Segregation and School Violence*

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Abstract

While research exploring the consequences of desegregation and resegregation for academic achievement and intergroup attitudes and behavior has been prolific, scant attention has been paid to the impact that school segregation differences has had on school violence. Using data from the state of Florida Department of Education and the U.S. Bureau of the Census, we attempt to adjudicate between competing hypotheses about the nature of a relationship between segregation and school violence: (1) that segregation is associated with increased school violence; and (2) that segregation is associated with decreased school violence, especially under conditions of racial inequality. Results from a multilevel analysis show that increased school district segregation has a substantive negative association with school violence, particularly in contexts of greater community inequality, consistent with Pettigrew’s (1971) observations about the contact hypothesis. The implications of these findings are discussed.

Ever since the landmark case Brown v. Board of Education, both efforts to desegregate schools and the consequences of such efforts have been the subject of contentious debate among scholars and laypersons alike. Despite the prolific attention paid to the effects of desegregation and busing, with over one hundred studies and counting (Ballantine 2001), we can point to few definitive conclusions. While some research suggests that desegregation is associated with moderate gains in academic achievement for minority students (Mahard & Crain 1983), an increased likelihood of attending college, greater success in finding jobs, and higher incomes (Trent 1997; Wells 1995), other research efforts have found no effect on the achievement levels of black students (St. John 1970;

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Further complicating our understanding of the consequences of school desegregation on various outcomes of interest is that there exists considerable variation in the extent of integration that has taken place in our nation's public schools — even among school districts that are under court order to desegregate. White flight has been argued to be a strategy employed to avoid contact with black students (Wilson 1985). Efforts to obfuscate the implementation of court-ordered desegregation are also well documented, including such strategies as employing room dividers in classrooms and segregating buses (Rodgers & Bullock 1972). Known as second-generation school discrimination (Bullock & Stewart 1978; Hochschild 1984; Meier, Stewart & England 1989), these include more subtle segregation strategies such as ability grouping, curriculum tracking, and the discriminatory use of suspensions and expulsions for minority group members (Meier et al. 1989). Finally, Orfield (2001) reports that there has been an increase in school segregation since 1988 that continues to the present.

While questions remain about the consequences of desegregation for academic achievement and intergroup attitudes and behavior, at least there has been no neglect of these issues. Yet scant attention has been paid regarding the impact that such desegregation efforts have had on school crime and violence.¹ This is somewhat surprising given the notion, which has a long-established tradition in sociological thought, that social and economic inequality has criminogenic consequences for African Americans and other minority groups. Since Merton's (1938) anomie theory, sociologists have explored the consequences of structured disadvantages for racial and ethnic minority groups on community crime rates. Indeed, the association between racial residential segregation patterns and community crime has been explored, albeit in a limited manner. Of these studies, most have found evidence that there exists some sort of relationship between racial segregation and increased crime rates (Sampson 1985; Messner & South 1986; Logan & Messner 1987; South & Felson 1990; Peterson & Krivo 1999; Shihadeh & Flynn 1996; Parker & McCall 1999). One of two explanations (or both) is generally applied to make sense of the finding of increased racial segregation generating higher crime rates: relative deprivation theory (Blau & Blau 1982) or a version of social control theory (Logan & Messner 1987). The former emphasizes how structured inequality generates crime by creating frustration and aggression among disadvantaged groups, while the latter focuses on the role that segregation plays
in weakening bonds between disadvantaged groups and the conventional normative structure that ordinarily serves to restrain self-serving tendencies.

Findings of an association between residential segregation and crime can serve as the basis of an inquiry into the association between school-based segregation patterns and school violence. Indeed, because schools are a complete social environments with pervasive influence on their students (Elliott, Hamburg & Williams 1998), an examination of the relationship between school segregation patterns and school violence is warranted. However, a quandary emerges in making predictions about the nature of the association between school segregation patterns and school violence — should the rate of school violence increase or decrease in desegregated schools, with other salient school and community factors remaining constant? The conundrum is derived from the two contributing bodies of literature: research finding a positive association between residential segregation and crime and research raising doubts about school desegregation efforts improving intergroup relations and attitudes in the short term. The latter concern is aptly captured by Schofield and Sagar’s review of research: “There is a growing awareness of the societal costs of intergroup hostility and stereotyping. It is clear that under many conditions interracial contact can lead to increased intergroup hostility. Hence, unless interracial schools are carefully planned there is a real possibility that they will exacerbate the very social tensions and hostilities that many initially hoped they would diminish” (1983:339; as cited in Forbes 1997:55). The salience of this observation for school violence is straightforward: if school desegregation exacerbates social tensions and hostilities among students, such hostilities would likely manifest themselves in school violence and disorder incidents (controlling for other relevant factors).

The analysis presented here offers a first attempt at answering the question of whether desegregation reduces or exacerbates the problem of school violence. Using statewide data from Florida’s school districts and census data, we examine whether variations in school segregation are associated with acts of school violence independent of other known correlates of school misbehavior. Because many school districts are in the process of altering desegregation plans that have been in place for years, exploring the effects of variations in the extent of school district segregation on school disorder could not be more timely.

Background

Identifying factors predictive of school crime and violence are of particular import, given recent tragedies that have taken place on our nation’s school campuses. Students carrying weapons to school, weapon-associated threats and assaults, robberies and fights are occurring at high levels at our schools (Elliott,
Hamburg & Williams 1998; Kingery, Coggeshall & Alford 1998), relative to other places. According to the Centers for Disease Control and Prevention, approximately half of the boys and one quarter of the girls surveyed reported being attacked by someone at school (CDC 1993). The school is the modal setting for violent acts of victimization among younger adolescents (ages 12-15) and second most common setting for violent acts besetting older (ages 16-19) teens (Simon, Crosby & Dahlberg 1999). Teacher victimization is also prevalent, with a recent Metropolitan Life Survey of the American Teacher (Harris & Assoc. 1999) finding that nearly one out of every six teachers reports being the victim of a violent act at school. Snyder and Sickmund emphasize the importance of the school setting in examining adolescent crime, stating, “There is no comparable place where crimes against adults were so concentrated” (1995:16). While there is some debate as to whether the problems of school crime and violence have risen in the past decade or not (Coggeshall & Kingery 2001; Furlong & Morrison 1996), the crisis of such malfeasance is not questioned.

