Racial Differences in the Associations of Neighborhood Disadvantage, Exposure to Violence, and Criminal Recidivism among Female Juvenile Offenders

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The current study examined the impact of exposure to violence and neighborhood disadvantage on criminal recidivism among Black \( (n = 69) \) and White \( (n = 53) \) female juvenile offenders. Participants were girls between the ages of 13 and 19 \( (M = 16.8; SD = 1.2) \) who were sentenced to secure custody. Using a multi-method research design, the study assessed neighborhood disadvantage through census level data, exposure to violence through self-report, and criminal recidivism through official records. Results indicated that Black girls were significantly more likely than White girls to live in disadvantaged neighborhoods, but both reported similar levels of parental physical abuse and witnessing neighborhood violence. In structural equation models, neighborhood disadvantage and witnessing neigh-
borhood violence were indicative of future recidivism for the group as a whole. However, multiple group analyses indicated the existence of race specific pathways to recidivism. Witnessing neighborhood violence was associated with recidivism for Black girls while parental physical abuse was associated with recidivism for White girls. Results suggest that characteristics within the neighborhood play a considerable role in recidivism among female juvenile offenders generally and Black female juvenile offenders, specifically. Race specific risk models warrant further investigation, and may help lawmakers and clinicians in addressing racial disparities in the justice system.

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INTRODUCTION

Minority youth are disproportionately represented in every aspect of the juvenile justice system (Nofziger & Kurtz, 2005; Piquero & Buka, 2002; Puzzanchera, Stahl, Finnegan, Tierney, & Synder, 2003; Redding & Arrigo, 2005; Snyder, 2005). In 2003, Black youth comprised 45% of all juvenile arrests for violent crimes, a striking statistic given that this cohort represents only 16% of the juvenile population (Synder, 2005). Similar trends have been observed in self-report data for both males and females when comparing White to non-White youth (Piquero & Buka, 2002).

While many studies have documented racial inequality within the juvenile justice system (Redding & Arrigo, 2005), few have explored the potential race-specific risk factors that may explain differential rates of antisocial behavior. The current study sought to evaluate neighborhood disadvantage and exposure to violence as risk factors for recidivism among female juvenile offenders and to determine whether these associations varied by race. Specifically, we examined whether (1) racial differences exist in the prevalence rates of neighborhood disadvantage and exposure to violence, (2) neighborhood disadvantage and exposure to violence are associated with higher rates of criminal recidivism for female juvenile offenders, and (3) the associations between these risk factors differ for Black and White female juvenile offenders.

Neighborhood Disadvantage

Research linking neighborhood disadvantage to the disproportionate representation of minorities in the justice system has been conducted from a macro-level, sociological perspective in which neighborhood characteristics are correlated with rates of neighborhood violence (see Peterson & Krivo, 2005; Sampson & Wilson, 1995). From this perspective, differences in crime rates of Black and White Americans are a result of varying levels of economic disadvantage (Sampson, Morenoff, & Gannon-Rowley, 2002; Sampson, Morenoff, & Raudenbush, 2005; Sampson & Wilson, 1995). Indeed, Black Americans are more likely than their White counterparts to inhabit disadvantaged neighborhoods, which are characterized by high levels of unemployment, poverty and dependence on public assistance.
These same neighborhoods also have higher crime rates (Peeples & Loeber, 1994; Peterson & Krivo, 2005; Sampson, 1997; Sampson et al., 2002). The racial gap in offending is further intensified because the typical Black community, at an absolute level, has more disadvantages such as poverty and single parent households than most disadvantaged White communities (Peeples & Loeber, 1994; Peterson & Krivo, 2005; Sampson, 1997). However, when levels of disadvantage are similar for the two groups, its impact on antisocial behavior appears to be equivalent across race (Krivo & Peterson, 1996; Peterson & Krivo, 2005). Together, this suggests that the higher representation of Black Americans in the justice system is closely linked to socioeconomic factors.

A relationship between neighborhood disadvantage and crime has also been found at a micro-level, psychological perspective. Peeples and Loeber (1994) found that residing in underclass neighborhoods was significantly related to delinquent behavior for boys. Similarly, Silver, Mulvey, and Monahan (1999) demonstrated that neighborhood factors are predictive of future violence for psychiatric inpatients above and beyond individual level factors, such as socioeconomic status, history of arrests, substance abuse, and psychopathy.

Some evidence suggests that the relationship between neighborhood disadvantage and crime may extend across gender, but the magnitude and mechanisms may vary (Hipwell et al., 2002; Kroneman, Loeber, & Hipwell, 2004; Steffensmeier & Hayne, 2000). Steffensmeier and Hayne (2000) found that the impact of neighborhood disadvantage on offending was not as strong for females as for males. Similarly, Kroneman et al. (2004) concluded that neighborhood effects tend to be small to moderate in magnitude for girls after accounting for individual and family level variables. They further argue that intervening processes such as parenting style, peer groups, and subtypes of aggression may differ for males and females. Ultimately, the pathway between neighborhood disadvantage and female antisocial behavior is not well understood, though it remains plausible that girls may react differently than boys to factors within their neighborhoods.

**Exposure to Violence**

Several cross-sectional studies have found that incarcerated girls and girls living in urban settings are more likely to both experience and witness violence (Holsinger & Holsinger, 2005; Lipschitz, Ramusson, Anyan, Cromwell, & Southwick, 2000). Odgers & Reppucci (2002) suggest that as many as 90% of girls within the juvenile justice system have experienced some form of violence. Similarly, Lipschitz et al. (2000) found that 85% of the girls living in an urban setting had witnessed neighborhood violence, with the majority reporting exposure to more than one event. Notably, experiencing violence and witnessing violence tend to co-occur (Brady & Caraway, 2002; Fehon, Grilio, & Lipschitz, 2001; Saunders, 2003). In a national survey of youth, 20% of the respondents reported exposure to two forms (i.e. sexual assault, physical assault, physical abuse, or witnessing violence) of violence (Kilpatrick & Saunders, 1999; Saunders, 2003). As a result, it remains important to assess both experiencing and witnessing violence.

