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Explaining Discrepancies in Arrest Rates Between Black and White Male Juveniles

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Abstract

The authors investigated discrepancies in arrest rates between Black and White male juveniles by examining the role of early risk factors for arrest. Two hypotheses were evaluated: (a) Disproportionate minority arrest is due to increased exposure to early risk factors, and (b) a differential sensitivity to early risk factors contributes to disproportionate minority arrest. The study included 481 Black and White boys who were followed from childhood to early adulthood. A higher incidence of early risk factors accounted for racial differences related to any juvenile arrest, as well as differences in violence- and theft-related arrests. However, increased exposure to early risk factors did not explain race differences in drug-related arrests. Minimal support was found for the hypothesis that a differential sensitivity to risk factors accounts for disproportionate rate of minority male arrests. In sum, most racial discrepancies in juvenile male arrests were accounted for by an increased exposure to childhood risk factors. Specifically, Black boys were more likely to display early conduct problems and low academic achievement and experience poor parent–child communication, peer delinquency, and neighborhood problems, which increased their risk for juvenile arrest.

Keywords

juvenile arrest; racial discrepancies; risk factors

When examining arrest rates, one finds racial discrepancies that cannot be ignored (Beckett, Nyrop, Pflingst, & Bowen, 2005; Krueger, Bond Huie, Rogers, & Hummer, 2004; Lauritsen, 2005; Ramchand, Pacula, & Iguchi, 2006). Specific to juvenile arrest, evidence suggests that Black youths are up to 3 times more likely to be arrested than White youths (Huizinga et al., 2007). Although many have speculated about the origins of racial discrepancies in juvenile arrest, few have empirically evaluated potential explanations of these discrepancies (Kempf-Leonard, 2007). In the current study, we evaluated two potential explanations of racial discrepancies in juvenile male arrest using prospective information collected on child internalizing and externalizing behavior and contextual risk factors.

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One primary hypothesis in the literature is that racial discrepancies in arrest rates occur as a byproduct of Black youths displaying and experiencing more risk factors for arrest across multiple domains (Kempf-Leonard, 2007; Moffitt, 1994). Increased exposure to risk models propose that environmental and societal inequalities (e.g., poor health care and educational systems) cause Black youths to exhibit more adverse individual risk factors, which then leads to a greater probability for arrest. Along these lines, risk factors across multiple domains have been linked to juvenile arrest (Loeber et al., 2005), and many of these risk factors are more prevalent among Black versus White youths (Piquero, Moffitt, & Lawton, 2005). In terms of risk for arrest, child problem behavior, including attention-deficit/hyperactivity problems (Lahey et al., 1999), conduct problems (Hanson et al., 1984), oppositional defiant problems (Lahey et al., 1999), affective problems (Loeber et al., 2005), low anxiety (Tremblay, Pihl, Vitaro, & Dobkin, 1994), and interpersonal callousness (Loeber et al., 2005) have been associated with juvenile arrest. Additional factors such as family socioeconomic status (SES; Bynum & Thompson, 1999; Patterson & Yoerger, 2002), poor parent-child communication (Hanson et al., 1984; Loeber et al., 2005), physical punishment (Loeber et al., 2005), peer delinquency (Felson, 1998; Hanson et al., 1984; Patterson & Yeorger, 2002), peer rejection (Hanson et al., 1984), low academic achievement (Herrenkohl, Hawkins, Chung, Hill, & Battin-Pearson, 2001), and neighborhood problems (Bynum & Thompson, 1999; Felson, 1998; Piquero, Moffitt, & Lawton, 2005) have also been associated with arrest.

In some preliminary studies, researchers have statistically evaluated risk factors and suggested that exposure to high levels of risk factors may account for racial discrepancies in arrest (Krueger et al., 2004). However, few studies have simultaneously examined risk factors across multiple domains in childhood prior to the onset of first arrest (Piquero et al., 2005; Sampson, Morenoff, & Raudenbush, 2005). Considering an array of risk factors assessed in childhood makes it possible to identify the primary factors that may account for racial discrepancies in arrest (Kempf-Leonard, 2007). This information could then be used to refine early prevention strategies designed to target specific factors that increase child's risk for juvenile arrest. One way to evaluate whether specific risk factors significantly account for racial discrepancies in arrests is through the use of indirect effects models (MacKinnon, Lockwood, & Williams, 2004). Indirect effects models can be used to statistically evaluate whether the influence of race on arrests can be accounted for by the influence of specific early risk factors as well as to determine the proportion of the race effect that is accounted for by specific risk factors. Thus, the current study examined which risk factors best explained racial discrepancies in juvenile male arrest rates through the use of indirect effects models.

In addition to increased exposure to risk models, other theories have suggested that disproportionate minority arrest rates may be accounted for by a differential sensitivity to early risk factors between Black and White youths. These differential sensitivity models suggest that the exclusionary practices associated with institutionalized racism may leave Black juveniles more sensitive to risk factors than White juveniles (Piquero et al., 2005). For example, longitudinal evidence indicates that the negative impact of physically abusive parenting practices on behavior may be more pronounced in Black than in White children (Lansford et al. 2002). However, studies examining the association between less severe forms of physical discipline and conduct problems in the two racial groups have produced mixed findings (Lansford, Deater-Deckard, Dodge, Bates, & Pettit, 2004; Pardini, Fite, & Burke, 2008). Thus, there is some preliminary evidence, particularly in regard to physical discipline, to suggest differential sensitivity to risk factors between Black and White youths. However, research examining whether differential sensitivity plays a role in racial discrepancies in arrest rates is needed. One way to examine differential sensitivity is to examine whether the association between risk factors and arrest statistically differ among racial groups (Aiken & West, 1991). Accordingly, we investigated the differential sensitivity hypothesis of racial discrepancies by examining whether relations between risk factors and arrest rates varied across racial groups.