Although researchers do not dispute the importance of explaining school crime, the issue of whether school factors contribute to such explanations is hotly contested. As stated by Laub and Lauritsen (1998), “Conventional wisdom holds that school violence is a reflection of violence in the broader social context, that is, violence is imported into a school by the students, and by intruders from the neighborhood surrounding the school” (p. 127). Menacker, Weldon, and Hurwitz (1990) further this notion by claiming that, since school characteristics and processes contribute little to delinquent proclivities among students, strategies designed to reduce or control crime should be directed at the community — the source of the problem. Welsh, Stokes and Greene (2000) note that although the irrelevancy of school characteristics to understanding school disorder is a popular belief among policy makers, it has rarely been subjected to empirical verification.

While systematic studies of the effects of school characteristics on school-level delinquency and violence are sparse, a significant body of literature exists that theoretically links certain school experiences and individual delinquency proclivities. Indeed, most generalist explanations of crime and delinquency assign central import to school and student experiences in understanding both differences in individual involvement and group differences in general offending rates. For instance, strain theorists have argued that that the school experience generates delinquency by evaluating youths negatively (A. Cohen 1955; Cloward & Ohlin 1960) and that crime may be an individual or collective solution to feelings of status frustration. Likewise, social-control theorists assert that schools are an important socializing institution that buttresses attempts by the family to teach adolescents to “buy into the system,” pursue conventional goals through legitimate pathways, and delay self-gratifying impulses (Hirschi 1969). Other scholarship has emphasized how school policy
and actors generate delinquency by forcing students into irrelevant curriculums (Polk & Schafer 1972; W.G. West 1981) or into tracks that reproduce social stratification (Polk & Schafer 1972; Kelly 1978). Studies that have focused on the role of the individual school experiences have found school failure to be a strong predictor of both official and self-reported criminal behavior (Empey & Lubeck 1971; Polk & Schafer 1972; W. G. West 1975; Gold 1978) as well as overall academic performance (Wolfgang, Figlio & Sellin 1972; D. West & Farrington 1977; Shannon 1982; Farrington 1991; LeBlanc 1994).²

Of the few studies that have attempted to assess the contributions of school factors on school disorder and violence (controlling for individual and/or community factors),³ the results have been mixed, with some studies finding school factors matter (Gottfredson & Gottfredson 1985; Hellman & Beaton 1986; Welsh et al. 2000; Felson et al. 1994) and other research reporting little support for this thesis (Baerveldt 1992; Sheley, McGee & Wright 1992) or mixed support (Welsh, Greene & Jenkins 1999). Additionally, the effect size of school factors (when they were found to be significant predictors of school crime and violence) is arguably small, although Gottfredson (2001) argues that this effect size is larger than the average effect size affiliated with school-based interventions. Finally, many of the prior studies of the association between school crime and school factors have focused on a single school district or a random sample of schools, limiting the generalizability of the study results. Thus, consideration of the consequences of school segregation on school violence must remain cognizant of the larger debate — that is, whether school factors or characteristics generally influence school violence.

Hypotheses

The aforementioned conundrum regarding the direction of an association between school segregation and school violence stems from the lessons learned from the two salient bodies of literature. The first, namely research examining the association between residential segregation and community crime and violence, has generally found positive associations between the two factors. The two prominent explanations of crime and delinquency mentioned before, strain and social control, can be interpreted as predicting an association between school differences in segregation and school violence. From a strain approach, segregation, as a form of perpetuating inequality, would likely produce the anger, frustration, and resentment that strain theorists identified as a critical factor in the process that leads one to engage in crime (e.g., Agnew 1992; Cloward & Ohlin 1960; Cohen 1955), especially if the segregation and resultant inequality was visible (i.e., relative deprivation theory). Alternatively, social-control theory implies that such visible school segregation would disable social
linkages between student and institution, reduce commitment to conventional pursuits, and increase self-gratifying behavior among students who have not been convinced that “playing by the rules” benefits them. Whether one accepts a strain or social control-based explanation, the logical hypothesis derived from this literature is obvious:

**Hypothesis 1**: The greater the segregation in a school system, the greater is the rate of school violence.

While the second salient body of literature, namely research examining the consequences of desegregation in schools on intergroup relations and behaviors, has not specifically examined any linkage between segregation and crime, the collective findings have clear implications for examining such an association. Research in this vein is organized around testing Allport’s (1954) contact hypothesis. While significant qualifications and weaknesses have been articulated (e.g., Amir 1969; Brewer & Miller 1984), the core notions of his hypothesis has served as the catalyst for most of these studies. Allport qualifies his basic thesis that increased intergroup contact will serve to reduce prejudice and hostility between groups; only under conditions of equal status between the two groups, cooperative dependence upon each other, striving for a common goal, and with institutional and/or normative support, should we expect the contact hypothesis to be valid (Pettigrew 1971; see also Forbes 1997). Unfortunately, in most desegregated school systems, these conditions are rarely met. African American students typically come from disadvantaged backgrounds, including deeply segregated; communities. School administrators and teachers may actively fight desegregation efforts, using aforementioned second-generation school discrimination strategies to effectively re-segregate (and perpetuate intergroup status differences as a result) and such school environments may enhance competition, rather than reduce such rivalries. Indeed, schools may serve to reproduce social inequality between groups by the differential distribution of knowledge and skills (Oakes 1985). The failure to meet the conditions set forth by Allport (1954) and elaborated on by Pettigrew (1971) and others has been used to explain why some research has found *increases* in prejudice and hostilities following desegregation (Cohen 1975; Forbes 1997; St. John 1975; Stephan 1978; Schofield 1986, 1991; Stephan & Stephan 1996). Desegregation can magnify and intensify existing processes, according to Pettigrew (1971) — under the right circumstances it can reduce hostilities and prejudice, but under the wrong conditions it will amplify such conflict. Furthermore, Patchen (1982) reports that unfriendly contact in desegregated schools may increase as a function of the relative proportion of the minority — if the minority group is small in number, the issue of which group dominates the school is settled. But as the proportion of minority students rises to 49-50%, there is a corresponding rise in unfriendly intergroup conflict as a function of conflict over which group will dominate the school
(as cited in E. Cohen, 1984). Hence, greater desegregation in a school district
may give rise to more violent behavior in the form of turf battles.

The notion that under the “wrong” conditions — unequal status between
groups, a competitive environment, and a lack of normative or institutional
support for integration — hostilities and conflict would increase provides an
alternative hypothesis for the association between segregation and school
violence:

Hypothesis 2: The greater the desegregation in a school system, coupled with
greater group inequality, the greater is the rate of school violence.\(^4\)

Hence, if this hypothesis was valid, we would expect that a positive relationship
between desegregation and school violence would exist and that this
association would be amplified in conditions of greater community inequality
between blacks and whites.\(^5\) These hypotheses will be tested by examining the
association between school violence levels and the extent of segregation in
school systems for public schools in the state of Florida, controlling for
additional school and community factors that may be salient predictors of
violence in schools. Our analysis also provides, to the best of our knowledge,
the first statewide analysis of the association between school characteristics and
school violence.

Methods

Data

The data for these analyses were obtained from the Florida Department of
Education (2000a, 2000b) and the Bureau of the Census (2001). There are 67
public school districts, one for each county, in the state of Florida, serving more
than 2.3 million students. Significant changes have occurred in the student
population in the state, with a 54.5% increase in the student population from
1976–99 and an increase of 139% in the number of minority students during
this period (FDOE 2002). Indeed, Florida has the highest average enrollment
for its elementary schools in the nation (FDOE 2002), with a mean of 777
students per school. We use data from the Florida Schools Indicators Report
(2000a) and the School Advisory Council Reports (FDOE 2000b) for the
academic year 1999–2000 for information on school characteristics and disorder
incidents. The Florida Department of Education collects comprehensive
information on various factors (FDOE 2000b) from each school district for every
single school during scheduled survey periods throughout the academic year.\(^6\)
We examine only the public middle and high schools in Florida because prior
research suggests that the bulk of violent school crime occurs on these
campuses.\(^7\)

We exclude 27 counties/school districts (out of 67) on the basis of both
empirical and logical grounds. The 27 school districts represent rural, sparsely
populated counties. Including these school districts in the analyses is problematic because they are comprised of few middle and high schools. Modeling equations for districts with few schools becomes daunting, particularly if the number of parameters to be estimated exceeds the number of units (schools) in a given district (unless the coefficients for the level 1 variables are fixed); there exists the potential of a lack of variability among these school districts for level 1 variables. Hence, we exclude all districts/counties whose sum total of high schools and middle schools is less than five (i.e., less than 5 level-1 units), a strategy that is common among multilevel studies of schools (e.g., Lee et al. 1998; Lee & Smith 1995). Furthermore, this lack of variability may distort relationships between critical predictor variables and crime rates. School districts with only one high school and two middle schools are logically much less likely to have severely segregated school districts (especially given our measure of racial segregation, to be discussed shortly), since these districts have little opportunity to segregate at the school level due to the low number of units (schools). The analyses that are the subject of the paper include 740 schools (317 high schools and 423 middle schools) across 40 school districts/counties. Forty level 2 groups provide sufficient power for detecting any cross-level associations (Kreft & DeLeeuw 1998).

**Dependent Variable**

School violence incidents reported by each of the schools in the state of Florida in the 1999-2000 school year is the dependent variable. These incidents include those crimes that occur on school property. While such incidents represent an incomplete picture of school violence, neglecting all events that fail to get reported to the state or detected by school officials, this measure does capture relatively serious events and has been used before to examine between-school differences in such activity (Welsh et al. 2000). Additionally, the state of Florida established statewide guidelines for reporting behaviors that occur on school property, which should minimize (although not eliminate) concerns about variability in reporting practices. The National Center for Education Statistics has recognized Florida's incident data collection system as a model for school safety data collection (FDOE 2001) and the state has developed and delivered training sessions to facilitate accurate and reliable reporting of school crime incidents, including the production and dissemination of a CD-ROM training guide, complete with video clips of incidents and a self-assessment test.

Included among the violent incidents are the following types of acts: homicide, rape, robbery, assault, fighting, and harassment. Unfortunately, the state of Florida does not provide violent crime data disaggregated by the race of the victim or the offender. Hence, we cannot discern whether or not differences in the violent crime rate across schools represents differences in interracial (white offender-black victim; white victim-black offender) and/or
intraracial (white-white; black-black) violence. However, some research has found a positive association between segregation and community crime that does not disaggregate crime into inter- versus intraracial categories (Logan & Messner 1987; see also Shihadeh & Flynn 1996). Furthermore, controlling for percent black in all the analyses provides some context for evaluating the dynamics between the majority and minority groups in the school. Finally, it is not clear from the salient school desegregation literature whether to expect increases in white-black violence and/or black-white violence. Nonetheless, we acknowledge that our inability to disaggregate violent acts into their respective victim-offender dyads is a limitation to these analyses.