In terms of racial differences in the prevalence of exposure to violence, results have been mixed. Large scale normative studies demonstrate that Black youth are at
greater risk for exposure to violence (Finkelhor, Ormrod, Turner, & Hamby, 2005; Kilpatrick & Saunders, 1999; National Institute of Justice, 2003; Piquero & Buka, 2002). For instance, in a report by the National Institute of Justice (2003), more than half of all Black youth in their normative sample witnessed violence (compared with 34% of White youth) and 24% were physically assaulted (compared with 16% of White youth). Conversely, a study specific to girls in the juvenile justice system found that White female juvenile offenders were more likely to report being physically abused than Black female juvenile offenders (Holsinger & Holsinger, 2005). This difference between the correctional sample and the normative sample, if replicated, may be indicative of a higher risk threshold for White girls to engage in antisocial behavior that leads to incarceration. That is, White girls may require greater exposure to violence to be incarcerated compared with Black girls.

**Exposure to Violence and Antisocial Behavior**

Longitudinal studies have found that children who experienced violence are more likely to engage in crime later in life (English, Spatz-Widom, & Brandford, 2001; Herrera & McCloskey, 2001; Smith & Thornberry, 1995). For example, English et al. (2001) found that rates of offending were significantly higher among abused or neglected children compared with an age and race matched control group. This association may be stronger for girls than for boys, as research has found that girls with prior abuse histories are more likely than boys with similar histories to be arrested for violent offenses (Blum, Ireland, & Blum, 2003; Herrera & McCloskey, 2001) and to have adult arrests (Widom, 1989). Indeed, these studies demonstrate that physical abuse is a significant risk factor for antisocial behavior among girls.

While research on female juvenile offenders has started to examine the relationship between experiencing violence and antisocial behavior (Burnette & Reppucci, 2009; Odgers, Reppucci, & Morretti, 2005), witnessing violence has received less attention. Previous studies with normative populations indicate that witnessing violence has a more detrimental impact on antisocial behavior than directly experiencing violence (Flannery, Wester, & Singer, 2004; Noziger & Kurtz, 2005). For example, Flannery et al. (2004) found that witnessing violence accounted for 16% of the variance in antisocial behavior, whereas experiencing violence explained only 2% of the variance. Similarly, Noziger and Kurtz (2005) found that witnessing violence was the most substantial risk factor for future offending, more so than having deviant peers or experiencing violence. As with experiencing violence, there is some indication that the relationship between witnessing violence and subsequent violence is more closely linked for girls than for boys (Farrell & Bruce, 1997).

Finally, some studies suggest that Black and White girls may react differently to exposure to violence (Buka, Stichick, Birdthistle, & Earls, 2001; Flannery et al., 2004; Holsinger & Holsinger, 2005; Noziger & Kurtz, 2005; Zingraff, Leiter, Myers, & Johnsen, 1993). Holsinger and Holsinger (2005) found that incarcerated girls were more likely to commit a violent crime if they had been abused. When separating these data by race, the results held true for Black girls but not for White girls. Other studies have found that maltreated Black girls were more likely to have an arrest for criminal behavior than non-maltreated controls (Rivera & Widom, 1990; Widom, 1989) and maltreated White girls (Zingraff et al., 1993). Similarly, Flannery and colleagues (2004) found that White students who witnessed violence reported...
less antisocial behavior than non-White youth. On the other hand, Paschall, Flewelling, and Ennet (1998) found that witnessing violence was a significant risk factor for offending regardless of race or socio-economic status. Overall, the results are mixed in terms of racial differences in the impact of exposure to violence on antisocial behavior. When differences are present, the relationship between the two seems to be more closely linked to Black youth.

Delineating Race Specific Pathways

Studies that test for a main effect by examining race as an individual variable can be misleading because combined data can mask substantial differences that may exist between groups (South & Messner, 2000; Wierson & Forehand, 1995). To decipher race specific pathways to antisocial behavior, it is important to examine the groups separately (Holsinger & Holsinger, 2005; Miller-Johnson, Moore, Underwood, & Coie, 2005; Wierson & Forehand, 1995), as different risk variables may be predictive for each group.

Studies that have separated the data by race have found support for race specific pathways to offending. Wierson and Forehand (1995) found no main effect for race in their model, but when they examined the groups separately different risk models emerged for Black and White Americans. Other research on race specific risk models (Holsinger & Holsinger, 2005; Katz, 2000; Wierson & Forehand, 1995) have found that Black and White Americans are not homogenous in their responses to certain risk factors such as presence of mental heath diagnoses, age of first arrest, crime severity, and abuse. While studies are beginning to explore race specific risk models, this line of research is still in its infancy.

Current Study

Overall, the prevalence of exposure to violence among normative and incarcerated girls has been well documented (Finkelhor et al., 2005; Holsinger & Holsinger, 2005; Odgers & Moretti, 2002). However, whether racial differences exist with regard to the prevalence and impact of exposure to violence on antisocial behavior is less clear. We know of no studies that have examined race specific pathways between neighborhood disadvantage, exposure to violence (either witnessing or experiencing), and criminal recidivism among a group of previously incarcerated female juvenile offenders.

