage of population below the poverty line; 2) percent of population that is on some form of public assistance; 3) percent of population that is unemployed; 4) percent of population that is less than 18 years of age; 5) percent of population whose households are female headed. These measures are highly associated with each other and with percent African American in neighborhood, the sixth variable in this scale. All variables load on the same factor, and each variable was weighted by its factor loading in the calculation of the regression score (see Sampson et al., 1997). The interpretation of these factors is that they represent neighborhood concentrated disadvantage. Residential stability was measured through census variables regarding whether individuals were in the same house since 1985 and the percentage of owner-occupied houses in each neighborhood. The variables loaded on the factor at .77

and .86, respectively. This scale was coded such that higher scores indicate greater neighborhood stability.

Overview of Analytic Approach

In order to assess the extent to which the independent predictors may be multicollinear, we first fit the data to a regression model with a tolerance statistic, Tolerance statistics are a valuable diagnostic tool to screen predictors for collinearity (Tabachnick & Fidell, 1996). Tolerance estimates were above .75 for each of the independent predictors at the individual and family level.[6] Given the relatively high tolerance among these predictors, it is appropriate to model these independent predictors simultaneously. Bi-variate correlations of the predictors are presented in Exhibit 6, confirming the impression that the key predictors of interest could be used simultaneously. This exhibit also shows that although the correlation between aggressive behavior and depressive symptoms is significant ($p < .001$), the relationship is modest ($r^2 = .13$).

One important feature of the sampling design of the PHDCN is that girls lived in 75 neighborhoods. Thus, clustering (i.e., nesting of girls within neighborhoods) is present in the data, such that individuals who live in the same neighborhood are not independent from each other. Failure to accommodate variation at the neighborhood level could result in aggregation bias and model mispecification. For example, using a single-level technique (e.g., regression analyses) with nested data may lead to biased standard errors and possibly spurious results. Hierarchical linear modeling (HLM), however, accounts for clustering, thus yielding unbiased estimates of relationships of people who are clustered within neighborhood (Bryk & Raudenbush, 1992). HLM simultaneously models two equations, one at the individual level and one at the level of clustering (which in this case is at the neighborhood level).

To begin the HLM sequence, data were fit to a null model with a non-linear Poisson distribution. As indicated in the final estimation of variance components, girls' engagement in

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[6] Higher tolerance estimates indicate lower collinearity among predictors.

physical aggression varied significantly across neighborhood context (T_{00} = .30, σ^2 =.83, ICC=4%, Exhibit 7, Model 1). Given that clustering is present in the data, all subsequent analyses were carried out using a two-level HLM. Level-one modeled individual- and family-level characteristics (e.g., age and family SES), and level-two modeled neighborhood characteristics (e.g., residential stability). Responses to the measure of aggressive behavior are in fact counts with characteristic distributions; thus, data were fit to a non-linear Poisson distribution. White girls were the omitted race category in these analyses. Given the wide-distribution of ages represented in this sample, age of respondent was modeled in these analyses.

Previous research has shown that constraining gammas (where necessary) yields a more parsimonious model (Barnett, Marshall, Pleck, Raudenbush, & Brennan, 1993; Bryk & Raudenbush, 1992; Raudenbush et al., 2000). To determine which of the gammas should be constrained, we examined the results of the General Hypothesis Test in the initial full model (Exhibit 7, Model 2). Crosshatches (#) displayed in this table identify which gammas were constrained (Exhibit 7, Model 3). Using the same analytic strategy, a subanalysis based on girls in the 15 year old cohort was conducted to test relationships between pubertal timing and engagement in aggressive behavior.

In all analyses, we modeled a linear and quadratic term representing depressive symptoms. This was performed in order to determine whether the relationship between aggressive behavior and depressive symptoms was linear (i.e., as depressive symptoms increase, engagement in aggressive behavior increases), or curvilinear (i.e., at the highest levels of depressive symptoms, engagement in aggressive behavior decreases).

Sample Means

The pattern of endorsement of aggressive acts revealed a relatively high prevalence of aggressive acts committed during the past year (Exhibit 4). The act most likely to be committed was hitting someone with whom one does not live (e.g., an acquaintance, a friend, a teacher; 27.8%) and the act least likely to be committed was attacking someone with a weapon (5.2%). Nearly 7 percent of adolescent girls had been in a gang fight during the past year. Overall, responses indicated that

approximately 37 percent of girls had engaged in at least one aggressive act during the past year, with 564 acts of aggression committed by 254 adolescent girls.