**INDEPENDENT VARIABLES**

**School Characteristics**

Consistent with recent research examining the association between school factors and school crime (Welsh et al. 1999, 2000), this analysis includes previously utilized measures of the different characteristics that comprise school climate. School climate refers to those distinct characteristics that serve to define the parameters of appropriate behavior among its constituents. Therefore, variations in school climate (and the characteristics that define a particular school climate) would be predictive of variations in the rates of inappropriate behavior among students attending a particular school. Important aspects of a school (in defining its school climate) include its culture (values, norms, and attitudes that characterize interactions, including clarity of rules and enforcement practices), organizational structure (administrative structure, including salaries, class size, student-teacher ratio, overall school enrollment), social milieu (background characteristics of school constituents), and ecological environment (physical dimensions of the building and grounds) (Anderson 1982; Welsh et al. 2000). Such factors have been theorized to influence the level of school disorder in that institution, independent of individual and community context factors, in fairly predictable ways (see Welsh et al. 2000 for an extended discussion).

We use three measures to capture school culture: the percentage of students absent 21 or more days (*student absenteeism*), the school dropout rate from the prior school year and the percent of students (tenth graders in high school and eighth graders in middle schools) who scored level 3, 4, or 5 on the Florida Comprehensive Achievement Test (FCAT) — scores below a 3 are considered unacceptable according to state standards. School attendance rates and dropout rates have been argued elsewhere as measures of student attachment to school and belief in conventional rules, two important aspects of school culture (Welsh et al. 2000). Likewise, academic achievement, as measured by standardized tests such as the FCAT, may also capture a student's attachment
<table>
<thead>
<tr>
<th><strong>School level factors</strong></th>
<th>Mean</th>
<th>S.D.</th>
<th>Min</th>
<th>Max</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violent crime</td>
<td>9.42</td>
<td>14.41</td>
<td>.00</td>
<td>111.98</td>
<td>Number of violent incidents (including violent acts against persons and weapons possession) reported to the state, divided by the number of students enrolled in the school, multiplied by 1,000</td>
</tr>
<tr>
<td>School culture</td>
<td>.02</td>
<td>.99</td>
<td>-2.52</td>
<td>5.19</td>
<td>Factor scores extracted from principal components analysis of following measures: (1) percent of students absent 21 days or more; (2) percent of students (8th and 10th graders) who scored at a satisfactory level (3, 4, or 5) in the Florida Comprehensive Achievement Test (FCAT); and (3) percent of students who dropped out in the prior school year</td>
</tr>
<tr>
<td>School organizational structure</td>
<td>.09</td>
<td>.93</td>
<td>-3.90</td>
<td>3.19</td>
<td>Factor scores extracted from principal components analysis of following measures: (1) Total number of students enrolled (as of October of the school year); (2) average class size of language arts and math classes; and (3) factor scores extracted from principal components analysis of average expenditures per regular and exceptional student</td>
</tr>
<tr>
<td>Teacher social milieu</td>
<td>.00</td>
<td>.91</td>
<td>-2.95</td>
<td>4.47</td>
<td>Factor scores extracted from principal components analysis of following measures: (1) percent of teachers with a masters degree; (2) average number of years of teaching experience</td>
</tr>
<tr>
<td>African-American</td>
<td>.25</td>
<td>.22</td>
<td>0</td>
<td>.99</td>
<td>Percentage of students enrolled who are African American</td>
</tr>
<tr>
<td>School code</td>
<td>.43</td>
<td>.50</td>
<td>0</td>
<td>1</td>
<td>Dummy coded measure of level of school (0 = middle school; 1 = high school)</td>
</tr>
</tbody>
</table>

*(n = 740 schools; n = 40 districts/counties)*
TABLE 1: Descriptive Statistics: School, School District, and County Variables (Cont’d)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D.</th>
<th>Min</th>
<th>Max</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>District-county level factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index of dissimilarity—school district</td>
<td>.37</td>
<td>.12</td>
<td>.13</td>
<td>.68</td>
<td>The proportion of all students (white and black) who must be transferred in order for the percent African American in each school to be equivalent to the percent African American in the entire school district</td>
</tr>
<tr>
<td>Index of racial inequality</td>
<td>.01</td>
<td>.96</td>
<td>-1.78</td>
<td>2.48</td>
<td>Factor scores extracted from principal components analysis of following measures: (1) the index of dissimilarity for black-white residential patterns for a county; and (2) the ratio of county median household income for non-Hispanic whites by blacks’ median household income; (3) the ratio of county black to non-Hispanic white adult male jobless rate; and (4) the ratio of county non-Hispanic white to black adults who are high-school graduates. Larger numbers indicate greater racial inequality</td>
</tr>
<tr>
<td>Population density</td>
<td>348.45</td>
<td>353.93</td>
<td>24.39</td>
<td>1516.4</td>
<td>Number of people residing in a county divided by number of Square miles in a county</td>
</tr>
<tr>
<td>Index crime rate</td>
<td>4958.72</td>
<td>1650.0</td>
<td>2352.8</td>
<td>9094.5</td>
<td>Number of index crimes reported by law enforcement agencies in each county for 1999, divided by the county population and multiplied times 100,000</td>
</tr>
</tbody>
</table>

(n = 740 schools; n = 40 districts/counties)

In order to reduce concerns about multicollinearity and the need for parsimony, we employ a principal-components analysis to extract a factor representing school culture.  

\(^8\)
Higher scores on this factor represent lower levels of attachment and commitment to school.