The Current Study

In sum, we sought with the present study to better understand discrepancies in arrest rates between Black and White male juveniles by examining the role of individual (i.e., inattention/hyperactivity, oppositional defiant disorder, conduct problems, affective problems, anxiety problems, interpersonal callousness, and low academic achievement) and contextual risk factors (i.e. family SES, poor parent–child communication, physical punishment, peer delinquency, peer rejection, neighborhood SES, and neighborhood problems). Two hypotheses were evaluated: (a) A differential exposure to early risk factors accounts for differences in arrest rates between Black and White male juveniles, and (b) differential sensitivity to early risk factors accounts for the discrepancy in arrest rates among male juveniles. To examine these questions, we used risk factors that had been measured in children in the second grade to predict juvenile arrest when they were 10–17 years old. The current study examined any juvenile arrest, along with domain-specific arrests (i.e., violence-related, theft-related, and drug-related), given that different types of delinquency may be influenced by divergent causal mechanisms (Loeber, Farrington, Stouthamer-Loeber, & White, 2008). In this study, we extend previous research by prospectively predicting arrest throughout adolescence, including risk factors across multiple - domains, examining multiple types of offenses, and comparing differential sensitivity and differential risk explanations. Associations were examined in a community-recruited sample of boys with an oversampling of high-risk boys in order to ensure variability in study constructs.

Method

Participants

Participants for the current study consisted of the boys in the youngest cohort of the Pittsburgh Youth Study (PYS; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998), a community sample of inner-city boys. Participants were recruited from first graders attending the Pittsburgh public schools in 1987–1988. A multi-informant (i.e., parent, teacher, child report) screening measure of antisocial behavior was used to increase the number of high-risk males included in the PYS. Those boys scoring within the upper 30% of antisocial behavior and an approximately equal, number of boys randomly selected from the remainder were followed longitudinally. The participation rate of selected families was 84.6%. Boys in the initial recruiting sample were similar to boys in the longitudinal follow-up sample in terms of race, age, family composition, and parental education level (for details, see Loeber et al., 1998). Descriptive statistics for study predictors based on race and risk status are presented in Table 1.

Procedures

Interviews were conducted with the boys and their primary caretakers typically in their homes. Prior to assessment, informed written consent was obtained from caretakers (Loeber et al., 1998). Data collection procedures were approved by the University of Pittsburgh Institutional Review Board. Risk factors were assessed when participants were in second grade, and arrest outcomes were assessed when participants were between 10 and 17 years old.

Measures

Child's race—A caretaker-reported demographic questionnaire (Loeber et al., 1998) was used to collect information regarding the child's race (i.e., "What is the child's race?"). Caretakers chose from one of five categories: White ($N = 202$), Black ($N = 279$), Hispanic, ($N = 1$), Asian ($N = 9$), and other racial heritage ($N = 13$). Because the number of children in other racial groups was minimal, only children who were White or Black were included in analyses.

Externalizing behavior problems—The current study included four facets of externalizing problems: *conduct problems* (CP; 8 items assessing behaviors such as fighting, stealing, and destroying - others' property), *oppositional defiant problems* (ODP; 5 items assessing behaviors such as arguing and being defiant), *attention-deficit/hyperactivity problems* (ADHP; 11 items assessing impulsive behavior, restlessness, and inattention), and *interpersonal callousness* (IC; 8 items assessing behavior such as being manipulative and showing no guilt after misbehaving). Constructs were created from items on an extended version of the caretaker-reported Child Behavior Checklist (CBCL; Achenbach, 1991) and the Teacher Report Form (TRF), with the higher of the two informants' ratings being used (Achenbach & Edelbrock, 1986). Many of the items included in the CP, ODP, and ADHP scales have been rated by clinicians as being very consistent with the *Diagnostic and Statistical Manual* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994) conceptualizations of conduct disorder, oppositional defiant disorder, and attention-deficit/hyperactivity disorder, respectively (Achenbach, Dumenci, & Rescorla, 2001, 2003). The IC scale was designed to assess the interpersonal and affective features associated with psychopathy in youths (Pardini & Loeber, 2008; Pardini, Obradovic, & Loeber, 2006). Confirmatory factor analysis has supported the construct validity of the CP, ODP, ADHP, and IC scales across all three cohorts of the PYS, and each of these scales was significantly correlated with persistent delinquent behavior across a 3-year follow-up period (for details, see Pardini, Obradovic, & Loeber, 2006). Moderate to high internal consistency was obtained for the CP ($\alpha = .87$), ODP ($\alpha = .79$), ADHP ($\alpha = .89$), and IC ($\alpha = .86$) scales.

Internalizing problems—The *DSM-IV*-oriented scales of *anxiety problems* (nine items assessing the presence of fears and nervous behaviors) and *affective problems* (six items assessing the presence of sadness and self-injurious behavior) from the caretaker-reported CBCL were used to measure facets of internalizing problems. These items were rated by clinicians as being very consistent with *DSM-IV* conceptualizations of childhood anxiety and depressive disorders, respectively (Achenbach, Dumenci, & Rescorla, 2001; 2003). Internal consistencies of the affective problems ($\alpha = .59$) and anxiety problems ($\alpha = .57$) scales were low in the current study.

Family socioeconomic status (SES)—A caretaker-reported demographic questionnaire (Loeber et al., 1998) was used to collect information regarding family characteristics. Information on caretakers' educational attainment and current occupation were used to calculate the Hollingshead Index of Socioeconomic Status (Hollingshead, 1975).

Poor parent-child communication—We used the 18 items from the Revised Parent-Adolescent Communication Form (RPACF; Loeber et al, 1998) to assess the parents' communication style with their child and gauge how often the caregivers discussed issues with their child in an open and supportive manner. Parents responded to each item using a 3-point scale (0 = *almost never*, 1 = *sometimes*, 2 = *always*). Items were coded such that high scores represented poor parent-child communication. Internal consistency of the scale was moderate ($\alpha = .74$).

Physical punishment—One item from the Discipline Scale (Loeber et al, 1998) was used to examine physical punishment ("If your son does something that he is not allowed to do or that you don't like, do you slap or spank him, or hit him with something?"). Caretakers responded using a 3-point Likert scale (1 = *almost never*, 2 = *sometimes*, 3 = *often*). Because only 6.2% of caretakers responded with *often*, we dichotomized the item by combining the *sometimes* and *often* categories.

Peer delinquency—The Peer Delinquency Scale (PDS; Loeber et al, 1998) was used to measure affiliation with deviant peers. The PDS includes nine items assessing delinquent acts such as stealing. Boys rated how many of their friends had engaged in the acts over the past 6 months using a 4-point scale (0 = *none of them*, 4 = *all of them*). Internal consistency of the scale was moderate ($\alpha = .79$).