On average, primary caregiver reports of their daughters' depressive symptoms were consistent with nationally normed data (e.g., Achenbach, 1991a; Achenbach, 1991b; M=4.25 sd=4.18). The mean of problematic substance use was .13 (sd=.34), suggesting that the overall prevalence of problematic substance use was not especially severe in this sample. Fifty-five girls (19.9%) reached menarche between the ages of 8.0 and 10.9, 178 (62%) reached menearche between the ages of 11.0 and 12.6, and 53 girls (18.1%) reached menarche between the ages of 12.7 and 15.2. Girls were grouped into early, on-time, and late maturers, accordingly. Trichotomization of menarcheal age into these pubertal timing categories is in keeping with previous efforts in this area (e.g., Moffitt, Caspi, Belsky, & Silva, 1992), where girls whose menarcheal ages fall in approximately the first and last 20th percentile are considered early and late maturers, respectively, and those whose menarcheal age fall in the middle 60th percentile are considered on-time maturers.

Effects of Individual- and Family-level Characteristics on Girls' Aggressive Behavior

Exhibit 7 (Model 3) displays results of the full and final model of the effects of individual, family, and neighborhood characteristics on girls' aggressive behavior. Examination of the coefficients for individual-level characteristics showed that older girls were more likely to engage in aggressive acts than were younger girls. In addition, results indicated that problematic substance users engaged in more aggressive acts than did those who were not problematic substance users. The relationship between aggressive behavior and depressive symptoms was more complex and is discussed in the next section.

Family-level characteristics were also associated with girls' engagement in aggressive acts. A main effect was found for single-parent homes, such that girls residing in single-parent homes engaged in more aggressive behavior than did their counterparts from two-parent homes. Family socioeconomic status, however, was not associated with girls' engagement in aggressive behavior. The interaction between socioeconomic status and race was also not significantly different from zero.

Next, we examined the coefficients for race/ethnicity to determine whether levels of engagement in aggressive behavior varied across groups. Results revealed that white girls engaged in fewer aggressive acts than did African American girls. Engagement in aggressive behavior did not differ between white and Latina girls. A post-hoc multivariate hypothesis test was conducted to determine whether the level of aggressive behavior varied across Latina and African American girls. Results of this test showed that Latina girls engaged in fewer aggressive acts than did African American girls ($p < .05$).

Our next step was to determine whether neighborhood characteristics were associated with variation in aggressive behavior *within* racial/ethnic groups. Examination of the coefficients for neighborhood level characteristics showed a positive main effect for neighborhood stability among whites' aggressive behavior. That is, in neighborhoods with greater stability, white girls engaged in more aggressive behavior than did white girls in neighborhoods with less stability. A trend in the opposite direction was detected among African American and Latina girls, suggesting that in neighborhoods with greater stability, African Americans and Latinas were less likely to engage in aggressive behaviors than were their counterparts in neighborhoods with more instability (Exhibit 7). Relationships between neighborhood concentrated disadvantage and aggressive behaviors were not significantly different from zero for any of the racial/ethnic groups.

The Relationship Between Aggressive Behavior and Depressive Symptoms.

As shown in Exhibit 7, the relationships between depressive symptoms and aggressive behavior were not consistent across race/ethnicity. The relationship between aggressive behavior and depressive symptoms was present, but only among white girls. In contrast, results failed to yield a significant relationship between depressive symptoms and aggressive behavior among African Americans or Latinas. In fact, although not significantly different from zero, the direction of the coefficient was negative, implying that if the effect had reached the level of significance, it would have suggested the presence of an inverse relationship between depressive symptoms and aggressive behavior for African American and Latina girls. The coefficient for the quadratic term representing

depression was not significantly different from zero, indicating that the relationship between depressive symptoms and aggressive behavior is linear.

To further explicate these relationships within race/ethnicity, we examined whether neighborhood characteristics moderated the link between depressive symptoms and aggressive behavior. The effects of neighborhood characteristics on this relationship also varied across race/ethnicity. Results showed that the slope between depressive symptoms and aggressive behavior was steeper for white girls who live in neighborhoods with greater stability than it was for white girls who live in neighborhoods with less stability. The pattern was in the opposite direction for African American and Latina girls. Results demonstrated that the slope between depressive symptoms and aggressive behaviors for minority girls was flatter in more stable neighborhoods than it was in less stable neighborhoods.