The current study sought to evaluate whether (1) racial differences exist in the prevalence rates of neighborhood disadvantage and exposure to violence, (2) neighborhood disadvantage and exposure to violence are associated with higher rates of criminal recidivism for female juvenile offenders, and (3) the associations differ for Black and White female juvenile offenders. As such, we hypothesized the following.

(1) Black female juvenile offenders will be more likely to inhabit disadvantaged neighborhoods and report greater levels of exposure to violence than White female juvenile offenders.

(2) Neighborhood disadvantage (see Figure 1; Path A) and exposure to violence (Paths D and E) will be directly associated with criminal recidivism.
(3) Neighborhood disadvantage will indirectly influence criminal recidivism via physical abuse (Paths B and D) and witnessing neighborhood violence (Paths C and E).

(4) The relationship between neighborhood disadvantage, exposure to violence, and criminal recidivism will vary by race.

**METHOD**

**Participants**

Participants \((N = 122)\) were recruited from a juvenile correctional center in Virginia and ranged in age from 13 to 19 \((M = 16.78; SD = 1.24)\). The sample was part of a larger study \((N = 141)\) with 38% White, 50% Black, and 12% other ethnicities, including Native Americans and Hispanics. Given our interest in examining racial differences, only data from the girls who self-identified as White \((n = 53)\) and Black \((n = 69)\) were analyzed. No significant racial differences were found with regard to age at interview \((t(120) = 0.17, p = .87; d = 0.03)\), severity of previous criminal charges \((t(102.38) = -1.18, p = .24; d = 0.24)\), self-report of previous violence...
(t(115) = 0.42, \( p = .68; d = 0.08 \)), or self-report of previous delinquency
(t(115) = 1.61, \( p = .11; d = 0.30 \)). Official records indicate that 79% of the sample
had a prior criminal charge that was violent in nature (e.g. assault and battery, armed
robbery, attempted murder) and 95% of the sample reported engaging in violent
activity prior to incarceration (e.g. armed robbery, using a weapon during a fight, a
fistfight, shooting at someone).

Procedure

All adjudicated female adolescents in the State of Virginia were sent to the single
correctional center where data were collected. This sample did not include youth
adjudicated in adult court. Every girl from June, 2003, to November, 2004, was
asked to participate in the study and 93% agreed. Each girl completed six to eight
hours of interviews and self-report measures. Due to restrictions of the correctional
facility, no compensation other than snacks or soda was provided. For girls under the
age of 18, active parental consent was obtained. A federal certificate of
confidentiality protected participants and their families, and the study was approved
by the Internal Review Boards of both the University of Virginia and the Virginia
Department of Juvenile Justice.

Measures

Community Violence Measure (CVM)

The CVM was adapted for the current study to assess whether the girl had witnessed
antisocial activities in her neighborhood during the 6 months prior to incarceration
on a three point scale (0—never; 2—always). Questions included whether she had
seen someone getting arrested, someone getting stabbed or shot, somebody getting
beat up, guns, guns being shot, or gang activity. Questions demonstrated strong
internal consistancy (full sample, \( \alpha = .91 \); Black, \( \alpha = .92 \); White, \( \alpha = .91 \)). This
subscale was negatively skewed and was squared to address violations in the
assumptions of normality.

Conflict Tactics Scale—modified (CTS)

The CTS (Straus, 1979, 1995) is a self-report instrument that assesses the frequency
of coercive and aggressive acts within interpersonal relationships on a four-point
scale (1—never; 4—always). Each participant was asked to rate how often a specific
act had been done to her by her mother and her father. Items included whether the
parent pushed, grabbed, or shoved her in an argument; threw something at her;
slapped her; kicked, bit or hit her; or hit her with an object. Paternal and maternal
physical abuse were combined to create a composite score of parental physical abuse
(full sample, \( \alpha = .90 \); Black, \( \alpha = .81 \); White, \( \alpha = .95 \)). Parental physical abuse,
paternal physical abuse, and maternal physical abuse subscales were all positively
skewed and were transformed by taking the logarithm.
Neighborhood Disadvantage

Each girl was asked where she lived immediately prior to incarceration. Addresses were geo-coded and matched to a census tract. Census tracts average about 4,000 people, have relatively homogenous characteristics, and are defined by significant physical boundaries such as rivers and major streets (U.S. Bureau of the Census, 2001). Addresses were available for 107 girls, which resulted in the geocoding of 94 census tracts. These tracts comprised 6% of the tracts in the state (tracts in state \( N = 1529 \)). Only 12 tracts had more than one girl (11 had two girls and 1 had three girls). Therefore, nested modeling was not required.

To create a neighborhood disadvantage subscale,\(^1\) we calculated the mean of four items: percentage of female-headed households, percentage of people below the poverty line, percentage of people on public assistance, and percentage of people unemployed. The subscale yielded adequate reliability (full sample, \( \alpha = .82 \); Black, \( \alpha = .82 \); White, \( \alpha = .74 \)). Percentage of people below the poverty line, people on public assistance, people unemployed, and the neighborhood disadvantage subscale were all transformed by taking the logarithm to address violations in the assumptions of normality.

Criminal Recidivism

Arrest data were accessed through the Virginia Department of Juvenile Justice official records system. Police records checks were conducted for all girls who had been released from the correctional facility for at least 12 months. At the time of the last record check (December, 2006), girls had been released for an average of about two years (\( M = 28.13 ; \ SD = 6.98 \)). Data were available on 112 girls (50 White girls, 62 Black girls); 92% of the original sample. No significant racial differences emerged with regard to time since release (\( t(110) = 0.09, p = .93 ; d = 0.02 \)) or age at follow-up (\( t(110) = 0.54, p = .59 ; d = 0.10 \)). Significant racial differences were present with recidivism (\( X^2(1, N = 112) = 11.44, p < .01 ; \Phi = 0.32 \)); Black girls were more likely to be rearrested compared to White girls.