Peer rejection—This scale consists of four items administered to both caretakers and teachers as part of the CBCL (Achenbach, 1991) and TRF (Achenbach & Edelbrock, 1986), respectively. The items assess the child's tendency to be disliked, teased, and ridiculed by their peers. Internal consistency for the scale was adequate ($\alpha = .73$).

Low academic achievement—Four items administered as part of the TRF (Achenbach & Edelbrock, 1986) were used to assess academic achievement. Teachers rated the child's overall performance on four different subjects (i.e., reading, writing, math, spelling) using a 4-point scale (ranging from *well below average* to *well above average*). Items were recoded such that higher scores represented lower levels of academic achievement. The scale had high internal consistency ($\alpha = .91$).

Neighborhood SES disadvantage—Neighborhood SES disadvantage scores were derived from a principal components factor analysis of 1990 U.S. Census tract data of Pittsburgh neighborhoods (Wikström & Loeber, 2000). Each participant was assigned a neighborhood socioeconomic disadvantage factor score based on the neighborhood in which he lived at the first follow-up assessment. High scores represent high neighborhood SES disadvantage.

Neighborhood problems—A 17-item caretaker-reported Neighborhood Scale was used to assess neighborhood problems such as assaults, drug dealing, and vandalism (Loeber et al., 1998). For each item, caretakers indicated the severity of the problem using a 3-point scale (1 = *not a problem*, 3 = *a big problem*). This measure exhibited high internal consistency ($\alpha = .91$).

Juvenile arrest—Two court sources were used to gather information on juvenile arrest charges. Information on juvenile offenses within Allegheny County prior to 2001 was collected from Allegheny County Juvenile Court records (participants were 10–17 years old). In addition, the Pennsylvania Juvenile Court Judges' Commission provided data on juvenile offenses throughout Pennsylvania up to 1997 (participants were 10–16 years old). In order to prevent double-counting of charges found across both data sources, we examined dates of arrest so that any charge that was registered on the same date across both sources was counted only once. For the present study, we examined outcomes related to the presence of any type of criminal charge as a juvenile (i.e., 0 = *no charges*, 1 = *1 or more charges*), as well as three different dichotomous categories of charges: violence-, theft-, and drug-related arrests. Arrest for violence was coded positive if the participant had any charges for crimes against another person that involved the use of force or threat of force (e.g., homicide, robbery). Theft arrest was coded positive if the participant had any charges related to the illegal procurement or possession of property without the owner's consent that did not involve the use of force or threats of force (e.g., burglary, larceny), while drug-related arrest was coded positive for participants who had any charge related to the possession of drug paraphernalia and illegal substances, as well as drug dealing.

Statistical Analysis

Statistical analyses were conducted using Mplus Version 4.2 software (Muthén & Muthén, 2006). As recommended in the literature, all predictor variables were standardized prior to the

primary analyses in order to aid our interpretation of the findings (Aiken & West, 1991). Due to the dichotomous nature of the arrest variables, weighted least squares estimation with a mean and variance adjusted chi-square statistic (WLSMV) was utilized in the current study. WLSMV provides unbiased estimates, standard errors, and model fit tests for dichotomous data (Muthén, 1984). This estimator uses a standard error, mean, and variance adjusted chi-square test statistic, which is appropriate for non-normally distributed data (Muthén, 1984; Muthén & Muthén, 2006). The weighted root-mean-square residual (WRMR) statistic was used to evaluate model fit, with a WRMR value of less than .90 suggesting the model provided good fit to the data (Yu & Muthén, 2001).

Empirical evaluation is required to determine whether risk factors account for the relation between race and arrests. It is not enough to simply add risk factor variables to the model (Baron & Kenny, 1986). Accordingly, we used indirect effect models to evaluate whether increased exposure to risk factors accounted for the significant relation between race and juvenile arrest. First, we estimated the bivariate relation between race and the outcome of arrest by estimating models that regressed arrest onto race. Next, analyses were conducted to determine whether a disproportionate exposure to risk factors could statistically account for the association between race and arrest (i.e., race has an indirect effect on arrest), as well as to determine the proportion of the race effect accounted for by specific risk factors. For these indirect effect models, regression paths from race to each of the risk factors and from each risk factor and race to arrests are estimated simultaneously within the model (See Figure 1). These models allow one to determine whether the risk factors completely account for the significant relation between race and arrests. If race is no longer a significant predictor of arrests after the inclusion of the risk factors in the model, then it suggests that race only indirectly affects arrest through its relation with one or more risk factors in the model. More specifically, we used the bias-corrected bootstrap method to test indirect effects (MacKinnon et al., 2004). This method has been found to provide a more accurate balance between Type 1 and Type 2 errors than other methods used to test for indirect effects (MacKinnon et al., 2004). The bias-corrected bootstrap method provides a more accurate test of indirect effects by correcting for bias in the estimate of the central tendency through resampling to account for the nonnormal distribution of the indirect effect (Bollen & Stine, 1990; MacKinnon et al., 2004). Five hundred bootstrap samples and the 95% bias-corrected confidence intervals (CIs) were used to test the significance of indirect effects.

To further evaluate the magnitude of the indirect effects, we calculated the percentage of the total effect of race on arrest that was accounted for by each significant risk factor, as well as all significant risk factors together (MacKinnon & Dwyer, 1993). Specifically, we divided the estimated indirect effect for each significant risk factor, as well as the sum of the indirect effects for all significant risk factors, by the regression parameter representing the association between race and arrest without the risk factors in the model.

Odds ratios for the relation between the risk factors and arrest are also reported in order to allow evaluation of the magnitude of associations between the risk factors and arrests. Odds ratios greater than 1 suggest an increase in odds of the outcome per 1 standard deviation increase in the independent variable, and odds ratios less than 1 indicate a decrease in odds of the outcome per each standard deviation increase in the independent variable (Tabachnick & Fidell, 2001).

Overarching models in which all the potential risk factors were included were first estimated in order to establish which risk factors uniquely account for racial differences in arrest. Individual models for each risk factor were then estimated in order to provide follow-up analyses of which risk factors accounted for racial differences in arrest when considered individually.