In addition, the moderating effect of neighborhood concentrated disadvantage on the relationship between depressive symptoms and aggressive behavior approached the level of significance among African American girls. Specifically, the slope between depressive symptoms and aggressive behavior flattens among African American girls who live in neighborhoods with higher levels of concentrated disadvantage. Neighborhood levels of concentrated disadvantage were not significantly associated with the link between depressive symptoms and aggressive behaviors for whites or Latinas.

Effects of Pubertal Maturation on Aggressive Behavior

In a separate analysis, we sought to determine whether pubertal timing played a role in girls' engagement in aggressive behavior. As such, we repeated a similar sequence of analyses on the subsample of girls in the 15 year old cohort (n=286). Results revealed that late-maturing girls were less likely to engage in aggressive acts than were their on-time (B= -.85, se= .28, $p < .01$) or early maturing peers (B= -.28, sd=.23, $p < .05$). Differences in aggressive behavior were not detected between those who were on-time and those who were late maturers ($p > .10$).

The link between depressive symptoms and aggressive behavior among white girls persisted, even after pubertal status was entered into the model (B=.15, $p < .05$). We modeled an interaction term representing depressive symptoms and pubertal timing to determine whether aggressive behavior would vary in relation to different levels of depressive symptoms and pubertal timing. The interaction term was also not significantly associated with engagement in aggressive behavior.

Discussion

The goals of the present study were two-fold: 1) to examine the prevalence of aggressive behavior among Latina, African American, and white adolescent girls; and 2) to identify connections between girls' aggression and individual, family, and neighborhood characteristics. Given that the study includes girls exclusively, we have a particular interest in the relationships with depressive symptoms and other salient risks (e.g., pubertal maturation). Results showed that 38 percent of girls engaged in at least one aggressive act during the twelve months leading up to the interview. Family characteristics were associated with aggression: Those residing in single-parent households engaged in more physical aggression than did those in two-parent households. Additionally, African American girls and older girls engaged in more aggressive acts than did their non-African American and younger peers. Further, we found evidence that race/ethnicity moderated the relationship between physically aggressive behavior and depressive symptoms. Only white girls exhibited the expected positive relationship between depressive symptoms and aggressive behavior; African American nor Latina girls experienced this connection. Race/ethnicity also moderated the relationship between aggressive behavior and neighborhood characteristics. Specifically, white girls in more stable neighborhoods were more aggressive and African American and Latina girls in more stable neighborhoods were less aggressive than were their counterparts in less stable neighborhoods. Overall, exploring the differential effects of race/ethnicity on girls' aggression provided a more nuanced estimation of aggressive behavior. In a second set of analyses conducted on girls in the 15-

year-old cohort, results showed that later maturers were their less likely to act aggressively than were their early or on-time peers.

Prevalence of Aggressive Behavior

The evidence presented here suggests that there is indeed a high prevalence of engagement in physically aggressive acts among adolescent girls. Over a third of the girls acted physically aggressive during the year prior to the study. This is a potentially troubling finding, as girls who engage in physically aggressive behavior during adolescence are at increased risk of experiencing serious problems in the future across several domains of psychosocial functioning (e.g., dropping out of high school, marital disruption, mental distress) compared to their peers who are not aggressive (Serbin et al., 1998). It is clear from the present study's finding that girls' engagement in physically aggressive behavior is not an anomaly, but rather a fairly common event.

Associations between Aggressive Behavior and Family-level Characteristics

The finding that girls from single-parent homes were more likely to act aggressively is in line with previous research. This connection may reflect greater parental maladjustment, lower supervision, poor parent-child communication, and harsher punishment found among single-parent households (Elder, Eccles, Ardelt & Lord, 1995; Loeber, Drinkwater, Yin, Anderson, Schmidt & Crawford, 2000; McCord, 1982; Simons, 1996; Snyder, 1991). Exposure to these types of family interactions have been implicated in the development of adolescents' delinquent (Coie et al., 1999; Farrington & West, 1971; Loeber et al., 2000) and aggressive behavior (Holden, 2000). While many of these earlier studies have been conducted on boys, the findings of the present work suggest that residing in single parent households is a risk factor for girls' aggressive behavior as well.

