

## **Race, Sex, and Discrimination in School Settings: A Multilevel Analysis of Associations With Delinquency**

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### **Abstract:**

#### **BACKGROUND**

Adolescence is a critical phase of development and experimentation with delinquent behaviors. There is a growing body of literature exploring individual and structural impacts of discrimination on health outcomes and delinquent behaviors. However, there is limited research assessing how school diversity and discrimination impact students' delinquent behaviors. In response, the purpose of this study was to assess if individual- and school-level indicators of discrimination and diversity were associated with student delinquent behaviors among African American and White students.

#### **METHODS**

We analyzed Wave I (1994-1995) data from the National Longitudinal Study of Adolescent Health. Our analysis was limited to 8947 African American and White students (73% White, 48% male, and 88% parent  $\geq$  high school education). We used multilevel zero-inflated negative binomial regression to test the association of individual- and school characteristics and discrimination with the number of self-reported delinquent behaviors.

#### **RESULTS**

Race, sex, perceived peer inclusion, and teacher discrimination were predictors of students' delinquent behaviors. The average school perceived peer inclusion and percentage of African Americans in teaching roles were associated with delinquent behaviors.

#### **CONCLUSIONS**

Findings from this study highlight the potential for intervention at the interpersonal and school levels to reduce delinquency among African American and White students.

**Keywords:** risk behaviors | alcohol | drugs | delinquency | discrimination | teacher diversity

### **Article:**

Adolescence has been defined as a critical phase of development and experimentation with delinquent behaviors.<sup>1, 2</sup> For example, in the United States in 2013 nearly half a million (N = 666,263) youth under age 18 were arrested for a plethora of crimes including vandalism, robbery, and even murder,<sup>3</sup> rendering financial and social burdens on society.<sup>4</sup> African Americans are overrepresented in detainments as a result of delinquency; they also tend to self-report a greater number of delinquent behaviors.<sup>5-9</sup> Delinquent behaviors are also associated with physical injury and other risk-taking behaviors such as alcohol and drug use, lower academic performance, socioeconomic status, and parental involvement.<sup>1, 10</sup> Given the individual, interpersonal, organizational, and structural impacts delinquent behaviors have on society, there is an imperative need to understand causal pathways to delinquency among adolescents.<sup>1</sup>

Established research supports adolescents participate in delinquent behaviors as a result of their friends' involvement in similar activities, suggesting adolescents model behaviors in the environments within which they navigate.<sup>1, 2, 10-13</sup> Nonetheless, there is a social dynamic interaction between the way in which adolescents view themselves and their involvement in delinquent behaviors.<sup>1, 2, 13</sup> For example, adolescents who feared being involved in future delinquent behaviors were more likely to report peer exposure to and involvement in delinquent behaviors.<sup>1, 2, 13</sup> This provides evidence that adolescent's intra and interpersonal relationships are key factors to their behaviors and development.

There is a body of literature exploring individual and structural impacts of discrimination on health outcomes and risk-taking behaviors, including delinquency.<sup>9</sup> Discrimination is an effect of a social process involving a deeply discrediting attribute or label, which marginalizes groups of people from the whole as dangerous people in society.<sup>14, 15</sup> There are 2 forms of discrimination. Individual discrimination involves a direct interaction between 2 people where one person discriminates against another person. Structural discrimination encompasses institutional practices and laws that work to continuously disadvantage groups of people.<sup>15</sup> There is an interaction between individual and structural discrimination, where both must exist in order for exclusion and separation to be developed and perpetuated in society.<sup>15</sup>

Discrimination can have profound effects on health including induced stress and depression. For example, racial discrimination and prejudice have been associated with strain and stress among African American adolescents, leading to participation in delinquent behaviors as a coping strategy.<sup>7, 16</sup> Depressive symptoms and anger were also mediating factors for the relationship between racial discrimination and delinquent behaviors among American adolescents.<sup>7</sup> However, the belief aggression was a necessary tactic for interpersonal relationships was only a mediating factor for African American males.<sup>7</sup> Additionally, research has shown a direct relationship between students of color who experienced racial/ethnic discrimination with delinquent and other risk-taking behaviors.<sup>8, 9, 17, 18</sup> Nonetheless, there is a dearth of literature assessing how diversity, as well as school-level discrimination, impact students' delinquent behaviors.