Note that some investigators have found that child reports of peer delinquency may be a reflection of the child's own antisocial behavior rather than the behavior of their peers per se (e.g., Haynie & Osgood, 2005). Moreover, the association between conduct problems and arrest most likely reflects continuity of problem behavior over time, as many conduct problems seen in children in the second grade would be grounds for arrest if exhibited by older adolescents. As a result, including these variables in the model may attenuate the indirect effects of other risk factors on relations between race and arrests. To examine the influence of these variables on the results, we re-estimated the overarching increased exposure to risk models without child conduct problems and child-reported peer delinquency in the model. Additionally, a combined parent and teacher scale of deviant peer affiliation was included in the model in lieu of the child self-reported variable to determine whether associations were due to the use of child reports of peer delinquency.

We then tested differential sensitivity effects by examining whether associations between risk factors and arrest varied as a function of race using a multiple group model approach (Muthén & Muthén, 2006). An unrestricted model, in which relations were allowed to vary freely across the racial groups was first estimated. Next, a model in which associations between risk factors and arrest were constrained to be equal across the racial groups was estimated. A diff test procedure was then used to determine whether constraining relations to be equal across the groups resulted in a significant decrement in the model chi-square (Muthén & Muthén, 2006). If constraining relations across the groups resulted in significant decrement in the model chi-square, then findings would suggest that associations varied across the racial groups. The multiple group model strategy was first used to provide overall omnibus tests of whether the 14 risk factors (i.e., a block effect) varied across the racial groups. Then models in which only one risk factor was constrained to be equal across racial groups at a time were estimated in order to provide follow-up analyses of whether there were racial differences in particular risk factors.

Results

Descriptive Statistics

Table 1 contains the means and standard deviations for all predictor variables by both race and high risk score at screening. Arrest rates for each of the offense categories by race are reported in Table 2. As expected from previous studies, chi-square difference tests indicate that Black youths were significantly more likely to be arrested as juveniles than White youths across all types of arrests. The discrepancy was particularly pronounced for the variable representing any type of criminal charge as a juvenile. Specifically, approximately one half of Black boys in the sample had been charged with a crime as a juvenile, while approximately one third of White boys had a criminal charge as a juvenile.

Correlations among all study predictors and outcomes are reported in Table 3. Any type of juvenile arrest and violence-related arrests were moderately associated with all risk factors except for affective and anxiety problems. Theft-related arrests were weakly to moderately associated with all risk factors except for affective and anxiety problems, physical punishment, and peer rejection. In contrast, drug-related arrests were weakly to moderately associated with only 5 of the risk factors (i.e., low academic achievement, poor parent-child communication, peer delinquency, neighborhood disadvantage, and neighborhood problems). As anticipated, race was weakly to strongly correlated with 10 of the 14 risk factors, suggesting that Black youths were more likely to display and experience the majority of risk factors than White youths. This increased level of risk among Black boys was present across multiple domains, including individual (e.g., conduct problems), school (e.g., low academic achievement), family (e.g., poor parent-child communication), peer (e.g., peer delinquency), and community-level (e.g., neighborhood problems) risk factors.

Increased Exposure to Risk

Juvenile arrest—In the initial bivariate model examining the relation between race and general arrest (WRMR = .000), race emerged a significant predictor of arrest ($B = 0.33, p < .05; R^2 = .10$). Specifically, Black youths were more likely to be arrested than White youths. All potential risk factors were then added to the model (WRMR = .081; see Table 4 for all path estimates). Specifically, paths from race to each of the risk factors, as well as paths from each of the risk factors and race to arrest, were estimated simultaneously. In this model, race was no longer a significant predictor of juvenile arrest ($B = 0.07, p = .44$). Indirect effects analysis indicated that peer delinquency ($B = 0.04, 95\% \text{ CI} = .01-.08; \% \text{ indirect effect [IE]} = 12\%$), conduct problems ($B = 0.06, 95\% \text{ CI} = .02-.12; \text{IE} = 19\%$), SES ($B = 0.03, 95\% \text{ CI} = .03-.07; \text{IE} = 9\%$), poor communication ($B = 0.04, 95\% \text{ CI} = .01-.08; \text{IE} = 13\%$), and low academic achievement ($B = 0.02, 95\% \text{ CI} = .002-.060; \text{IE} = 7\%$) significantly accounted for the relation between race and any juvenile arrest. Taken together, these significant risk factors accounted for 60% of the total effect between race and general arrest. Figure 2 depicts the percentage of effect between race and any juvenile arrest accounted for by each of the significant individual risk factors.¹

Risk factors were then examined in separate models in order to determine which risk factors significantly accounted for the relation between race and general arrest when considered alone. Consistent with the overarching model, peer delinquency ($B = 0.05, 95\% \text{ CI} = .03-.09$), conduct problems ($B = 0.06, 95\% \text{ CI} = .02-.09$), SES ($B = 0.06, 95\% \text{ CI} = .03-.09$), poor communication ($B = 0.07, 95\% \text{ CI} = .04-.11$), and low academic achievement ($B = 0.05, 95\% \text{ CI} = .02-.08$) significantly accounted for the relation between race and any juvenile arrest when considered individually. Additionally, interpersonal callousness ($B = 0.02, 95\% \text{ CI} = .003-.050$), attention-deficit/hyperactivity problems ($B = 0.03, 95\% \text{ CI} = .01-.06$), neighborhood problems ($B = 0.06, 95\% \text{ CI} = .01-.12$), neighborhood SES disadvantage ($B = 0.16, 95\% \text{ CI} = .06-.28$), and physical punishment ($B = 0.02, 95\% \text{ CI} = .003-.050$) significantly contributed to the relation between race and juvenile arrest. When examined together in a single model, these 10 risk factors accounted for 72% of the total effect between race and general arrest.