We include three measures to capture school organizational structure: school size, average class size, and per pupil expenditures. Each has been found to be predictive of school crime and disorder (Gottfredson & Gottfredson 1985). School size, measured in our study by total school enrollment, has been argued to be associated with school crime from a social-control perspective. Larger schools are more difficult to monitor and hence, all things being equal, provide more opportunities for motivated offenders to commit criminal acts (Toby 1983; Welsh et al. 2000). Average class size (obtained by measuring language arts and math classes) is related to school crime because of both decreased supervision and quality and diminished attention paid to individual students in larger classes (Gottfredson & Gottfredson 1985). Resources should affect the quality of the learning experience, as well as supervision capabilities. Our study considers a measure of per pupil expenditures to capture resource differences. As was the case with school culture, we employ a principal components analysis to extract a factor representing school organizational structure. Higher scores on this factor represent lower levels of resources invested per pupil.

We consider two aspects of the social milieu of the school district: percent black students and teachers’ milieu. The latter was extracted using principal-components analysis from two measures of teachers’ characteristics: percent of teachers with master’s degrees and average number of years teaching experience of the faculty. Both of these measures have been suggested as pivotal aspects of the social milieu (Anderson 1982).

**District/County Level Variables**

We examine the influence of two important community characteristics in our analyses: population density and the county level index crime rate. Density has been found to be predictive of overall crime patterns (Sampson 1985; Messner & South 1986; Logan & Messner 1987; Peterson & Krivo 1999; South & Felson 1990; Shihadeh & Flynn 1996), while the index crime rate is a proxy for other community-level factors that may influence a school’s crime rate.

**School Segregation**

The measure of school-district segregation is the index of dissimilarity. As a measure of segregation, it is the proportion of students (white versus black) who must be transferred in order for the percent black in each school to be equivalent to the percent black in the entire school district.
Racial Inequality Measure

We examine four factors salient to race-based group inequality: residential segregation, economic inequality, unemployment, and educational attainment. *Residential segregation,* measured by the index of dissimilarity for the community (county), is the proportion of residents (white versus black) who must move in order for the percent black in each census tract in the county to be equivalent to the percent black in the entire county. Prior explorations have established an array of adverse consequences stemming from residential segregation, including lessened “prospects for employment, for public services, for educational advancement, for appreciation in home values, and more” (Logan & Messner 1987:510). Further, past research has established a strong connection between racial residential segregation and the concentration of African American disadvantage (Krivo et al. 1998; Massey & Denton 1993; Massey, Eggers & Denton 1994) and that such segregation advantages whites (Krivo et al. 1998). *Interracial economic inequality* is captured as the ratio of white-to-black median household income for each county. *Unemployment* is also expressed as a ratio of black-to-white jobless (unemployed or out of the labor force) rates for adult males, as is *educational attainment,* which is the white-to-black ratio of the percentage of adults who are high school graduates. Because of concerns about multicollinearity and the need to concisely capture racial inequality with a single measure, we employ a principal-components analysis to extract a single factor representing inequality. Higher scores on this factor represent greater inequality between blacks and whites in a given county.

We argue that if the second hypothesis has merit, it will be in the context of intergroup inequality. Therefore, we model an interaction term examining the product of the school segregation measure and the group inequality measure. Table 1 presents the descriptive information for each of the variables considered in these analyses, while the Appendix provides the correlation matrices for the level 1 and level 2 variables.¹⁴

Results

We use hierarchical models to analyze school violence rates. Such multilevel models are appropriate to estimate the influences of both school-level and district/county-level variables (Bryk & Raudenbush 1992; Kreft & DeLeeuw 1998). The failure to model the influences on school violence rates in such a way would obfuscate commonalities of schools within a school district or county, which violates the assumptions of OLS regression analyses. Multilevel models appropriately consider the error structures at both the school and school district/county level. Our multilevel models consist of a school-level equation and a district/county level equation (level 2). The intercept of the
TABLE 2: Hierarchical Linear Model ANOVA for Violent Crime

<table>
<thead>
<tr>
<th>Violent Crime Rate</th>
<th>Coefficient</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between school districts (grand mean)</td>
<td>8.92</td>
<td>1.18</td>
</tr>
<tr>
<td>Error variance components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between school districts/counties</td>
<td>40.71</td>
<td>170.97***</td>
</tr>
<tr>
<td>Within school districts/counties</td>
<td>176.43</td>
<td></td>
</tr>
<tr>
<td>Intraclass correlation</td>
<td>18.75%</td>
<td></td>
</tr>
</tbody>
</table>

*** p ≤ .001 (two-tailed tests)

Level 1 equation is modeled as a function of level 2 properties and a district/county level error term. The level 1 and level 2 equations are:

\[
Y = \beta_0 + \beta_1(\text{Culture}) + \beta_2(\text{Organization}) + \beta_3(\text{Milieu}) + \beta_4(\text{Pct Black}) + \varepsilon, \\
\beta_0 = \gamma_{00} + \gamma_{01}(\text{School Segregation}) + \gamma_{02}(\text{Index Crime}) \\
+ \gamma_{03}(\text{Density}) + \gamma_{04}(\text{Inequality}) + \gamma_{05}(\text{Inequality} \times \text{School Segregation}) + \varepsilon
\]

We begin our analyses by differentiating the amount of variation explained by school factors versus those explained by district/county level measures to assess the relative import of level 1 versus level 2 predictors. Table 2 presents the variance components from the unconditional models predicting school violence rates. As is the case with most multilevel analyses, most of the variation in the dependent variable is attributable to within school district differences rather than between districts. The intraclass correlation, which denotes the relative proportion of variation that is attributed to differences between school districts, is 18.75%. Hence, there exists significant variation across school districts to justify evaluating predictors of school violence at the district/county level.