Diversity of school context has been used in the literature to examine the impact of structural discrimination. Diversity of school context is also associated with adolescents' social, moral, and behavioral development.<sup>19</sup> Research supports increasing the racial diversity of the teachers in

the classroom significantly reduced student's delinquent behaviors.<sup>20</sup> School context, specifically, perceived peer discrimination and school ethnic diversity negatively impacted students' delinquent behaviors, regardless of students' race/ethnicity.<sup>21</sup> Nonetheless, African American students were more likely to report perceived peer discrimination.<sup>21</sup> Higher proportions of female teachers in schools served as a protective factor to delinquent behaviors for all students across race/ethnicity groups, except for African American students.<sup>21</sup> These findings indicate individual- and school-level discrimination, race/ethnicity, and sex are key components in students' involvement in delinquent and other risk-taking behaviors.

The purpose of this study was to assess if individual- and school-level indicators of discrimination and diversity were associated with student delinquent behaviors among African American and White students. This study was guided by the social ecological model which asserts individual characteristics (eg, race, parent's education) and perceptions (eg, perceived discrimination and prejudice) interact with institutional factors (eg, to influence behaviors). This study aims to accomplish this goal through answering 2 primary questions: (1) Are individual- and school-level perceptions of discrimination and prejudice in school settings associated with African American and White students' delinquent behaviors? (2) Is school diversity in teaching staff associated with African American and White students' delinquent behaviors?

## **Methods**

### Data Source

This study analyzed restricted-use data from the National Longitudinal Study of Adolescent Health (Add Health). Add Health is the only nationally representative sample of adolescents in middle and high school in the United States who have been followed across adolescence and into adulthood containing information about individual and school discrimination and diversity. There are currently 4 waves of data collected through in-school and in-home interviews capturing information about participants' social networks, sexual health, socioeconomic status, neighborhoods, psychological health, general health, school characteristics and more. Participants were selected through randomized cluster cohort stratified sampling. The first wave (Wave I) of data was collected during the 1994 to 1995 academic year, with 20,745 participants in grades 7 to 12. This study was limited to the Wave I restricted-use dataset due to availability of variables on school discrimination and context.

### Participants

A total of 20,745 adolescents participated in the Add Health in-home survey during Wave I. For the current analysis, we restricted the sample to 14,546 non-Hispanic White and African American adolescents who participated in the Wave I in-home survey. Additionally, we conducted case-wise deletion, removing from analysis any participant who had missing data on individual- or school-level study variables. This resulted in a final analytic sample of 8947 non-Hispanic White and African American adolescents in middle and high school during 1994 and 1995.

### Instruments

### *Delinquent behavior*

Delinquent behavior was measured using a 15-item scale. Participants were asked how often they engaged in specific delinquent behaviors in the year prior to the interview, eg, “In the past 12 months, how often did you...” “...paint graffiti or signs on someone else's property or in a public place?”, “...deliberately damage property that didn't belong to you?”, “...lie to your parents or guardians about where you had been or whom you were with?”, “...take something from a store without paying for it?”, “...get into a serious physical fight?”, “...hurt someone badly enough to need bandages or care from a doctor or nurse?”, “...run away from home?”, “...drive a car without its owner's permission?”, “...steal something worth more than \$50?”, “...go into a house or building to steal something?”, “...use or threaten to use a weapon to get something from someone?”, “...sell marijuana or other drugs?”, “...steal something worth less than \$50?”, “...take part in a fight where a group of your friends was against another group?”, “...act loud, rowdy, or unruly in a public place?” Response options ranged from 0 (never), 1 (1 to 2 times), 2 (3 to 4 times), or 3 (5 or more times). Factor analysis indicated that the 15 items represent a single dimension and are appropriate to use as a single scale, and the Cronbach's alpha for the 15-item scale was  $\alpha = 0.82$ . A composite score was created in correspondence with previous studies by summing the responses to each item, resulting in a scale variable that ranged from 0 to 45.21-23 Low scores indicated lower delinquent behaviors while high scores indicated higher delinquent behaviors.