Domain-specific arrest—In the initial model that estimated the relation between race and each of the domain-specific arrests simultaneously (WRMR = .001), race was a predictor of violence-related ($B = 0.32, p < .05; R^2 = .09$), theft-related ($B = 0.24, p < .05; R^2 = .06$), and drug-related ($B = 0.39, p < .05; R^2 = .13$) arrest. Specifically, Black youths were more likely to be arrested for all three types of offenses than White youths. All potential risk factors were then added to the model (WRMR = .073; see Table 4 for all path estimates) to examine whether the association between race and each arrest category could be explained by a differential exposure to risk factors. Specifically, paths from race to each of the risk factors, as well as paths from each of the risk factors and race to each arrest category, were estimated simultaneously. In this model, race was no longer a predictor of violence-related arrest ($B = 0.06, p = .49$). Indirect effects analysis indicated that conduct problems ($B = 0.04, 95\% \text{ CI} = .01-.09; \text{IE} = 13\%$), low academic achievement ($B = 0.04, 95\% \text{ CI} = .01-.07; \text{IE} = 11\%$),

¹To account for neighborhood differences in arrest rates, we used information on the number of arrests recorded by the police within each Pittsburgh neighborhood at the beginning of the study. Information from the Pittsburgh Department of Public Safety (1988) included the overall number of arrests for Part I (e.g., murder, forcible rape, robbery, aggravated assault, burglary) and Part II offenses (e.g., simple assaults, vandalism, stolen property) within each neighborhood. For each Pittsburgh neighborhood, an arrest rate per 100 inhabitants was calculated to account for population differences across neighborhoods. Although race predicted community-level arrest ($B = 0.45, p < .0001$), community-level arrest rates were unrelated to arrests ($ps = .35-.79$). Moreover, the overall pattern of associations remained when we included community-level arrests in analyses. The only indirect effect influenced by inclusion of community-level arrests in the model was neighborhood problems. Neighborhood problems no longer significantly accounted for the relation between race and violence-related arrests. This is likely due to the overlap in the two neighborhood constructs, leaving little unique variance to account for the relation between race and violence-related arrests in the model, as the neighborhood problems variable may be viewed as a caregiver reported measure of crime in the neighborhood, including items such as assault, drug dealing, and vandalism.

communication problems ($B = 0.04$, 95% CI = .02–.08; IE = 14%), peer delinquency ($B = 0.04$, 95% CI = .01–.08; IE = 12%), and neighborhood problems ($B = 0.06$, 95% CI = .01–.13; IE = 20%) significantly accounted for the relation between race and violence-related arrest (see Figure 2 for visual presentation of percentage of effect accounted for by significant risk factors). Taken together, these significant risk factors accounted for a combined 70% of the total effect between race and violence-related arrest.

Likewise, race was no longer a predictor of theft-related arrest ($B = 0.07$, $p = .40$) in this model. For theft-related arrest, indirect effects analysis indicated that SES ($B = 0.05$, 95% CI = .03–.10; IE = 22%) and conduct problems ($B = 0.04$, 95% CI = .01–.09; IE = 16%) significantly accounted for the relation between race and theft-related arrest (see Figure 2 for visual presentation of percentage of effect accounted for by significant risk factors). Taken together, these significant risk factors accounted for a combined 38% of the total effect between race and theft-related arrest.

In contrast to the findings for violence- and theft-related arrest, no risk factors included in the model significantly accounted for the relation between race and drug-related arrest. In fact, after we added the risk factors to the model, only race emerged as significant predictor of drug-related arrest ($B = 0.22$, $p = .03$; see Table 4 for all estimated paths).

Risk factors were then examined in separate models in order to determine which risk factors significantly accounted for relations between race and domain-specific arrests when considered alone. Consistent with the overarching model, conduct problems ($B = 0.05$, 95% CI = .02–.08), low academic achievement ($B = 0.05$, 95% CI = .03–.09), communication problems ($B = .07$, 95% CI = .04–.11), peer delinquency ($B = 0.05$, 95% CI = .02–.10), and neighborhood problems ($B = 0.10$, 95% CI = .05–.16) significantly accounted for the relation between race and violence-related arrest. Additionally, interpersonal callousness ($B = 0.02$, 95% CI = .001–.04), attention-deficit/hyperactivity problems ($B = 0.03$, 95% CI = .01–.06), peer rejection ($B = 0.03$, 95% CI = .01–.06), neighborhood SES disadvantage ($B = 0.12$, 95% CI = .01–.23), physical punishment ($B = 0.02$, 95% CI = .002–.050), and SES ($B = 0.04$, 95% CI = .02–.08) significantly contributed to the relation between race and violence-related arrest. When these 11 risk factors were combined in a single model, they accounted for 72% of the total effect between race and violence-related arrest.

Also consistent with the overarching model, SES ($B = 0.07$, 95% CI = .04–.11) and conduct problems ($B = 0.04$, 95% CI = .01–.07) significantly accounted for the relation between race and theft-related arrest. Additionally, low academic achievement ($B = 0.03$, 95% CI = .01–.08) and communication problems ($B = 0.04$, 95% CI = .02–.08) significantly contributed to the relation between race and theft-related arrest when factors were examined individually. When combined in a single model, these four risk factors accounted for 47% of the total effect between race and theft-related arrest.

When examined individually, no risk factors were found to significantly account for the relation between race and drug-related arrest. Overall, these findings suggest that a differential exposure to early risk factors included in the current study may not explain the racial discrepancies in drug-related arrest, but exposure to such factors does seem to account for racial differences in violence- and theft-related arrest.

Increased Exposure to Risk: Supplemental Analyses

To examine the influence of conduct problems and child-reported peer delinquency on the results, we re-examined the increased exposure to risk models without these variables in the model. The risk factors that significantly accounted for the association between race and arrest did not change in any of the models, and the direct paths from race to general, theft-related,

and violence-related arrests remained nonsignificant. Additionally, we re-estimated each of the models using a combined parent and teacher scale of deviant peer affiliation that was created by summing a single item from the CBCL and TRF, respectively (regarding whether the child associated with children who “get in trouble”). It is important to note that the significant peer delinquency effects that we found using the child-report measure were also significant when the alternative parent- and teacher-report peer deviance scale was used. Overall, this suggests that the reported findings are remarkably stable and robust.

Differential Sensitivity

Juvenile arrest—A multiple group model approach was used to provide an overall omnibus test of whether the association between risk factors and juvenile arrest varied as a function of race. The diff test suggested that associations did not vary as a function of race, $\Delta\chi^2(12) = 18.29, p = .11$. Additionally, the models in which risk factors were examined individually revealed that their effects did not vary by race ($ps > .05$). These findings suggest that the association between each of the risk factors and general arrests did not significantly differ between Black and White boys.