Contrary to expectation, family SES was not associated with adolescents' aggressive behavior. This runs counter to studies that have found links between low SES and delinquent behavior (e.g., Farrington, 1995; Lerner & Galambos, 1998; Pagani, Boulerice, Vitaro, & Tremblay, 1999; Nagin & Tremblay, 1999). In fact, Farrington and Loeber's (2000) recent review of juvenile

delinquency studies identified economically impoverished circumstances as a major risk factor. The lack of support for the relationship between SES and aggressive behavior may reflect the notion that SES indicators only approximate other conditions (e.g., stress associated with economic pressure, poor housing, unemployment). This is in keeping with Korbin, Coulton, Chard, Platt-Hourston & Su's (1998, p. 231) statement that "economic factors may only be weak proxies for the real conditions in neighborhoods that are salient to families' abilities to care for and nurture their young children...[especially when applied to] residents who have been restricted in their economic and social mobility by external forces." Additionally, it is possible that the effects of poverty on girls' aggression is mostly explained by family structure variables, such as single parent households. Future efforts should be aimed at elucidating the potential mediating role of family structure on the link between SES and aggression among girls.

Associations Between Aggressive Behavior and Individual Level Characteristics

Consistent with previous studies of adolescent girls, older youth in this sample engaged in more aggressive behavior than did their younger counterparts (Elliott, 1994; Loeber, Huiziga, & Thornberry, 1996; Zoccolillo, 1993; Loeber et al., 1996; Wangby et al., 1999). This may be partially explained by patterns showing that older adolescents are typically granted more behavioral autonomy than are younger adolescents (e.g., Seidman et al., 1998; Steinberg, 1990). For some adolescents, this greater autonomy may translate into increased opportunities to associate with deviant older peers who are more likely to be directly involved in aggressive behaviors. This, in turn, provides these adolescents occasions to become involved in aggressive behavior themselves (Caspi & Moffitt, 1993).

Separate analyses on the subsample of girls who reached menarche (i.e., those in the 15 year old cohort) revealed that late maturers were less likely to engage in aggressive behavior than were early and on-time maturers. These results are congruent with studies demonstrating that late maturers are less likely to be involved in delinquent behaviors (Caspi et al., 1993; Flannery et al., 1993). It is

possible that because late maturers appear younger, they are less likely to be drawn into older peer groups that may expose them to opportunities to act aggressively.

Other studies, however, also show that early maturers are worse off compared to on-time maturers (Graber et al., 1997; Hayward et al., 1997; Stattin & Magnusson, 1990). We found no differences in the level of aggressive behavior among early and on-time maturers. There are at least two avenues to explore regarding why our results diverge from these other studies. First, previous work do not focus exclusively on aggressive behavior, but rather examine the broader category of delinquent activities (e.g., truancy, property offenses, promiscuity). By disentangling the physical aggression component out of the larger construct of conduct disorder/delinquency, we offer a more precise estimation of the relationships between pubertal timing and girls' aggression. Secondly, other investigations of pubertal timing and girls' delinquency have been conducted predominantly on middle-class white adolescents (e.g., Stattin & Magnusson, 1990; Graber, Brooks-Gunn & Warren, 1995; Graber et al., 1997). We can speculate from the current findings that patterns of pubertal timing and girls' aggressive behavior may vary partly as a function of racial/ethnic and SES differences between samples. In other words, the extent to which one can generalize from studies of all white middle class youth to samples of ethnically diverse youth from varied SES families is unclear.

As expected, a connection was found between problematic substance use and aggressive behavior. This is in keeping with several studies that have shown strong and robust relationships between substance use, conduct disorder (Robins & McEvoy, 1990; Windle, 1994), delinquent behavior (Kashani, Jones, Bumby, and Thomas, 1999), and violent crimes (Lee & McEvoy, 1990). As noted earlier, substance use is a risk factor for aggressive behavior (Brady et al., 1998; Giancola et al., 1999; Hien & Hien, 1998; Loeber et al., 1998; Robins, 1986). This may be partly due to diminished impulse control associated with substance users under the influence (Brady et al., 1998), or to the type of deviant peers substance abusing adolescents associate with (Loeber et al., 1998). Brook, Cohen

and Brook (1998) demonstrated that the link between aggressive behavior and substance use was mediated by depressive symptoms.