RESULTS

Independent Sample T-Tests

Independent sample T-tests were conducted to determine whether racial differences existed between the measures of interest. All data were corrected for equality of variances based on Levene’s test, when necessary.\(^2\) Table 1 summarizes means and standard deviations for all variables at the combined and race specific level.

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\(^1\) Previous research (Sampson, 1997; Sampson, Morenoff, & Earls, 1999) utilized a neighborhood disadvantage factor that was comprised of the following items—percent of people below the poverty line, percent of people receiving public assistance, percent of people unemployed, percent of female headed households, and percent of Black residents. However, examination of the alpha yielded unacceptable reliability (full sample, \( \alpha = .66 \); Black, \( \alpha = .66 \); White, \( \alpha = .59 \)) at the aggregate and race disaggregate level. Based on item analyses, percent of Black residents was removed.

\(^2\) For variables where equality of variances was not assumed, the Wilcoxon rank transform test was also conducted. An identical pattern of results were attained. T-tests are reported for uniformity.
Significant racial differences emerged on neighborhood disadvantage, with Black girls living in more disadvantaged neighborhoods than White girls ($t(104.69) = -4.79$, $p < .001$; $d = 0.94$). All indicators of neighborhood disadvantage, including percentage of female headed households ($t(92.82) = -5.36$, $p < .001$; $d = 1.12$), people unemployed ($t(74.41) = -4.90$, $p < .001$; $d = 1.13$), people on public assistance ($t(92.34) = -3.21$, $p < .01$; $d = 0.67$), and people below the poverty line ($t(93.33) = -4.46$, $p < .001$; $d = 0.93$), were significantly higher for Black girls than for White girls. There was a large effect size for neighborhood disadvantage and all its indicators except people on public assistance, which had a medium effect size (Cohen, 1988). Black and White girls reported equal amounts of physical abuse by their parents ($t(110) = 0.56$, $p = .58$; $d = 0.11$) and similar levels of witnessing violence in their neighborhood ($t(112) = -1.56$, $p = .13$; $d = 0.30$).

### Correlations with Criminal Recidivism

Point biserial and Pearson’s correlations were examined to explore associations with neighborhood disadvantage, exposure to violence, and criminal recidivism at both a combined and a race specific level³ (see Table 2).

### Neighborhood Disadvantage and Criminal Recidivism

A significant relationship emerged between neighborhood disadvantage and criminal recidivism for the combined group ($r = .24$, $p < .05$), with percentage of female headed households being the most significant indicator ($r = .26$, $p < .05$). The other indicators of neighborhood disadvantage were not significantly related to criminal recidivism.

### Neighborhood Disadvantage and Exposure to Violence

Witnessing neighborhood violence was positively related to neighborhood disadvantage ($r = .27$, $p < .01$) and female headed households ($r = .25$, $p < .05$)

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³ Age and time at risk were also examined but not reported. They were not significantly related to recidivism.
for the combined sample. Moreover, parental physical abuse was significantly associated with witnessing neighborhood violence for the combined sample \((r = .27, p < .01)\), as well as for White girls \((r = .33, p < .05)\). Physical abuse by the father was associated with witnessing neighborhood violence for both groups \((r = .27, p < .01; r_{White} = .30, p < .05; r_{Black} = .31, p < .05)\); whereas physical abuse by the mother and witnessing neighborhood violence was only significant for White girls \((r = .29, p < .05)\). Not surprisingly, physical abuse by the father and physical abuse by the mother were significantly related to each other \((r = .45, p < .001)\); this relationship was stronger for White girls \((r = .66, p < .001)\) than for Black girls \((r = .27, p < .05)\).

### Exposure to Violence and Criminal Recidivism

Bivariate correlations revealed a significant relationship between witnessing neighborhood violence and criminal recidivism \((r = .23, p < .05)\) for the combined sample. Race specific analyses revealed a significant correlation between witnessing neighborhood violence and criminal recidivism \((r = .28, p < .05)\) for Black girls and between parental physical abuse \((r = .35, p < .05)\) and criminal recidivism for White girls.
Structural Models

T-tests and correlations were conducted to describe the nature of the bivariate relationship between the variables at a combined and a race specific level. Next, structural models were evaluated to examine the simultaneous relationships between neighborhood disadvantage, exposure to violence, and criminal recidivism for female juvenile offenders at a combined and a race specific level. Specifically, the relative contributions of the following associations were tested (see Figure 1): (1) neighborhood disadvantage and criminal recidivism (Path A); (2) neighborhood disadvantage and parental physical abuse (Path B); (3) neighborhood disadvantage and witnessing neighborhood violence (Path C); (4) parental physical abuse and criminal recidivism (Path D); (5) witnessing neighborhood violence and criminal recidivism (Path E); (6) witnessing neighborhood violence and parental physical abuse (Path F). A latent variable, which allows for the use of reliable variance, was created for neighborhood disadvantage.

Modeling was done in two stages. First, analyses were conducted on the combined data to examine the direct and indirect relations between neighborhood disadvantage, exposure to violence, and criminal recidivism. This first step found the best fitting model for the sample as a whole. Next, race specific models were conducted using multiple group analyses. The second step compared the two groups to determine whether the pathways between the variables differed by race.