Before we estimate a full model with both level 1 and level 2 predictors included, we examine a random coefficient model to determine if: (1) the level 1 predictors are associated with the dependent variable; and (2) each of the level 1 predictors (i.e., the intercept and the slopes) varies significantly across school districts. Thus, all of the level 1 predictors are allowed to randomly vary across districts, while no level 2 variables are included in the equation. Table 3 presents the results of these analyses.\(^{15}\)
### TABLE 3: Random Coefficient Model of School level effects on Violent Crime

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>S.E.</th>
<th>T-Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violent crime rate&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between school districts</td>
<td>13.59</td>
<td>1.34</td>
<td>10.10***</td>
</tr>
<tr>
<td>(grand mean)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within school districts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent African American</td>
<td>7.23</td>
<td>4.92</td>
<td>1.47*</td>
</tr>
<tr>
<td>School code</td>
<td>-9.43</td>
<td>1.04</td>
<td>-9.03***</td>
</tr>
<tr>
<td>School organization</td>
<td>-5.0</td>
<td>.94</td>
<td>-.53</td>
</tr>
<tr>
<td>School culture</td>
<td>3.31</td>
<td>.94</td>
<td>3.54***</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error variance components</th>
<th>Variance</th>
<th>$\chi^2$</th>
<th>DF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between school districts</td>
<td>43.12</td>
<td>140.41***</td>
<td>39</td>
</tr>
<tr>
<td>Percent African American</td>
<td>246.53</td>
<td>45.26</td>
<td>39</td>
</tr>
<tr>
<td>School organization</td>
<td>12.12</td>
<td>61.30*</td>
<td>39</td>
</tr>
<tr>
<td>School culture</td>
<td>11.53</td>
<td>52.07</td>
<td>39</td>
</tr>
<tr>
<td>Within school districts</td>
<td>140.97</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> School code variance fixed at zero; teacher social milieu excluded from analysis; percent African American grand mean-centered.

* p ≤ .05 (two-tailed tests)  ** p ≤ .01 (two-tailed tests)  *** p ≤ .001 (two-tailed tests)

The results revealed that while percent African American, school culture, and school code are significant predictors of school violence, the coefficient for school organization fails to reach statistical significance. Furthermore, none of the slopes for the significant level 1 predictors appears to vary significantly across school districts. Thus, we fix the effects of both percent African American and school culture in the full model to conserve degrees of freedom.

Table 4 presents the model that contains the significant school-level predictors (derived from the random-coefficients model) and the district/county predictors. The results of the school predictors on violent crime are similar to the random-coefficient model — percent African American, school code, and school culture are significant predictors of a school's violent crime rate. Schools with a greater percentage of students being African American, middle schools, and schools exhibiting weaker attachment and commitment of the student body to the school have higher violent crime rates.

Of the school district/county factors, the index crime rate was found to have a significant direct association with school violence — higher levels of crime in the community are correlated with greater rates of violence at schools in those communities. Likewise, school district segregation was found to have a significant inverse association with the rate of school violence in a model that
TABLE 4: Hierarchical Linear Model of School and School District/County level effects on Violent Crime Rate

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>S.E.</th>
<th>T-Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violent crime rate*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between school districts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grand mean</td>
<td>14.04</td>
<td>1.12</td>
<td>12.55***</td>
</tr>
<tr>
<td>School district segregation</td>
<td>-26.02</td>
<td>10.20</td>
<td>-2.55*</td>
</tr>
<tr>
<td>Racial inequality</td>
<td>6.91</td>
<td>3.18</td>
<td>2.17*</td>
</tr>
<tr>
<td>Index crime rate</td>
<td>.001</td>
<td>.00</td>
<td>1.80†</td>
</tr>
<tr>
<td>Population density</td>
<td>-0.02</td>
<td>0.003</td>
<td>-.68</td>
</tr>
<tr>
<td>Segregation * inequality</td>
<td>-13.01</td>
<td>7.46</td>
<td>-1.74†</td>
</tr>
<tr>
<td>Within school districts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent African American</td>
<td>6.02</td>
<td>2.82</td>
<td>2.17*</td>
</tr>
<tr>
<td>School code</td>
<td>-9.20</td>
<td>1.00</td>
<td>-9.13***</td>
</tr>
<tr>
<td>School culture</td>
<td>2.69</td>
<td>.62</td>
<td>4.37***</td>
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</tbody>
</table>

Error variance components

<table>
<thead>
<tr>
<th></th>
<th>Variance</th>
<th>X²</th>
<th>D.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between school districts</td>
<td>26.08</td>
<td>140.01***</td>
<td>34</td>
</tr>
<tr>
<td>Within school districts</td>
<td>152.97</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* School code, percent African American, and school culture variance fixed at zero; percent African American, index crime rate, population density and school district segregation grand mean-centered.

† p ≤ .10 (two-tailed tests)  * p ≤ .05 (two-tailed tests)  ** p ≤ .01 (two-tailed tests)  *** p ≤ .001 (two-tailed tests)

excluded the interaction term. The strong inverse association between school-district segregation and the rate of school violence casts doubts on the validity of the first hypothesis, derived from the literature on residential segregation and community crime, that increasing segregation should be associated with increasing school crime rates. Instead, the second hypothesis is supported by these data: increasing levels of school segregation are associated with decreases in school violence, and the level of racial inequality in the community conditions the inverse relationship between school segregation and school violence (p < .1). In conditions in which students live in racially stratified communities but attend integrated schools, this model predicts the highest violent crime rates. Indeed, this finding is wholly consistent with prior research that finds intergroup contact may exacerbate feelings of frustration and prejudice between groups if the groups are unequal in status (Pettigrew 1971).