### *Perceived peer inclusion and teacher fairness*

Two items measured perceived peer inclusion and teacher fairness. Participants were asked how strongly they agree or disagree that “the students at this school are prejudiced.” There were 5 Likert-type response options ranging from strongly agree to strongly disagree, with lower scores indicating greater perceived peer prejudice and higher scores indicating greater perceived peer inclusion. Participants were asked how strongly they agree or disagree that “teachers at your school treat students fairly.” There were 5 Likert-type response options ranging from strongly agree to strongly disagree. Items were reverse coded such that lower scores indicate greater perceived teacher discrimination, with higher scores indicating greater perceived teacher fairness. Previous studies using Add Health have measured these items this way.<sup>21, 24-27</sup>

### *Sex*

Student sex was measured by self-report, with response options of male or female. In regression analysis, female was the referent sex category.

### *Race*

Student race was measured by self-report. The current study was limited to participants who self-identified as non-Hispanic African American or White. In regression analysis, White was the referent race category.

### *Average core grades*

Students reported their current grades on an A (4) to D (1) scale for English, Math, History or Social Studies, and Science. A mean score across these 4 courses was computed. High scores indicated higher grades, with low scores indicating lower grades.

### *Substance use*

Students reported ever-use for alcohol, cigarettes, smokeless tobacco, marijuana, cocaine, inhalants, and other illegal drugs, such as heroin or LSD. We computed a variable assessing the number of alcohol and/or drugs students ever tried by first summing across these items, resulting in a count ranging from 0 to 6. We then collapsed these counts to 4 categories: no substance use, 1 substance, 2 substances, or 3 or more substances.

### *Exposure to violence*

We operationalized exposure to violence using an 8-item scale. Participants were asked how often they were exposed to different types of violence in the year prior to the interview, for example: “During the past 12 months, how often did each of the following things happen?”, “You saw someone shoot or stab another person”, “Someone pulled a knife or gun on you”, “Someone shot you,” “Someone cut or stabbed you”, “You got into a physical fight”, “You were jumped”, “You pulled a knife or gun on someone”, “You shot or stabbed someone”. Response options were 0 (never), 1 (once), and 2 (more than once). Items were summed to create a composite scale score, with the resulting scale variable ranging from 0 to 16. Factor analysis indicated that the 8 items were appropriate to use as a single scale, and Cronbach's alpha for the 8-item scale was  $\alpha = 0.71$ . Low scores indicated no or minimal exposure to violence, whereas high scores reflected immense exposure to violence.

### *Family and social support*

We measured family and social support using a 7-item scale. Students were asked a series of questions about people around them they receive support from. They were asked how much they feel that adults, teachers, parents, and friends care about them (4 items), as well as “How much do you feel that people in your family understand you?”, “How much do you feel that you and your family have fun together?”, “How much do you feel that your family pays attention to you?” Response options ranged from not at all (1) to very much (5). We calculated the mean of the 7 items, resulting in a scale variable ranging from 1 to 5. This choice allowed us to retain the interpretability of the original response options. Factor analysis indicated that the 7 items were appropriate to use as a single scale, and Cronbach's alpha for the 7-item scale was  $\alpha = 0.79$ . Low scores reflected adolescents who did not feel supported by family and friends, while high scores indicated adolescents felt supported.

### *Parental control*

We measured parental control using a 7-item scale. Students were asked a series of questions about their relationship with their parents. For example: “Do your parents let you make your own decisions about the time you must be home on weekend nights”, “Do your parents let you make your own decisions about the people you hang around with”, “Do your parents let you make your

own decisions about what you wear”, “Do your parents let you make your own decisions about how much television you watch”, “Do your parents let you make your own decisions about which television programs you watch”, “Do your parents let you make your own decisions about what time you go to bed on week nights”, and “Do your parents let you make your own decisions about what you eat?” Response options were no (0) or yes (1). Response options were such that high scores reflect higher parental control. Items were summed to create a composite scale score, with the resulting scale variable ranging from 0 to 7. Factor analysis indicated that the 7 items were appropriate to use as a single scale, and Cronbach's alpha for the 7-item scale was  $\alpha = 0.59$ .