Mplus (Muthén & Muthén, 1998–2009) was used for structural models. This allowed for missing data to be handled by the full information maximum likelihood (FIML) procedure. Since the outcome of interest is categorical, all analyses were conducted using the probit function with the weighted least squares mean and variance adjusted (WLSMV) estimator. This estimator does not compute the conventional chi square difference test because the differences are not distributed as a chi square. Therefore, the mean adjusted robust chi square difference test (the DIFFTEST function) was implemented to calculate appropriate chi square differences when comparing the fit of nested models. Models were evaluated based on the chi square statistic given by the DIFFTEST function for nested models as well as the cut-off values for standard fit indices (e.g. root mean square error of approximation, RMSEA < 0.05; comparative fit index, CFI > 0.95; weighted root mean square residual WRMR < 0.95 for categorical variables; Hu & Bentler, 1999; Yu, 2002). The primary interest was based on relative fit, model parsimony, and variance explained. However, absolute fit indices were also examined.

Combined Analyses

The first step allowed us to simultaneously test the direct and indirect relations between neighborhood disadvantage, exposure to violence (i.e. witnessing neighborhood violence and parental physical abuse), and criminal recidivism for the combined sample (see Table 3).

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Combined level models were also conducted controlling for race. These models yielded poor fit statistics and are not reported. Notably, race and the correlation between the two forms of violence exposure were the only consistent predictors in all models.
The baseline model (Model 1) allowed for all the pathways to be estimated. This fully saturated model accounted for 13% of the variance and yielded excellent fit indices. Next, Models 2 through 7 set each pathway to zero in a sequential order to detect which variables were substantially contributing to the model. Model 2, which removed the pathway between neighborhood disadvantage and criminal recidivism (Path A), significantly worsened model fit. Interestingly, it increased the variance explained by about 9%. Models 3 and 4 set the pathway between neighborhood disadvantage to physical abuse (Path B) to zero. Removing either of these pathways did not alter model fit. Models 5 and 6 evaluated the associations between witnessing neighborhood violence and parental physical abuse on criminal recidivism (Paths D and E), respectively. Setting these pathways to zero did not alter model fit. Finally, Model 7 examined the relationship between the correlation between witnessing neighborhood violence and parental physical abuse (Path F); removing this association significantly worsened model fit.

Models 8 through 10 combined the results from the individual parameters. Model 8 removed physical abuse (Paths B and D) from the model. This did not alter model fit and continued to exhibit excellent fit statistics. Model 9 (see Figure 2) was deemed the best fitting model based on fit indices, variance explained, and model parsimony. This model indicated that neighborhood disadvantage ($\beta = .28$, $p < .05$) and witnessing neighborhood violence ($\beta = .29$, $p < .05$) both uniquely predicted criminal recidivism. The relative contributions of these two parameters to rearrest were approximately the same.

### Table 3. Fit statistics for aggregate level data

<table>
<thead>
<tr>
<th>Goodness-of-fit indices</th>
<th>$X^2$</th>
<th>$\Delta X^2$</th>
<th>df</th>
<th>$\Delta$ df</th>
<th>$p &lt; .05$</th>
<th>CFI</th>
<th>RMSEA</th>
<th>WRMR</th>
<th>$r^2$</th>
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</thead>
<tbody>
<tr>
<td>Model 1. Baseline model</td>
<td>3.71</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>1.00</td>
<td>0.00</td>
<td>0.23</td>
<td>.13</td>
<td></td>
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<tr>
<td>Setting each parameter to 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2. Neighborhood disadvantage to recidivism (Path A)</td>
<td>6.62</td>
<td>3.91</td>
<td>4</td>
<td>2</td>
<td>yes</td>
<td>0.97</td>
<td>0.07</td>
<td>0.49</td>
<td>.22</td>
</tr>
<tr>
<td>Model 3. Neighborhood disadvantage to physical abuse (Path B)</td>
<td>1.83</td>
<td>0.60</td>
<td>3</td>
<td>1</td>
<td>no</td>
<td>1.00</td>
<td>0.00</td>
<td>0.32</td>
<td>.13</td>
</tr>
<tr>
<td>Model 4. Neighborhood disadvantage to witnessing neighborhood violence (Path C)</td>
<td>5.34</td>
<td>2.85</td>
<td>3</td>
<td>1</td>
<td>no</td>
<td>0.98</td>
<td>0.08</td>
<td>0.56</td>
<td>.16</td>
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<tr>
<td>Model 5. Physical abuse to recidivism (Path D)</td>
<td>3.60</td>
<td>0.20</td>
<td>7</td>
<td>1</td>
<td>no</td>
<td>1.00</td>
<td>0.00</td>
<td>0.24</td>
<td>.14</td>
</tr>
<tr>
<td>Model 6. Witnessing neighborhood violence to recidivism (Path E)</td>
<td>7.21</td>
<td>2.74</td>
<td>7</td>
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<td>no</td>
<td>1.00</td>
<td>0.02</td>
<td>0.33</td>
<td>.11</td>
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<tr>
<td>Model 7. Witnessing neighborhood violence with physical abuse (Path F)</td>
<td>10.56</td>
<td>5.21</td>
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<td>0.95</td>
<td>0.08</td>
<td>0.45</td>
<td>.15</td>
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<td>Combining models for parsimony</td>
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<tr>
<td>Model 8. Path B and D to zero</td>
<td>2.15</td>
<td>0.98</td>
<td>4</td>
<td>2</td>
<td>no</td>
<td>1.00</td>
<td>0.00</td>
<td>0.33</td>
<td>.14</td>
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<tr>
<td>Model 9. Path B, C and D to zero</td>
<td>5.07</td>
<td>3.10</td>
<td>4</td>
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<td>no</td>
<td>0.99</td>
<td>0.05</td>
<td>0.61</td>
<td>.16</td>
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<tr>
<td>Model 10: Path B, D and E to zero</td>
<td>8.14</td>
<td>5.96</td>
<td>5</td>
<td>3</td>
<td>no</td>
<td>0.97</td>
<td>0.07</td>
<td>0.72</td>
<td>.08</td>
</tr>
</tbody>
</table>

$\Delta X^2$ differences were calculated based on the DIFFTEST function in Mplus. Degrees of freedom are based on the formula provided by the WLSMV estimator and are not directly comparable. CFI = comparative fit index, RMSEA = root mean squared error of approximation, WRMR = weighted root mean square residual.
Multiple group analyses were conducted to determine whether these results and patterns were maintained for both Black and White girls. Before testing the relationship between the variables, we established measurement equivalence at the latent level for the two groups. Models 2 and 3 (see Table 4) fixed the loadings and intercepts for neighborhood disadvantage. The fit indices remained acceptable and established that the latent variable was indeed comparable for the two groups. This allowed for testing of relationships between variables at a race specific level.