With respect to racial/ethnic differences, results showed that Latinas and whites were less likely to engage in aggressive behaviors than were African Americans. Unfortunately, with the current data, we have no way to contextualize this finding. As a result, we are limited in understanding the specific interpersonal circumstances in which aggressive behavior surfaces. In particular, key contextual questions regarding the distinction between types of aggression remain to be investigated: Is the behavior predominantly instrumental aggression or irritable/hostile aggression? Did the aggressive response arise in the face of being physically attacked themselves? It is possible that race/ethnicity systematically varies in relation to contexts that promote different types of aggressive responding? With respect to this latter important question, Burton and Jarrett (2000) suggest that African American youth's "behaviors represent a cadre of actions that fit contextual demands" (p. 18), echoing the viewpoint that social and economic factors shape African Americans experiences (Gibbs, 1990; see also Hops et al., 1995; Ogbu, 1990). For example, McDermott & Spencer (1997) have shown that African American youth, more so than Latina or white youth, respond at times to the chronic stresses in their environment with adaptive, but disruptive behavior. As noted by Wilson (1987), a disproportionate amount of African Americans reside in socially isolated areas of economic impoverishment. These areas are connected to chronic and unpredictable stressors, risk factors that are associated with aggressive behavior. In addition, McCord and Ensminger (1995) found a strong relationship between experiences of racial discrimination and violent acts committed by African American youth. Along these lines, previous work has demonstrated a connection between victimization and delinquent behavior among girls (Khatri, Kupersmidt, & Patterson, 1999). These current and historical contextual factors may converge to increase the likelihood that African American girls act aggressively.

Of great interest to the present study was the examination of the relationship between depressive symptoms and aggressive behavior. A linear relationship between depressive symptoms

and engagement in physical aggression was found among white girls only. The linear, rather than curvilinear relationship suggests that, as white girls get more depressed, they act more aggressively. Identification of this relationship is consistent with psychosocial examinations of males (e.g., Kashani et al., 1995; Garbarino, 1999; Mitchell, McCauley, Burke & Moss, 1988), and similar to findings from studies of depressive symptoms and conduct disorder among females (Caron & Rutter, 1991; Loeber & Kennan, 1994; Robins & Price, 1986; Serbin, Peters, McAffer & Schwartzmann, 1991). Youth who experience both depressive symptoms and aggressive behavior are at elevated risk for subsequent negative outcomes (Compas & Hamman, 1994), which may in turn have a reinforcing influence on each of these problems. Studies of the co-occurrence of such phenomena suggests that one problem may create an increased risk for the other problem (i.e., pathogenic comorbidity, Caron & Rutter, 1991; Compas & Hammen, 1994). Other explanations posit that the two problems share similar risk factors (e.g., social cognitive processing patterns, Quiggle et al., 1992) or that one disorder is an earlier manifestation of the other disorder (i.e., prognostic comorbidity, Compas & Hammen, 1994; Rapp & Wodarski, 1997). Some explanations hypothesize that there may be a direct causal relationship between the two phenomena (Ben-Amos, 1992). Further, relationships among these problems may change over time as patterns of reciprocal influences are modified through developmental experiences (Costello & Angold, 1996).

Support for the relationship between depressive symptoms and aggressive behavior, however, was not found for African Americans or Latinas. This may be because, in contexts of chronic environmental stress, other factors besides depressive symptoms are more salient in the development of aggressive behavior. For example, as posited above, African American youth may encounter unpredictable situations that threaten their personal safety, and thus need to respond defensively; similarly, manifesting depressive symptoms (e.g., sadness, lethargy) may place minority youth in a vulnerable position (McDermott & Spencer, 1997).

The connection between depressive symptoms and aggressive behavior may not be present among Latina youth for somewhat different socio-cultural reasons. In their study of African

American, Latino, and White youth, McDermott and Spencer (1997) found that Latino youth were disproportionately represented among those who experienced diffident disorders, such as excessive timidity. Ramirez (1988) offers a cultural explanation for this connection among the Latina/Hispanic community, noting the "cultural de-emphasis of confrontation and competition in addition to the salient role of immigrant history which might foster social withdrawal" (p.234). Similarly, others have noted that Latina females are often taught to behave in traditionally feminine ways, which may include dependency and passivity (Rodriguez & Zayas, 1990; Salguero & McCusker, 1996). This set of cultural mores may potentially encourage a lowered sense of efficacy (e.g., learned helplessness model, Seligman and Maier, 1967), and at the same time, reduce the likelihood of acting aggressively. Indeed, Salguero and McCusker (1996) argue that among Latinos, depression is culturally acceptable. Taken together, this set of findings suggests that the relationship between depressive symptoms and aggressive behavior may be relevant in explaining experiences among white adolescent girls. For minority youth, however, this is not the case. Our field is at a critical juncture and need further develop culturally meaningful paradigms that take into account the specific contexts and environmental risks associated with minority girls' aggressive behavior .