### *Parent's education*

As a part of the Add Health study, 1 parent or guardian was interviewed during Wave I. During the parent interviews, parents were asked detailed questions about their highest level of education completed. For this analysis, response options were collapsed to 4 categories: “less than high school”, “high school/GED”, “some college”, or “college and/or more”.

### *School-level variables*

The school-administration questionnaire provided information on the school setting and climate. From this source, the school-level variables used in this study were: percentage of African American teachers and percentage of women teachers ranging from 0% to 100%. In addition, we aggregated individual student responses on (1) perceived peer inclusion and (2) teacher fairness to the school level, creating school mean peer inclusion and school mean teacher fairness variables.

### Data Analysis

A multilevel zero-inflated negative binomial model was used to account for the complexity of the Add Health sampling design<sup>28</sup> and our positively skewed outcome variable.<sup>29</sup> Zero-inflated models are maximum-likelihood count regression models used when a count outcome variable has excessive zero values.<sup>29</sup> Zero-inflated negative binomial models, specifically, are used when the count outcome variable's variance is greater than the mean.<sup>29</sup> The mean for the delinquent behaviors scale is 4.03, while the variance was nearly 5 times the mean at 24.69. A zero-inflated negative binomial regression models the probability of students participating in no delinquent behaviors versus a student who participates in delinquent behaviors, weighing cases accordingly to examine the predicted probability of the intensity of delinquent behavior scores. The majority of studies to date using Add Health data do not account for the skewness of the delinquent behavior variable. The only study to our knowledge that has accounted for the skewness of the delinquent behavior variable used negative binomial regression analysis in Stata,<sup>23</sup> or the use of a dichotomous outcome variable.<sup>5</sup>

Our multilevel zero-inflated negative binomial analyses also apply weights, to account for the complex cluster sampling design used in Add Health and the oversampling of individuals and schools. A total of 371 schools participated in Add Health, but only 124 schools were included in the current analysis due to case-wise deletion. Approximately 33% of individuals were removed due to missing data. Schools were recruited by clusters created from community and school

characteristics including region, urbanicity, school size, school type, percent White, percent African American, grade span, and curriculum. Students in each cluster therefore presumably had similar community and school characteristics. Thus, multilevel modeling techniques were used, with school as the level-2 grouping variable. In addition to the multilevel modeling to account for clustering, to account for Add Health's oversampling, individual- and school-level weights were applied in zero-inflated multilevel model analyses.

All ordinal and continuous independent variables were group mean centered to account for group differences on the outcome variable, while all covariates were grand mean centered assessing group differences on the outcome variable after controlling for individual-level variables. Data analyses were computed in SPSS version 24 and Mplus version 7.

## **Results**

### **Descriptive Statistics**

There were 8947 African American and White students included in this study. Most were White (73%), male (48%), and had a parent with at least a high school education (88%) (see Table 1).

Students reported low delinquent behavior scores (urn:x-wiley:00224391:media:josh12589:josh12589-math-0001 = 4.03 out of 45) and perceived teacher fairness (urn:x-wiley:00224391:media:josh12589:josh12589-math-0001 = 3.49 out of 5), with moderate perceived peer inclusion (urn:x-wiley:00224391:media:josh12589:josh12589-math-0001 = 2.85 out of 5). Students average core grades were just above a C (3.04). Approximately, 47% of students reported ever trying at least 2 substances. Last, students reported low levels of violence (urn:x-wiley:00224391:media:josh12589:josh12589-math-0001 = 0.94 out of 16) and parental control (urn:x-wiley:00224391:media:josh12589:josh12589-math-0001 = 1.81 out of 7), with high levels of family and social support (urn:x-wiley:00224391:media:josh12589:josh12589-math-0001 = 4.05 out of 5) (Table 1).