Domain-specific arrests—The multiple group model used to provide an overall omnibus test of whether the association between risk factors and domain-specific arrests varied as a function of race indicated that the overall pattern of associations between risk factors and arrests did not vary across racial groups, $\Delta\chi^2(19) = 19.62, p = .42$. However, the models in which each risk factor was examined individually suggested racial differences in the relation between physical punishment and violence-related and theft-related arrest, such that physical punishment was significantly associated with an increased risk for violence- and theft-related arrest for Black ($Bs = .030$ and 0.23 , respectively; $ps < .03$) but not for White boys ($Bs = -.11$ & $-.22$, respectively; $ps > .19$).

Discussion

The current study examined the role of early risk factors in accounting for discrepancies in arrest rates between Black and White boys. In this study, we extended previous research by prospectively predicting arrest throughout adolescence, including risk factors across multiple domains, examining multiple types of offenses, and comparing differential sensitivity and differential risk exposure explanations. Consistent with prior studies, Black boys displayed higher levels of individual risk factors and experienced higher levels of contextual risk factors across multiple domains and were also more likely to be arrested than White boys. Additionally, increased exposure to childhood risk factors across multiple domains accounted for racial differences in later juvenile arrest, particularly for violence- and theft-related arrest. Our findings contribute to a growing literature suggesting that an increased exposure to risk factors accounts for racial discrepancies in several areas of functioning, including educational achievement (e.g., Fryer & Levitt, 2005). While Black boys experienced and exhibited elevations on several risk factors, only a subset of these factors uniquely accounted for racial discrepancies in arrest, providing clearer primary targets for prevention programs in the early elementary school years aimed at reducing disproportionate rates of minority arrest.

Of the variables included in the current study, conduct problems emerged as the most consistent predictor of future arrest for both theft and violence and accounted for nearly one fifth of the discrepancy in general arrest rates between Black and White boys. While it is well known that children who exhibit severe conduct problems are at increased risk for arrest (Hanson et al, 1984; Lahey et al., 1999), it is important to note that other behavior problems did not add to the prediction of arrest when conduct problems and other risk factors were also included in the model. This finding is particularly important given that the *DSM-V* workgroup on disruptive

behavior disorders has stressed the need for studies examining whether behaviors consistent with oppositional defiant disorder, attention-deficit/hyperactivity disorder, and interpersonal callousness provide any predictive utility for antisocial outcomes above and beyond behaviors associated with conduct disorder (Moffitt et al., 2008). Along these lines, the current results suggest that interventions aimed at preventing juvenile arrest should target young boys exhibiting early signs of conduct disorder above all other forms of internalizing and externalizing behavior. Because low levels of academic achievement also uniquely accounted for the increased risk for later violence-related arrest, intervention programs designed for children exhibiting co-occurring conduct disorder symptoms and academic problems will likely have the greatest impact on disproportionate minority arrest rates.

Contextual risk factors in childhood also accounted for disproportionate male minority arrest rates, although there was variation in which factors were most important depending on the type of arrest examined. Boys who were exposed to conflicted parent-child interactions and who affiliated with delinquent peers were at relatively high risk for later arrest, especially for violence. Exposure to these two social factors accounted for 26% of the observed racial discrepancy in violence-related arrests. Exposure to increased levels of neighborhood problems emerged as the most important factor for explaining the increased risk for violence related arrests in Black boys, accounting for an additional 20% of the observed race effect. In contrast, SES was the most important factor for explaining disproportionate minority arrest for theft in boys but was not uniquely related to arrest for violence. Overall, findings suggest that efforts to eliminate disproportionate minority arrest rates should involve targeting multiple social systems.

Exposure to high levels of risk factors examined in the current study did not account for racial differences in drug-related arrest. There is evidence to suggest that Black youths are more likely to obtain and use substances in more public places, where police officers are more abundant and individuals are more likely to get caught (Beckett et al., 2005; Ramchand et al., 2006), which could explain racial discrepancies. Along the same lines, Coker (2003) proposed that Black individuals are more likely to be stopped for traffic offenses and, when stopped, to have their cars searched by police for evidence of more criminal activity (i.e., drug possession) that leads to arrest. Additionally, other risk factors (e.g. parental substance use) not assessed in the current study or more proximal predictors (e.g., substance use or peer relationships just prior to the time of arrest) may better account for drug-related arrest than the more distal predictors examined in the current study. However, further research is needed to determine which of these explanations best accounts for the racial discrepancies in drug-related arrest.

The current study found little support for the notion that disproportionate minority arrest rates can be explained by a differential sensitivity to certain risk factors. The sole exception was that exposure to physical punishment was related to violence- and theft-related arrests for Black, but not for White, boys. Although these findings are consistent with previous research using the PYS (Pardini et al., 2008), other investigators have suggested that physical punishment may actually reduce behavior problems in Black boys (Lansford et al., 2004). It seems unwise to view physical punishment in Black families as a beneficial parenting practice since it was associated with an increased risk for future arrest in the current study.

With regard to intervention, these findings stress the need for early multifaceted interventions that target both individual and contextual factors. Indeed, interventions that target multiple domains are more efficacious than interventions that target only one aspect of risk (Foster & Olchowski, 2007; Lochman & Wells, 2004). While findings suggest that the same factors should be the targets of intervention for both Black and White boys, Black boys are more likely to have individual risk factors and experience multiple contextual risk factors associated with arrest. An increased focus on effective prevention programs within schools and community-

based organizations that predominately serve Black families is indicated. Along these lines, the Pennsylvania Department of Health (2008) recently provided funding to implement an empirically based prevention program called Stop Now and Plan (SNAP) (Webster, Augimeri, & Koegl, 2002) for boys exhibiting significant conduct problems within the city of Pittsburgh. The goal of the intervention is to prevent arrest by targeting many of the risk factors that accounted for the disproportionate minority arrest rates found in the current study. The intervention will be implemented by community-based organizations that disproportionately serve Black families. As a result, we are hopeful that this program will be a positive step toward eliminating the racial discrepancies in arrest in the Pittsburgh area.