Associations Between Aggressive Behavior and Neighborhood-level Characteristics

Examination of structural neighborhood characteristics further elucidated the race/ethnic differences in patterns of aggression. White adolescents living in neighborhoods with greater stability engaged in more aggressive behavior than did white adolescents in neighborhoods with less stability. For African Americans and Latinas, however, a trend suggesting the opposite direction for this relationship was identified: Minority youth living in neighborhoods with greater stability engaged in less aggressive behavior than did their minority counterparts in neighborhoods with less stability. Inspection of the distribution of neighborhood stability by race/ethnicity showed that the modal type of neighborhood with respect to stability differed substantially across race/ethnicity. Neighborhoods where whites typically live were more likely to be stable, whereas neighborhoods where African American and Latina families lived were characterized by a greater instability. In addition to variation

in levels of residential stability by race/ethnicity, it is likely that the reasons for mobility may vary by race/ethnicity as well. For example, white families may move for upwardly mobile reasons, while minority families may move due to economic pressures or unexpected disasters (e.g., house fires). In general, these disparate patterns of mobility reflect the geographic segregation of minority families in U.S. inner-cities, segregation which in turn serves to reinforce the social and economic systems of impoverishment (Massey & Denton, 1988).

Nonetheless, living in unstable neighborhoods has been consistently identified as problematic and has been associated with declines in community social organization (Sampson, 1992, 2000), and degradation of local social networks (McLanahan & Sandefur, 1994). These neighborhood conditions have implications for effective community parenting (Elliott et al., 1998) and are linked to adverse youth outcomes (Duncan & Burton, 1994; Ensminger et al., 1996; Furstenberg & Hughes, 1997). Consistent with our finding of an interaction between neighborhood stability and race/ethnicity, it has been suggested that residential instability has a particularly deleterious impact on the experiences of minority youth (Oliver, 1988; Stack & Burton, 1993). This is partly because local ties in minority communities have a functional component, as residents help each other cope with poor resources (Stack & Burton, 1993). Oliver (1988) emphasizes the importance of residential connectedness among low and working class minority families, stating that they "have the most intensive local ties, in part because their strong kin and church ties are locally based" (p. 640). This race by context interaction supports a person X environment model, suggesting that a similar contextual influence (i.e., neighborhood stability) is associated with different outcomes (i.e., more or less aggression), depending on the characteristics (i.e., race/ethnicity) of the individuals.

Surprisingly, neighborhood concentrated disadvantage was not associated with girls' engagement in aggressive behavior. This is discrepant with studies that have demonstrated links between neighborhood economic conditions and delinquent or anti-social behavior (Brown & Gourdine, 1992; Peeples & Loeber, 1994; Sampson, 1992; Simons, Johnson, Beaman, Conger, & Whitback, 1996). Although we did not find a direct effect of neighborhood concentrated

disadvantage, it is possible that other neighborhood factors, which themselves are a natural sequelae of neighborhood disadvantage, play a more salient role (e.g., neighborhood compositional factors). For example, the salient neighborhood factor may not be concentrated disadvantage as much as it is neighborhood social capital and social organization. In support of such a connection, Simcha-Fagan and Schwartz (1986) found that social disorganization was associated with delinquency, above and beyond the effects of socioeconomic status. Wilson (1996) notes that many inner-city neighborhoods have high levels of social networks, which in turn may mitigate the negative consequences associated with neighborhood concentrated disadvantage. In addition, growing evidence suggests that neighborhood economic composition per se may be a less powerful predictor of youth outcomes than is a neighborhoods' proximity to affluent neighborhoods (e.g., Brooks-Gunn, Duncan, Klebanov, Sealand, 1993; Crane, 1991; Duncan, 1993). Although we did not test this hypothesis here, it may provide a fruitful path for future analyses.

Results additionally revealed that neighborhood characteristics differentially affected the link between depressive symptoms and aggressive behavior. Specifically, whites growing up in neighborhoods with more stability experienced a stronger relationship between depressive symptoms and aggressive behavior than did their white counterparts in relatively unstable neighborhoods. It is possible that in more stable neighborhoods, white adolescents have the opportunity to develop strong peer networks that may involve acting aggressively. However, for African Americans and Latinas, unstable neighborhoods further attenuated the already weak relationship between depressive symptoms and aggressive behavior. In addition, among African American youth in neighborhoods with greater concentrated disadvantage, the relationship between depressive symptoms and aggressive behavior becomes weaker still. As mentioned previously, it appears that contextual factors may be more relevant than individual characteristics in setting the stage for aggressive behavior among minority youth.