Table 1. Descriptive Statistics of Delinquency, Individual-, and School-Level Variables (N=8947)

Individual-Level Variables	Percent	N
<b>Race</b>		
White	73.2	6550
African American	26.8	2397
<b>Sex</b>		
Male	48.8	4366
Female	51.2	4581
<b>Average core grades (range 1 [D] to 4 [A])</b>	2.81	0.76
<b>Substance use</b>		
No substance	29.6	2648
1 substance	23.1	2067
2 substances	23.6	2111
3 or more substances	23.7	2121
<b>Parent's education</b>		
Less than high school	11.6	1038
High school	32.2	2881
Some college	31.7	2836
College or more	24.5	2192
	<b>Mean</b>	<b>Std. Deviation</b>
<b>Delinquency (range 0 to 45)</b>	4.03	4.89
<b>Individual discrimination</b>		
Peer inclusion (range 1 to 5)	2.85	1.22
Teacher fairness (range 1 to 5)	3.49	1.08
<b>Violence (range 0 to 16)</b>	0.94	1.72
<b>Parental control (range 0 to 7)</b>	1.82	1.52
<b>Family and social support (range 1 to 5)</b>	4.05	0.57
<b>School-level variables</b>		
	<b>Mean</b>	<b>Std. deviation</b>
<b>School diversity</b>		
Percentage of African American Teachers (range: 0% to 100%)	11.13	19.99
Percentage of women teachers (range: 23% to 100%)	60.59	15.72
<b>School discrimination</b>		
School-perceived inclusion	2.83	0.51
School-perceived discrimination	3.48	0.22

The average percent of teachers who identified as African American and women across schools was 11% and 61%, respectively. Additionally, average schools perceived peer inclusion was 2.83 and teacher fairness 3.48.

#### Multilevel Zero-Inflated Negative Binomial Results

Students' expected log count in delinquent behavior scores significantly varied by schools ( $p < .001$ ). There was a significant difference among students who had an expected log count of 0 in comparison to those who had an expected log count of 1 or higher in delinquent behavior scores across schools (Table 2).

Race, sex, teacher fairness, peer inclusion, and the average percentage of African American teachers at schools were significant predictors of students' delinquent behavior scores (Table 2). As the number of male students increased, students' expected log count in delinquent behavior

scores increased by 0.148 points ( $p < .001$ ), after accounting for average core GPA, substance use, parent's education, violence, family and social support, and parental control. In contrast, as the number of African American students increased, and students' levels of perceived teacher fairness and peer inclusion decreased, students' expected log count in delinquent behavior scores decreased by 0.098, 0.052, and 0.026, respectively (Table 2).

The average percentage of teachers who were identified as African American at schools and schools average perceived peer inclusion scores were the only level-2 variables significantly associated with students' delinquent behavior scores (Table 2). As the average percentage of African Americans in teaching roles across schools increased, students' expected log count in delinquent behavior scores decreased by 0.005 points ( $p < .001$ ), after accounting for average core GPA, substance use, parent's education, household income, violence, family and social support, and parental control. However, as school's average perceived peer inclusion increased, students expect log count in delinquent behavior scores increased by 0.102 ( $p < .05$ ), accounting for average core GPA, substance use, parent's education, household income, violence, family and social support, and parental control. Schools' average perceived teacher fairness as well as average percentage of teachers who are women were not significant predictors of students' delinquent behavior scores (Table 2).

Table 2. Results of Multilevel Zero-Inflated Negative Binomial Regression for Student Delinquency (N=8947)

	Fixed Effect	
	Coefficient	p
Intercept	1.261	$p < .001$
<b>Within-level effects</b>		
<b>Race</b>		
White (referent)		
African American	-0.098	$p < .05$
<b>Sex</b>		
Female (referent)		
Male	0.148	$p < .001$
<b>Individual discrimination</b>		
Teacher fairness	-0.052	$p < .001$
Peer inclusion	-0.026	$p < .01$
<b>Between-level effects</b>		
<b>School discrimination</b>		
School-perceived teacher fairness	-0.171	$p = .06$
School-perceived peer inclusion	0.102	$p < .05$
<b>School diversity</b>		
Percentage of school African American teachers	-0.005	$p < .001$
Percentage of women teachers	-0.001	$p = .58$
<b>Zero-inflation effect</b>		
Delinquency#1	-1.888	$p < .001$

Delinquency is a scale score ranging from 0 to 45, with higher numbers representing more delinquent behaviors. The regression model also controls for average grades, substance use, parent's education, household income, violence, family and social support, and parental control.