Findings may also have implications for the juvenile justice system. Black youths in the juvenile court system may be particularly in need of further assessment to determine what additional services may be needed to overcome early risk factors. Additionally, one interpretation of findings is that there is little evidence of racial bias in arrest, at least for non-drug-related arrests. However, this interpretation may be a bit deceptive, as one of the leading offenses for juvenile arrest is drug-related crime (Lauritsen, 2005). Black youths are far more likely to be arrested for drug offenses than White youths, despite evidence suggesting similar rates of use among White and Black youths (Beckett, Nyrop, & Pflingst, 2006; Ramchand et al., 2006).

Limitations

There are several noteworthy limitations of the current study. First, the sample was comprised of boys, and therefore findings should not be generalized to girls. This sample was a community-recruited sample with an oversampling of high-risk boys, which likely resulted in elevated arrest rates when compared with a representative community sample. Additionally, this study examined discrepancies in arrest rates between Black and White boys, and findings may not translate to other racial/ethnic groups. Moreover, findings need to be interpreted in light of the specific risk factors included in the models. Other individual and contextual factors (e.g., malnutrition, parental psychopathology) not examined in this study may also account for racial differences in arrest. There are also likely many proximal predictors (e.g., employment opportunities, educational opportunities, current peer affiliations) that play a role in the likelihood of arrest that were not examined in the current study. Along these lines, it is important to remember that having temporal precedence in longitudinal studies does not ensure causation, and it is likely that a developmental cascade of events starting in early childhood likely precedes juvenile arrest. However, the risk factors identified in the current study may be the early seeds of developmental trajectories that can lead to arrest. Future research examining the pathways through which these early precursors lead to arrest would be useful for further refining prevention strategies. A further measurement limitation is the low to modest internal consistencies of some variables included in the current study. Future studies should include more internally consistent measures. In addition, the current study focused on arrest and not differential treatment between Black and White in terms of sanctions following arrest, which may be influenced by other factors, including discriminatory practices (Kempf-Leonard, 2007). Furthermore, we examined domain-specific arrests by comparing boys who had been arrested for a particular type of offense (e.g., drug-related) with boys who had not been arrested for that specific type of offense, which included those who had not been arrested along with those who had only been arrested for other types of offenses (e.g., violence- and theft-related arrests). This provides information on what risk factors are unique predictors of a particular outcome but does not provide a comparison of those who have been arrested versus those who have not been arrested, and findings need to be interpreted as such.

It is also important to note that caution should be taken when interpreting the effects of peer delinquency and neighborhood problems in the current study. Specifically, peer delinquency

may be an indication of a child's own tendency to seek out antisocial peers rather than a direct influence of peers on the child's behavior. Research indicates that children tend to select peers who engage in similar levels of antisocial behavior (e.g., Bauman & Ennett, 1994; Hartup, 1995; Haselager, Hartup, van Lieshout, & Riksen-Walraven, 1998) and children who endorse antisocial beliefs may seek out deviant peer groups (Pardini, Loeber, & Stouthamer-Loeber, 2005). In addition, children tend to attribute their own behavior to the behavior of their friends (e.g., Bauman & Ennett, 1994; Haynie & Osgood, 2005). Along similar lines, findings indicating neighborhood problems contribute to the prediction of violent arrest may be the result of differential policing practices in these neighborhoods. It will be important for future research in the area to examine the extent to which other neighborhood characteristics influence arrest across racial groups, as well as to examine whether neighborhood characteristics moderate the effect of risk factors on arrest.

Conclusions

To summarize, findings suggest that increased exposure to early risk factors account for most discrepancies in juvenile arrest rates between Black and White boys, as race was no longer a significant predictor of general, violence-related, or theft-related arrests once risk factors were accounted for in the models. Note that these risk factors can be identified in childhood well before boys can be charged with a crime, emphasizing the importance of early prevention efforts. However, the current study assessed difficulties in the second grade, and environmental processes may have already influenced the development of problem behavior by that time. The current findings should not be interpreted as evidence that being Black causes the development of problem behavior that leads to arrest (Hawkins, 2003). Rather, early environmental factors are likely responsible for the racial differences observed in these risk factors. For example, Moffitt (1994) posited that institutional racism has put Black youths at risk for poor prenatal health care, malnutrition, and exposure to toxins, which can result in psychological problems. Moreover, institutional racism creates undue hardship for Black parents, which can influence parenting and other family characteristics that contribute to the child's problems. These difficulties are then further compounded by disadvantaged school systems, fewer employment opportunities, poor neighborhood quality, and the like. Thus, the fact that African American boys are at increased risk for experiencing individual and contextual risk factors of arrest suggests the need to also intervene on a larger societal level.

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Figure 1.

Heuristic of indirect effects model. The paths from race to each risk factor and juvenile arrest should not be interpreted as causal mechanisms. SES = socioeconomic status.

Figure 2.

Percentage of race effect accounted for by individual risk factors. Bars with asterisk above them indicate a statistically significant ($p < .05$) indirect effect for the risk factor and arrest category listed.

Table 1
Descriptive Statistics (Means and Standard Deviations) for Arrest Predictor Variables by Race and Risk Screening Score

Predictors	White boys				Black boys			
	Non-high screen		High screen		Non-high screen		High screen	
	M	SD	M	SD	M	SD	M	SD
Inattention/hyperactivity	7.06	4.99	10.92	5.11	8.94	4.35	11.66	5.11
Oppositional defiant problems	3.21	2.04	5.26	2.29	3.20	2.11	4.85	2.45
Conduct problems	1.24	1.77	3.86	3.29	2.28	3.09	4.52	3.84
Affective problems	1.73	2.08	2.42	2.35	1.70	1.93	1.88	2.16
Anxiety problems	1.50	1.73	1.96	1.60	1.38	1.53	1.64	1.78
Interpersonal callousness	2.58	2.79	5.68	3.86	3.38	2.83	5.77	3.72
Low academic achievement	1.79	0.54	1.99	0.57	2.05	0.56	2.25	0.59
Family SES	38.94	10.88	37.95	13.70	34.09	12.08	31.09	13.09
Poor communication	25.19	3.75	27.37	4.66	27.50	4.20	28.87	5.00
Physical punishment	0.63	0.49	0.75	0.44	0.70	0.46	0.82	0.38
Peer delinquency	2.82	3.23	5.03	5.05	4.69	3.85	7.19	4.88
Peer rejection	0.26	0.35	0.48	0.45	0.35	0.36	0.56	0.46
Neighborhood disadvantage	-0.13	0.61	-0.07	0.59	2.57	1.66	2.63	1.56
Neighborhood problems	19.91	4.30	22.11	6.32	28.98	9.15	28.81	9.29

Note. SES = socioeconomic status.