The next set of models (Models 4 through 9) sequentially constrained each pathway between the variables of interest to be equal for the two groups. This allowed us to examine whether the relationships between neighborhood disadvantage, exposure to violence, and criminal recidivism were similar for Black and White girls. Model 4, which set the pathway between neighborhood disadvantage and criminal recidivism to be equal for the two groups (Path A), indicated that this relationship significantly differed. This suggests that the relationship between these two variables does not function in the same manner for Black and White girls. Models 5 and 6 suggest that the pathway between neighborhood disadvantage and the two forms of exposure to violence (Paths B and C) is similar and non-significant for both groups. On the other hand, Model 7 indicates that the pathway between
physical abuse and recidivism is significantly different for the two groups (Path D). Constraining this path to be equal for the two groups resulted in a 7% decrease in explanatory variance for White girls and an 8% decrease in explanatory variance for Black girls. Model 8, at a relative level, demonstrated that the pathway between witnessing neighborhood violence and recidivism is also not equal for the two groups. Among Black girls, 8% of the explanatory power for recidivism is lost when this path is constrained to be equal. Lastly, Model 9 indicated that the relationship between the two forms of exposure to violence is similar and significant for both groups. When all pathways are constrained to be equal (e.g. Model 10) the variance

<table>
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<th>Goodness-of-fit indices</th>
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<td>$X^2$</td>
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<td>Model 1. Baseline model</td>
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Examining latent variable for comparability

| Model 2. Fixing loadings on neighborhood disadvantage | 13.49 | 2.63 | 12 | 2 | no | 0.97 | 0.05 | 0.55 | .21 | .23 |
| Model 3. Fixing intercepts on neighborhood disadvantage | 15.80 | 5.98 | 14 | 4 | no | 0.96 | 0.04 | 0.59 | .21 | .23 |

Setting parameter equal (baseline model is Model 3)

| Model 4. Neighborhood disadvantage to recidivism (Path A) | 18.99 | 4.12 | 14 | 1 | yes | 0.89 | 0.08 | 0.68 | .28 | .23 |
| Model 5. Neighborhood disadvantage to physical abuse (Path B) | 14.88 | 0.31 | 14 | 1 | no | 0.98 | 0.03 | 0.60 | .21 | .23 |
| Model 6. Neighborhood disadvantage to witnessing neighborhood violence (Path C) | 11.46 | 0.71 | 11 | 1 | no | 0.99 | 0.03 | 0.63 | .20 | .22 |

Model 7. Physical abuse to recidivism (Path D)

| 21.64 | 7.13 | 14 | 1 | yes | 0.84 | 0.10 | 0.72 | .13 | .15 |

Model 8. Witnessing neighborhood violence to recidivism (Path E)

| 15.84 | 1.44 | 14 | 1 | no | 0.96 | 0.05 | 0.61 | .13 | .26 |

Model 9. Witnessing neighborhood violence with physical abuse (Path F)

| 14.88 | 0.31 | 14 | 1 | no | 0.98 | 0.03 | 0.60 | .21 | .23 |

Combined models

| Model 10. All parameters set to equal | 15.97 | 6.38 | 12 | 4 | no | 0.92 | 0.07 | 0.90 | .09 | .08 |
| Model 11. Paths B, C and F set equal | 10.34 | 1.23 | 11 | 2 | no | 1.00 | 0.00 | 0.67 | .21 | .21 |

Setting parameters to zero

| Model 12. Paths B and C to zero | 11.03 | 3.63 | 11 | 4 | no | 0.99 | 0.01 | 0.82 | .25 | .21 |
explained for Black girls is about 9% and for White girls is 8%, resulting in a less than optimal model for predicting recidivism among the two groups.

Model 11 combined information obtained from analyses of the individual parameters. This model set the pathways to be equal among the two groups between neighborhood disadvantage and both forms of violence exposure (Paths B and C) as well as between the two forms of violence exposure (Path F). However, the relationships between the predictor variables (neighborhood disadvantage and exposure to violence; paths A, D, and E) and recidivism were free to vary by race. This resulted in a model that accounted for 21% of the variance for both Black and White girls.

Finally, Model 12 (see Figure 3) is the best fitting model for the race specific analyses. This model explained 25% of the variance for Black girls, and 21% of the variance for White girls was explained; an increase from the 16% variance explained using the combined sample. This model removed the pathways between neighborhood disadvantage and the two forms of exposure to violence (Path B and C). It further allowed the relationship between the three predictor variables (Paths A, D, and E) and recidivism to vary by race. This model indicated that neighborhood disadvantage was not significantly associated with recidivism for Black girls ($\beta = .25, p = .11$) or White girls ($\beta = -.19, p = .26$). It further indicated that parental physical abuse is significantly associated with recidivism for White girls ($\beta = .40, p < .01$) but not for Black girls ($\beta = -.28, p = .09$). Witnessing violence, on the other hand, was significantly

Figure 3. Unstandardized coefficients for the best fitting model for the race specific analyses.