Limitations

One limitation of this work is that neighborhoods are operationalized with respect to a contextual moment, that is, as a non-dynamic portrayal of the patterns and cycles of neighborhood (Burton & Jarrett, 2000; Burton, Price-Spratlen, & Spencer, 1997). As such the dynamic qualities of neighborhoods that may be integral to the interaction between neighborhoods and adolescents are not captured in the present work. In addition, within our theoretical framework, we purposefully describe these relationships as unidirectional—that is, neighborhoods have negative influences on youth outcomes. However, it is possible that residents influence the characteristics of their own neighborhood. For instance, in neighborhoods with more aggressive youth, residents may be more inclined to migrate out, thus contributing to higher rates of residential instability.

Another limitation of these findings is that the indicator of depression was measured through a symptom checklist (i.e., the CBCL). This poses two potential concerns: 1) that depressive symptoms are conceptually and operationally distinct from major depressive disorder, and are considered a less severe index of depression; and 2) that the overlap between depressive and anxious symptoms may obscure the latent construct of depressive symptoms. Further, the lack of support for the relationship between depressive symptoms and aggressive behavior among minority girls may reflect an unresolved measurement issue. It is possible that the lower prevalence of depressive symptoms among African Americans reflect cultural variation in the expression of depressed feelings. For instance, African Americans may be less inclined to discuss depressed mood, but more inclined to complain of somatic problems (Axelson, 1985; Rodriguez & Zayas, 1990). Future efforts that use more precise measures of depression (e.g., Diagnostic Interview Schedule for Children, DISC-IV) and that allow for culturally bound manifestation of depressive symptoms are needed.

Summary

Overall, aggressive behavior in adolescent girls is prevalent. This is in line with arrest rates for violent crimes committed by girls (Snyder, 1998) and underscores the need for our field to continue to explore risks associated with girls' physical aggression. Results also showed that the

expected apparent relationship between aggressive behavior and depressive symptoms might in fact be an artifact of previous research that was based on samples of narrow racial and economic diversity. We show that this relationship is present among white girls only and does not accurately reflect the experiences of minority girls. Clearly, additional studies need explore the contribution of race/ethnicity and SES to further unpack girls' aggression in the U.S. today. Additionally, the present findings showed that aggression is context-sensitive, and that race/ethnicity moderates the link between aggressive behavior and neighborhood characteristics. To accurately understand the role of neighborhood contexts on girls' aggression, future studies are encouraged to also consider the interaction between individual level characteristics (e.g., race/ethnicity) and neighborhood level characteristics (e.g., residential instability).

Exhibit 4

Descriptive Characteristics of PHDCN Sample of Girls (n=680): Means, Standard Deviations, Frequency, Percentage, and Ranges

Variable	Mean (sd)/ Frequency	Range
Age of adolescent (in years)	13.53 (1.53)	11.42 - 16.44
Family Socioeconomic Status (SES)[a]	.003 (1.39)	-2.47 – 3.42
Primary caregiver's educational attainment level (in years)	11.44 (2.97)	7-16
Total annual household income (in dollars)	30,445 (23,097)	2,500-75,000
Primary caregiver's marital status (n, %)	436 married (64.2%) 243 not married	
Race/Ethnicity (n, %)	307 Hispanic (45%) 269 African American (40%) 105 White (15%)	
Neighborhood Concentrated Disadvantage[b]	-.04 (.79)	-1.54 – 2.66
Neighborhood Residential Stability[b]	-.09	-1.94 – 2.23

Note: [a]Family SES scores were generated through factor analysis, based on primary caretakers' educational attainment level, total household income, and occupational prestige.
[b]Neighborhood level characteristics were gathered from the 1990 U.S. Census and reflect multiple variables, as specified in the Methods section.