Table 2

Prevalence and Age of Onset of Juvenile Arrest for Black and White Boys

Variable	Full sample (N = 481)			Black boys (N = 279)			White boys (N = 202)			$\chi^2(1, N = 481)$	t(219)
	%	N	M	%	N	M	%	N	SD		
Any arrest	45.9	221		56.6	158		31.2	63		30.54***	
Violence-related arrest	29.5	142		38.4	107		24.6	35		24.89***	
Theft-related arrest	26.8	129		33.3	93		27.9	36		14.36***	
Drug-related arrest	13.5	65		19.7	55		5.0	10		21.85***	
Age at first arrest			13.67			13.65			2.08		0.317
									2.25		

 $p = .001$.

Table 3

Correlation, Means, and Standard Deviations for Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	M	SD
1. Race	—																			—	—
2. Any arrest	.25*	—																		—	—
3. Violent arrest	.23*	.70*	—																	—	—
4. Theft arrest	.17*	.66*	.46*	—																—	—
5. Drug arrest	.21*	.43*	.33*	.27*	—															—	—
6. Inattention/hyperactivity	.15*	.20*	.16*	.09*	.03	—														4.87	2.
7. Oppositional/defiant	-.02	.21*	.14*	.12*	.01	.61*	—													4.12	2.
8. Conduct problems	.15*	.32*	.27*	.21*	.09	.58*	.69*	—												3.07	3.
9. Affective problems	-.06	.05	.02	.00	.03	.25*	.29*	.24*	—											1.91	2.
10. Anxiety problems	-.06	.00	-.04	-.04	-.02	.26*	.26*	.20*	.52*	—										1.60	1.
11. Interpersonal callousness	.09	.22*	.16*	.13*	.03	.66*	.66*	.68*	.23*	.28*	—									4.42	3.
12. Low acad. achievement	.20*	.22*	.23*	.15*	.13*	.42*	.18*	.23*	-.03	-.02	.20*	—								2.16	0.
13. Family SES	-.23*	-.23*	-.17*	-.24*	-.09	-.12*	-.13*	-.15*	-.04	.05	-.08	-.18*	—							34.98	12.
14. Poor communication	.22*	.28*	.27*	.18*	.11*	.26*	.18*	.23*	.17*	.10*	.21*	.22*	-.29*	—						27.40	4.
15. Physical punishment	.10*	.15*	.14*	.08	.05	.20*	.14*	.12*	.05	-.03	.13*	.13*	-.09	.11*	—					0.73	0.
16. Peer delinquency	.24*	.22*	.21*	.10*	.13*	.16*	.15*	.17*	.04	.02	.16*	.11*	-.04	.08	.12*	—				5.13	4.
17. Peer rejection	.12*	.18*	.21*	.08	.03	.53*	.55*	.68*	.26*	.25*	.59*	.20*	-.09*	.22*	.04	.15*	—			0.42	0.
18. Neighborhood disadvantage	.72*	.27*	.24*	.20*	.22*	.15*	.05	.21*	.03	.01	.14*	.17*	-.28*	.23*	.08	.21*	.14*	—		1.46	1.
19. Neighborhood problems	.45*	.20*	.24*	.09*	.19*	.14*	.11*	.18*	.12*	.11*	.14*	.10*	-.22*	.28*	.08	.11*	.17*	.053*	—	25.55	8.

Note. Acad. = academic; SES = socioeconomic status.

*
p < .05.

Table 4

Path Estimates and Odds Ratios for Overarching Indirect Effect Arrest Models

Risk factor	Race → risk factor	Risk factor → general arrest		Risk factor → violent arrest		Risk factor → theft arrest		Risk factor → drug arrest	
		Path est.	Odds ratio	Path est.	Odds ratio	Path est.	Odds ratio	Path est.	Odds ratio
ADHD	.15*	-.11	.90	-.11	.90	-.15	.86	-.16	0.85
Oppositional defiant	-.02	-.01	.99	-.04	.96	.03	1.03	-.04	0.96
Conduct problems	.15*	.42*	1.52	.27*	1.31	.26*	1.30	.16	1.17
Affective problems	-.06	-.01	.99	-.02	.98	-.02	.98	.09	1.09
Anxiety problems	-.06	-.04	.96	-.10	.90	-.04	.96	-.05	0.95
Interpersonal callousness	.09†	.03	1.03	-.03	.97	.06	1.06	-.00	1.00
SES	-.23*	-.13*	.88	-.06	.94	-.23*	.79	-.01	0.99
Poor communication	.22*	.19*	1.21	.20*	1.22	.12	1.13	.06	1.06
Physical punishment	.10*	.13*	1.14	.14*	1.15	.06	1.06	.01	1.01
Peer delinquency	.24*	.16*	1.17	.16*	1.17	.05	1.05	.12	1.13
Peer rejection	.12*	-.11	.90	.08	1.08	-.11	.90	-.07	0.93
Low acad. achievement	-.20*	.12†	1.13	.17*	1.19	.11	1.12	.16	1.17
Neighborhood disadvantage	.72*	.09	1.09	.02	1.02	.10	1.11	.08	1.08
Neighborhood problems	.45*	.03	1.03	.14*	1.15	-.07	.93	.11	1.12

Note. All predictors were standardized. Race → risk factor represents relations between race and risk factors. Risk factor → arrest represents relations between the risk factors and arrest. In these multivariate models, nonsignificant paths were found between race and general arrest ($B = .07, p = .44$), violence-related arrest ($B = .06, p = .49$), and theft arrest ($B = .07, p = .40$). However, race significantly predicted drug-related arrest ($B = .22, p = .03$). Est. = estimate; ADHD = attention-deficit/hyperactivity disorder; SES = socioeconomic status; acad. = academic.

† $p < .07$.

* $p < .05$.