Note: ** $p < .01$; *** $p < .001$. FHH = Percentage Female Headed Households. UNE = Percentage of People Unemployed. PAS = Percentage of People on Public Assistance. POV = Percentage of People Below the Poverty Line.
associated with recidivism for Black girls ($\beta = .42, p < .01$) but not for White girls ($\beta = .04, p = .83$). Again, the relative contribution of physical abuse for White girls and witnessing violence for Black girls was approximately equivalent.

DISCUSSION

The current study examined the relationship between neighborhood disadvantage, exposure to violence, and criminal recidivism among female juvenile offenders and explored the prevalence and associations among these variables for Black and White girls. Data suggest that (1) neighborhood disadvantage and exposure to violence both uniquely predict criminal recidivism for the group as a whole and (2) Black and White girls exhibit race specific pathways to criminal recidivism. Examining the data at a combined level, based on gender alone, can mask substantial racial differences that exist within the group.

Racial Differences in Prevalence of Risk Factors

The hypothesis that Black female juvenile offenders would be characterized by higher levels of neighborhood disadvantage and exposure to violence compared to their White counterparts was partially supported. Results are consistent with previous research that Black Americans are more likely to live in disadvantaged neighborhoods (Peeples & Loeber, 1994; South & Messner, 2000). However, they are in contrast with research from normative samples in which Black girls were more likely to both experience and witness violence (Finkelhor et al., 2005; Kilpatrick & Saunders, 1999) and from correctional samples that report higher levels of exposure to violence for White girls (Holsinger & Holsinger, 2005). Indeed, the current study found no racial differences in terms of experiencing or witnessing violence. The suggestions that White girls who are incarcerated may present with higher levels of exposure to violence was not supported.

Higher levels of neighborhood disadvantage did not translate to higher levels of witnessing neighborhood violence for Black girls. This may be the result of method variance (census versus self-report) in assessment. Thus, using macro-level data to approximate micro-level data could be misleading; neighborhood disadvantage does not automatically equate to high levels of witnessing neighborhood violence. It further indicates that factors within neighborhoods can differentiate the level of exposure to violence. Indeed, certain factors, such as types of peer group, amount of parental supervision, level of school attachment, and engagement in community activism, may act as risk or protective factors for witnessing community violence in high risk neighborhoods (Letiecq & Kobinsky, 2003; Patchin, Huebner, McCluskey, Varano, & Bynum, 2006; Salzinger, Ng-Mak, Feldman, Kam, & Rosario, 2006).

Criminal Recidivism

The hypothesis that neighborhood disadvantage would directly be associated with criminal recidivism was supported for the combined sample. In fact, results extend
prior research with adults and high risk boys to girls in that both neighborhood
disadvantage and witnessing neighborhood violence were indicative of antisocial
behavior (Eitle & Turner, 2002; Halliday-Boykins & Graham, 2001; McCart et al.,
2007; Peeples & Loeber, 1994; Peterson & Krivo, 2005; Wood, Foy, Layne, Pynoos,
& James, 2002). The results further confirm that both objective (disadvantage) and
subjective (witnessing violence) indicators of the neighborhood are related to
recidivism for female juvenile offenders.

At the bivariate level, the percentage of female headed households played a
substantial role in predicting recidivism. In addition to pure socioeconomic
indicators (poverty, public assistance, and unemployment), this variable could be
more strongly related to both recidivism and witnessing neighborhood violence due
to a third factor such as lack of parental monitoring due to maternal employment
obligations (LoPoo, 2005). Hence, the bivariate associations suggest that perhaps
these girls are at risk for rearrest in two ways—little parental monitoring and greater
opportunity to witness neighborhood violence.

The third hypothesis that neighborhood disadvantage would indirectly influence
criminal recidivism via exposure to violence was not supported at a latent level but
was supported at a bivariate level. These findings are consistent with previous
research on male juvenile offenders in which there was no association between
neighborhood disadvantage and parental level variables (Chung & Steinberg, 2006).
At the bivariate level, neighborhood disadvantage was related to witnessing
neighborhood violence but not experiencing violence such as parental physical
abuse. Indeed, it appears that witnessing neighborhood violence, neighborhood
disadvantage, and criminal recidivism are all inter-related. Theoretically, it makes
sense that violence within the home is less associated with neighborhood
disadvantage than violence within the neighborhood.

The final hypothesis that the relationship between neighborhood disadvantage,
exposure to violence, and criminal recidivism would vary by race was supported.
Different pathways were present for the two groups as indicated by the results from
the multiple group analyses. Although not significantly related to criminal recidivism
for either group, the pathway between neighborhood disadvantage and criminal
recidivism did differ by race, with the relationship being stronger for Black girls
compared with White girls. The only significant pathway for Black girls was between
witnessing neighborhood violence and recidivism, while the only significant pathway
for White girls was between physical abuse and recidivism.

There are several possible explanations for the existence of race specific pathways.
First, although similar levels of exposure to violence were reported for the two groups,
the nature of the violence may have been different. Indeed, a closer examination of the
correlations indicated that paternal and maternal physical abuse was more likely to co-
 occur for White girls compared with Black girls. Hence, they were more likely to report
being physically abused within both relationship contexts. Similarly, Black girls lived in
more disadvantaged neighborhoods and may have witnessed neighborhood violence
that was more severe and chronic in nature. Thus, severity and frequency of exposure to
violence may be more likely to predict recidivism rather than the specific type of
violence exposure; i.e., the chronicity of risk within a specified group may determine
recidivism more than the form of that risk.