Exhibit 5
Number and Percent of Adolescent Girls' Endorsing Items on the Self-Report of Offending Scale (Time Referent, 12 Months)

Aggressive Acts	N	%
Hit someone with whom you do not live	189	27.8
Throw an object at someone to hurt them	109	16.0
Hit someone with whom you do live	106	15.6
Carry a hidden weapon	79	11.6
Been in a gang fight	46	6.8
Attack someone with a weapon	35	5.2
Total Girls Endorsing Items	254/680	37.3

Exhibit 6

Intercorrelations among Predictor and Outcome Variables

Indicator	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Physical Aggression											
2. African American	.26****										
3. Latina	.20****	-.73****									
4. White	-.07*	-.35****	-.39****								
5. Age of adolescent	.28****	-.02	.00	.03							
6. PC marital status	-.18****	-.35****	.25****	.12***	-.05						
7. Family SES	.02	.10**	-.32****	.32****	.08*	.04					
8. Problematic Substance use	.37****	-.10**	.04	.09**	.35****	.01	.08*				
9. Depressive symptoms-linear (CBCL)	.13***	-.11**	.13***	-.04	.10**	.01	-.06	.18****			
10. Depressive symptoms-quadratic (CBCL)	.10**	-.07	.07	-.01	.09*	-.02	-.02	.18****	.73****		
11. Concentrated Disadvantage (Neighborhood)	-.02	.40****	-.12**	-.03	-.12**	.14***	-.30****	-.12**	-.03	-.01	
12. Residential Mobility (Neighborhood)	.01	.25****	-.27****	-.05	.01	.08*	.27****	.01	-.05	-.05	-.14***

Exhibit 7

Estimated Effects of Depressive Symptoms on Adolescent Girls' Aggressive Behavior: Fixed Effects Estimates for Two-level HLM

	Model 1		Model 2		Model 3 (Constrained Gammas)	
Parameters	**Coefficient, SE**	**t-ratio**	**Coefficient, SE**	**t-ratio**	**Coefficient, SE**	**t-ratio**
Intercept	-.25 (.08)	-3.12***	-1.03 (.24)	-4.38****	-1.03 (.23)	-4.41****
Nbhd Disadvantage			.05 (.32)	.17	.06 (.31)	.19
Nbhd Mobility			.32 (.17)	1.88~	.34 (.17)	2.01*
Age			.19 (.03)	5.68****	.19 (.03)	5.76****
Problematic Substance Use			1.13 (.11)	10.10****	1.11 (.11)	9.70****
Marital Status			-0.23 (.10)	-2.22*	-.25 (.11)	-2.36*
Family SES			-.06 (.11)	-.55	-.06 (.11)	-.53
Nbhd Disadvantage			-.02 (.05)	-.31	-.02 (.05)	-.45
Nbhd Mobility			-.03 (.04)	-.82	-.04 (.04)	-1.05
SES imputation indicator			-.15 (.13)	-1.18	-.18 (.13)	-1.37
African American			.95 (.25)	3.79****	.98 (.25)	3.91****
Nbhd Disadvantage			.24 (.33)	-.72	.15 (.33)	.45
Nbhd Mobility			-.30 (.18)	-1.70~	-.31 (.17)#a	-1.78~
Latina			. 14 (.25)	.55	.14 (.25)	.56
Nbhd Disadvantage			.04 (.36)	.10	.03 (.35)	.09
Nbhd Mobility			-.26 (.23)	-1.15	-.31 (.17)#a	-1.78~
Depressive Symptoms:linear			.09 (.04)	1.94*	.09 (.04)	1.97*
Nbhd Disadvantage			.03 (.05)	0.58	.03 (.05)	.49
Nbhd Mobility			.16 (.05)	3.00**	.15 (.05)	2.91**
Depressive symptoms:quadratic			-.00 (.00)	-.45	-.00 (.00)	-.62
Interact: Depression&African American			-.06 (.04)	-1.36	-.06 (.04)#b	-1.28
Nbhd Disadvantage			-.10 (.06)	-1.75~	-.11 (.06)	-1.88~
Nbhd Mobility			-.14 (.05)	-2.71**	-.14 (.05)#c	-2.62**
Interact: Depression&Latina			-.06 (.04)	-1.32	-.06 (.04)#b	-1.28
Nbhd Disadvantage			-.03 (.06)	-.44	-.01 (.06)	-.17
Nbhd Mobility			-.19 (.06)	-3.01**	-.14 (.05)#c	-2.62**
Interact: SES&African American			.03 (.13)	.26	.04 (.13)	.33
Interact: SES&Latina			.15 (.13)	1.19	.15 (.13)	1.18

Note: Model 1 represents the null model; Model 2 examined the links between primary caregivers' reports of adolescents' depressive symptoms and engagement in physical aggression; Model 3 represents the final and full model, with constrained gammas represented by cross-hatch (#). Letters following the cross-hatch (e.g., #a) indicate that those gammas were constrained to be equal to each other. ~ p<.10, *p<.05. **p<.01. ***p <.001. ****p<.0001.

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