## Discussion

The purpose of this study was to assess if individual- and indicators of discrimination and diversity were associated with student delinquent behaviors among African American and White students. Findings from this study show race, sex, and indicators of individual- and school-level discrimination are significant predictors of students' delinquent behaviors. These predictors are significant after controlling for student's average core GPA, substance use, family and social support, parental control, parent's education, household income, and violence. As expected, being a male was associated with higher delinquent behavior scores. Conversely, being an African American was associated with lower delinquent behavior scores. Similarly, students who perceived their school climate to be nondiscriminatory and inclusive reported lower delinquent behavior scores. These findings indicate students' perceptions of their school climate may be an important influence on students' delinquent behaviors. Surprisingly, as school's average perceived peer inclusion increased, so did students' delinquent behavior scores. This provides evidence that individual- and school-level perceived peer inclusion may be associated with students' delinquent behavior scores in different ways and may require distinct intervention strategies. Findings from this study also demonstrate that as the average percentage of African American teachers in schools increases students' delinquent behavior scores decrease. This is important in light of recent statistics on demographic trends in the teaching profession, indicating that some school districts are losing African American teachers and racial/ethnic diversity among teachers is not keeping pace with student diversity.<sup>20, 30</sup>

Previous research supports males and African Americans participate in significantly higher delinquent behaviors compared to females and Whites, respectively.<sup>5, 31-33</sup> More recent studies show White students are more likely to participate in nonviolent delinquent behaviors compared African American students.<sup>5, 21, 24-27</sup> Findings from this study vary from previous research, as we find being an African American significantly decreases a student's expected log delinquent behavior score. Differences may be due in part to our use of a zero-inflated negative binomial regression model which weighs the uneven distribution of students' delinquent behavior scores to examine the predicted probability of the intensity of delinquent behavior scores. It is also evident that higher perceptions of teacher fairness and peer inclusion are associated with a significant decrease in students' delinquent behaviors, after accounting for average core GPA, substance use, parent's education, household income, violence, family and social support, and parental control.<sup>21</sup>

Findings from our study also support the importance of school climate and diversity in potentially shaping the experiences and opportunities of youth. To our knowledge this was the first study to aggregate students' perceptions of teacher fairness and peer inclusion to the school level. Our findings support as school's average perceived peer inclusion increased, so does students' delinquent behaviors. However, our findings also indicate as the number of African Americans in teaching roles increase, students' delinquent behaviors decreased. This suggests teacher diversity, rather than school's average perceived peer inclusion is an important influence on student's delinquent behaviors.

## **Limitations**

There is a limitation in this study's measurement of racial discrimination. Our study did not measure the impact of racial discrimination on delinquent behaviors; rather we measured teacher

fairness and peers' inclusion. Previous studies using Add Health has used these variables as proxies of racial discrimination and differences in health outcomes between African American and White students.<sup>5, 21</sup> Despite this limitation, findings from this study can be used to inform individual- and school-level interventions to reduce delinquent behaviors among African American and White students.

## **Conclusions**

This study examined if individual- and school-level indicators of discrimination and diversity were associated with student delinquent behaviors among African American and White students. Findings from this study support the idea that individual-level characteristics and perceptions of teacher fairness and peer inclusion may be important factors for those who want to reduce adolescent delinquent behaviors. These findings also support the potential role of school context, specifically teacher diversity and the average perception of peer inclusion for schools. Thus, findings from this study highlight the significance of focusing on individual- and school-level indicators of discrimination to understand and intervene in delinquency among African American and White students.

## **Implications for school health**

In effort to increase school inclusivity and diversity, schools and school districts should consider the following strategies:

- Provide students with safe spaces such as facilitated focus groups to share their experiences with discrimination and inclusivity on their school campus.<sup>18</sup>
- Develop peer- and teacher-led programs aimed at identifying specific strategies to improve teachers' interactions with students, as well as inclusivity of the student body inside and outside of the classroom.<sup>20</sup>
- Increase involvement of schools and school districts in statewide initiatives to fund teacher preparation programs for minorities such as sharing job openings for teaching positions, as well as working more closely with scholars in teacher preparation programs to qualitatively assess what support systems and skills they need to thrive in a teaching environment.<sup>34</sup>

## **Human Subjects Approval Statement**

This study was deemed exempt by the University of North Carolina at Greensboro institutional review board.

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