Second, the relationship between parental physical abuse and antisocial outcomes
has been well documented and was expected (English et al., 2001; Widom, 1989);
thus the lack of relationship for Black girls was surprising. Tolan, Gorman-Smith, and Henry (2003) found that neighborhood safety mediates the relationship between parenting style and coercive parenting. Hence, for those living in more disadvantaged neighborhoods, coercive and even aggressive parenting styles may be utilized as a method to keep girls at home and out of trouble. The non-significant correlation between witnessing neighborhood violence and parental physical abuse among Black girls further supports this notion. Further, some research has found that stronger forms of physical discipline are related to fewer externalizing problems among Black Americans (Lansford, Deater-Deckard, Dodge, Bates, & Petit, 2004; Polaha, Larzelere, Shapirol, & Petit, 2004), regardless of neighborhood context or SES (Lansford et al., 2004), and that the meaning of specific behaviors may vary by the cultural group (Ogbu, 1993). These researchers have argued for a cultural and context-sensitive approach to understanding parenting in non-White families. Taken together, perhaps cultural aspects are serving to differentiate the impact of this risk factor.

Third, these results foster the idea that race encompasses a complex socio-cultural phenomenon. As such, race-specific processes that occur at both a macro and a micro level contribute to the disproportionate representation of Black Americans in the justice system. It is not the case that experiencing violence is not detrimental for Black girls and witnessing neighborhood violence is not detrimental for White girls (Lau et al., 2006; Wilson, Rosenthal, & Battle, 2007), but rather certain socio-cultural processes, particularly those within neighborhoods, are functioning to differentiate the pathway by which these girls reenter the justice system. The lack of congruency between the neighborhood disadvantage and criminal recidivism pathway among the two groups further supports this notion.

Fourth, it is possible that neighborhood level risk processes or certain macro-level risk factors may trump individual level factors in predicting recidivism in disadvantaged neighborhoods. When there are fewer macro-level risk factors (including neighborhood disadvantage), then individual level factors come to the forefront and operate as predictors of antisocial behavior. Being involved in neighborhood violence combined with other exacerbating factors in disadvantaged neighborhoods (e.g. higher police surveillance, easier access to weapons, and willingness by police to arrest individuals in high crime areas) likely leads to higher levels of recidivism for Black girls. Indeed, the disproportionate representation of minorities in the justice system appears to be related to the neighborhoods within which they reside.

**Limitations**

Although typical of research in this area, witnessing violence and parental physical abuse were both retrospective and relied on self-report. Hence, report of exposure to violence may be an artifact of memory and salience of specific incidents rather than true exposure. It is possible that those prone to antisocial behavior or other problematic behaviors may be more likely to recall witnessing or experiencing previous violence.

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5 We thank the reviewer for pointing out this limitation.
Witnessing neighborhood violence was broadly defined in this study to include exposure to antisocial behavior such as seeing guns and seeing somebody get arrested. While these two items do not necessarily represent violence in the traditional sense, they serve as a proxy for witnessing other violent behaviors that may not have been tapped into by this instrument. More severe forms of neighborhood violence may demonstrate greater predictive validity. Further, while this measure demonstrated adequate reliability among this group, it should be noted that it was adapted for the current study.

Finally, although this is a rather large sample size for such an extreme population, when data are disaggregated by race the sample sizes are slightly larger than 50 for each group. There was a positive trend present between neighborhood disadvantage and criminal recidivism for Black girls but the current study may not have had enough statistical power to detect smaller effects. As such, null results should be viewed with caution and research should continue to investigate this macro-level risk factor for criminal recidivism.

**Future Research**

The current study examined whether girls were getting rearrested for antisocial behavior and not whether they were actually engaging in these acts. Indeed, systemic biases likely play a prominent role in rearrest compared to actual offending behaviors. Self-report of antisocial behavior may yield similar pathways for Black and White girls and should be examined in future research.

The lack of a strong correlation between neighborhood disadvantage and witnessing neighborhood violence is encouraging. It suggests that other neighborhood level processes such as collective efficacy and neighborhood cohesion may be operating as protective factors in disadvantaged neighborhoods to prevent community violence at a macro level and recidivism at a micro level (Browning, 2002; Sampson, Raudenbush, & Earls, 1997). Further examination of the role of these protective factors may serve to inform policies that can disrupt the relationship between neighborhood level factors and recidivism.

**Implications**

Although our results warrant replication, there are several important implications. First, prevention and intervention efforts may need to be tailored for the two groups. For example, given that community violence was predictive for Black girls, discussing ways to avoid becoming entangled in community violence, such as enhancing coping skills, avoiding peer pressure, and maintaining distance from high conflict situations, may be of prime importance. Alternatively, for White girls, resolving issues related to physical abuse, such as acting out and engaging in attention seeking behaviors, may be of more importance. Second, results with regard to the relationship between witnessing neighborhood violence and criminal recidivism suggest that generic policies such as increasing neighborhood watch and preventing neighborhood violence could be beneficial. Third, parental monitoring and supervision should be considered in re-entry planning, especially
in high risk neighborhoods, given the significant association between percentage of female headed households and recidivism. Fourth, after school planning such as community centers that allow for some monitoring of youth is likely to be beneficial for individuals from high risk neighborhoods.

These results echo previous research, which has found that macro-level factors are likely to contribute to the over-representation of Black Americans in the justice system (Peeples & Loeber, 1994; Peterson & Krivo, 2005). Consistent throughout the analyses is that different results emerge based on whether the data are combined or race specific. It seems that race may be an organizing agent that serves as a proxy for key socio-cultural processes. The results argue for increased attention to race specific risk models for recidivism, as they may provide a unique window in delineating the causes behind the disproportionate representation of Black Americans in the justice system and inform differential modes of intervention.

REFERENCES