Under conditions of greater racial inequality in a county, the magnitude of the association between school segregation and violent crime is larger. Figure
1 displays the expected value of the middle school violent crime rate for different values of school district segregation in the context of low (−1 and −2 standard deviations) and high (+1 and +2 standard deviations) levels of racial inequality (all other values are at their respective grand means). Under conditions of relatively low racial inequality (i.e., −1 standard deviation), the expected value of middle school violent crime rate is 9.03 acts per 1000 students if the school district has relatively low levels of segregation (i.e., one standard deviation below the mean). However, the same level of school district segregation under conditions of a relatively high degree of racial inequality (+1 standard deviation above the mean) produces an expected value of almost three times the rate of the prior example: 25.29 acts per 1000 students.

Finally, the inclusion of the school district/county measures was found to explain a significant proportion of the between-district variance in the intercept for violent school crime. Comparing the variance components for the intercept term in Table 3 with its estimate in Table 4, we find that the addition of the segregation measures produces a 39.5% (43.12 − 26.08/43.12) reduction in variance of district level mean school violence.

Discussion and Conclusion

This research represents the first detailed effort to consider the influence of school-based segregation patterns on school violence.17 While prior research has demonstrated that residential segregation patterns are associated with index crime rates (Sampson 1985; Messner & South 1986; Logan & Messner 1987; South & Felson 1990; Peterson & Krivo 1993; Shihadeh & Flynn 1996), school segregation patterns have not been examined to assess their relationships with school violence rates, despite compelling reasons to examine such patterns of inequality. While research examining the association between residential segregation and violent crime has generally established a positive relationship between the two, other research on the consequences of desegregating schools inspires an alternative thesis. Based on research testing the contact hypothesis (i.e., that intergroup exposure will reduce intergroup conflict and hostilities), studies of school desegregation efforts have found that under conditions of racial inequality, desegregation may exacerbate rather than reduce intergroup hostility and conflict (Cohen 1975; St. John 1975; Stephan 1978; Schofield 1986, 1991; Stephan & Stephan 1996; Forbes 1997). Our research represents the first examination of these competing hypotheses as applied to school violence, to assess whether conditions of school desegregation serve to increase or decrease intergroup hostilities, in the form of violent crime. And given the recent decisions occurring nationwide to release school districts from court-ordered desegregation, the timeliness of this research cannot be understated.
The results of our analyses found that contrary to the original contact hypothesis, lower levels of school district segregation were found to correspond to higher levels of violent crime in the schools. Further, our research provides further validation to the work of Pettigrew (1971) and others that suggest that under the “wrong” conditions, desegregation can have unintended consequences. This is corroborated by the finding that the inverse relationship between the level of segregation in a school district and the school violent crime rate was amplified under conditions of greater racial inequality.

As was the case with prior studies, our findings also suggest that school social milieu and cultural factors do matter in explaining differences in school disorder, even if their cumulative effects are modest in size. A factor representing school culture derived from such measures as student absenteeism, dropout rates and academic competency (as measured by standardized tests) provide support for the notion that schools that exhibit lower levels of commitment to academics and the mission of schooling have greater violence rates. Also, the social milieu of the school was found to be a significant predictor of variation in violence rates in the same direction as previous research has demonstrated. Percent African American was found to be positively associated with the dependent variable.

While our findings contribute to our understanding of how segregation and inequality within the community and within our school systems can have meaningful associations with the rate of violence in our schools, there are some obvious limitations to our inquiry. First, these findings were derived from cross-sectional analyses of school factors and violent crime measured during the same academic year. Therefore, we cannot assess the causal order of the associations. For instance, it is clearly plausible that schools with high rates of violent crime would be stressful places to learn and work; hence, we should expect that as a consequence of school violence, students would be less attached and committed to the school. Indeed, it is plausible that such associations are reciprocal in nature; further research should attempt to assess the bi-directionality of such relationships. Additionally, the consequences of school segregation may be cumulative, so that the experience of being segregated may not manifest itself contemporaneous with the measurement of such differences in segregation, but rather by examining its consequences for students over time (see Mickelson 2001). Indeed, Schofield (1995) notes that there is some evidence to support the notion that desegregation may have positive long-term attitudinal and behavioral consequences that are not captured in research investigating short-term associations, such as these analyses. The limitations of our measure warrant further consideration, using better measures of the cumulative effects of segregated learning environments on school disorder.

Furthermore, our analysis does not consider the influence of forms of segregation that occur at lower levels than the district. Known collectively as second-generation school discrimination (Bullock & Stewart 1978; Hochschild
1984; Meier, Stewart & England 1989), such practices as ability grouping, curriculum tracking, the discriminatory use of suspensions and expulsions for minority group members (Meier, Stewart & England 1989) or even employing room dividers in classrooms and segregating buses (Rodgers & Bullock 1972) may be taking place in districts that appear to be more desegregated at the district level. That is, our data do not permit any description about the process of integration within a school district, only that some school districts are more desegregated than others. It is entirely possible that critical experiences of segregation and inequality are being experienced in the classrooms and within schools that are desegregated, while, on the other hand, students attending segregated schools are not being exposed to such obvious methods of segregation that may invoke the feelings of detachment, frustration, and anger that would link segregation to school disorder. Indeed, our findings provide
little insight into why such forms of segregation are associated with school violence. While the present research has established an association between segregation measures and school violence, we are dependent upon prior scholarship to interpret these effects in order to gain insight into process.

Finally, it is important to reiterate that the percent of variance unexplained in these analyses, at both the school and district/county levels, remains significant. Hence, the models probably exclude important factors that contribute to a school’s violence rate. Further research would further illuminate the relationships assessed in these analyses.

Despite these caveats, our findings suggest that segregation and racial inequality, both in the community and in the school system, has consequences for the level of violence in our schools. It is clear from these analyses that desegregation efforts may increase hostilities and conflict rather than ameliorate, particularly under conditions of structured inequality in the community. We are not, however, suggesting that integration efforts should be dismissed, but rather that efforts to desegregate school districts, particularly among those students who come from relatively highly segregated and racially stratified communities, need to consider how group differences may exacerbate group conflicts and hostilities. Indeed, other research examining the consequences of desegregation efforts has made note of the difference between desegregation and integration, with the latter referring to more than simply mixing groups (often forced); it includes interventions designed to promote interactions of a positive nature (Forbes 1997; Schofield 1991). Further research is necessary to explore how school climate and community characteristics coalesce to explain variation in school violence and how changes in school composition and integration may influence differences in such behavior as well.

Notes

1. While there has been little attention paid to the effects of desegregation on school crime, a few studies do examine the association between desegregation and disciplinary actions (Larkin 1979; Meier, Stewart & England 1989; Thornton & Trent 1988). However, the focus of these works is on whether disciplinary actions are being used in a discriminatory manner, with no consideration of the pattern of student behavior underlying the disciplinary actions.

2. More recent evidence suggests that the association between educational performance and delinquency may be spurious (Olweus 1983; Loeber & Maguin 1993), but the results are far from unequivocal (Gottfredson 2001).

3. Gottfredson (2001) notes that studies that do not isolate school and community contextual effects in their analyses “provide only a combined estimate of the two effects” (p. 68).
4. While schools are clearly a context that cultivates competition over valued resources (i.e., academics, social status), we are unable to measure the degree of institutional and/or normative support for integration in the school districts under examination. However, it is quite consistent with the aforementioned scholarship to expect, in the context of unequal status and resources between the groups, that desegregation would enhance intergroup conflict.

5. It should be noted that there were no counties in which African Americans had approached equality to whites in any of the measures that we considered to capture inequality. Hence, one could argue that the necessary condition for testing hypothesis 2 (under conditions of group inequality) was met across all schools. However, we extend this logic to examine whether the degree of racial inequality moderates the relationship between school segregation and violence. Additional analyses (not reported) that had measures of racial inequality excluded did not significantly alter the findings of an association between school segregation and violence.

6. For more information on the FSIR, see http://info.doe.state.fl.us/fsir2001/sources.html.

7. We exclude alternative schools from consideration because these populations are largely comprised of students who have engaged in significant delinquency or school disorder already; some of these school's crime rates are, not surprisingly, extremely high.

8. Results of principal components analyses available upon request.

9. Three sets of first-order principal components factor analysis were conducted to provide factor scores representing FCAT score performance (extracted from percent passing FCAT reading and math achievement tests), factor scores representing class size (extracted from average class size of math and language arts classes in the respective school), and factor scores representing per pupil expenditures (extracted from regular and exceptional student per-pupil expenditures).

10. Because some school districts/counties in Florida have relatively large proportions of students of Hispanic ethnicity, additional analyses were conducted, including percent Hispanic students as a level-1 measure and a school index of dissimilarity capturing the segregation of Hispanic students relative to whites as a level-2 measure. The level-2 measure was not found to be a significant predictor in any of the models. Additional analyses including these measures are available upon request.

11. We originally considered as a proxy for the ecological environment of the school, a measure of school operating costs. The argument in favor of this measure was that such expenditures may be partially related to both the overall condition and upkeep of the premises and the use of security measures and monitoring technology. However, our initial analyses suggested collinearity with per-pupil expenditures, so this measure was excluded from subsequent analyses. This omission did not alter the nature of the relationships between the other predictors and the dependent variables.

12. The level 2 measures (except for the school district segregation measure and the Index Crime Rate) were derived from 2000 Census data.

13. Prior to the analyses reported in this article, we conducted an OLS regression analysis of the school-district violent crime rates (regressed on all the level 2 predictors) to look for evidence of multicollinearity, particularly between the segregation measure and the
group inequality index. None of the Variance Inflation Factors approached 4, suggesting that collinearity was not a major concern.

14. We employed Cook’s Distance to identify influential cases. The largest statistic was for Port St. Lucie High School (0.129), which suggests that there are no significant influential cases in these analyses.

15. Prior to the analyses reported in Table 3, we conducted a series of analyses with each of the level 1 predictors included in separate models to determine if the factors had a significant association with the dependent variable. Additional analyses also included all level 1 predictors in a full random coefficients model for the dependent variable. One variable, teaching milieu, failed to reach statistical significance in either sets of models and was excluded from the model analyzed and reported in Table 3.

16. We mention this finding of a main effect in a model excluding the interaction term for those readers who would argue that the condition of inequality is met in all schools included in the analysis, in which case an interaction term would not be necessary to test the alternative hypothesis.

17. Gottfredson and Gottfredson (1985) did consider the effect of the implementation of court-ordered desegregation or busing in predicting student and teacher victimization, but not differences in segregation per se.

References
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## APPENDIX: Correlation Matrices: School-level and District/County-Level Variables

<table>
<thead>
<tr>
<th>Percent Black</th>
<th>Culture</th>
<th>Organization</th>
<th>Teaching Milieu</th>
<th>School Code</th>
<th>Violent Crime Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent black</td>
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<td>0.508</td>
<td>0.444</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Culture</td>
<td>0.508</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>0.444</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching milieu</td>
<td>0.140</td>
<td>0.104</td>
<td>0.354</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>School code</td>
<td>0.104</td>
<td>0.354</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violent crime rate</td>
<td>0.206</td>
<td>-0.122</td>
<td>-0.197</td>
<td>-0.263</td>
<td>1.000</td>
</tr>
<tr>
<td>Index Crime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index Density</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Inequality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Segregation (Schools)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Level 2 Variables

| Index crime rate | 1.000   |     |     |
| Population density | 0.497   | 1.000 |
| Group inequality index | 0.218   | 0.008  | 1.000 |
| Segregation (school-based) | 0.362   | 0.362 | 0.256 | 1.000 |