



Understanding the Linkages between Racial/Ethnic Discipline Gaps and Racial/Ethnic Achievement Gaps in the United States

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Citation: Gopalan, M. (2019). Understanding the linkages between racial/ethnic discipline gaps and racial/ethnic achievement gaps in the United States. *Education Policy Analysis Archives*, 27(154).
<https://doi.org/10.14507/epaa.27.4469>

Abstract: This study estimates racial/ethnic discipline gaps, using multiple measures of school discipline outcomes, in nearly all school districts in the United States with data collected by the Office of Civil Rights between 2013 and 2014. Just like racial/ethnic achievement gaps, discipline gaps also vary substantially, ranging from negative to greater than two standard deviations, across districts. However, unlike the correlates of racial achievement gaps, the extensive set of district-level characteristics available in the Stanford Education Data Archive (SEDA) including economic, demographic, segregation, and school characteristics, explain roughly just one-fifth of the geographic variation in Black-white discipline gaps and one-third of the variation in Hispanic-white discipline gaps. This study also finds a modest, statistically significant, positive association between discipline gaps and achievement gaps, even after extensive covariate adjustment. The results of this analysis provide an important step forward in determining the relationship between two forms of persistent inequality that have long plagued the U.S. education system.

Keywords: school discipline; achievement gap; discipline gap; race; ethnicity

Comprender las conexiones entre las brechas de disciplina racial / étnica y las brechas de logros raciales / étnicos en los Estados Unidos

Resumen: Este estudio estima las brechas de disciplina racial / étnica, utilizando múltiples medidas de resultados de disciplina escolar, en casi todos los distritos escolares en los Estados Unidos con datos recopilados por la Oficina de Derechos Civiles entre 2013 y 2014. Al igual que las brechas de rendimiento racial / étnico, Las brechas disciplinarias también varían sustancialmente, desde negativas hasta mayores de dos desviaciones estándar, entre distritos. Sin embargo, a diferencia de los correlatos de las brechas de rendimiento racial, el extenso conjunto de características a nivel de distrito disponibles en el Archivo de Datos Educativos de Stanford (SEDA), incluidas las características económicas, demográficas, de segregación y escolares, explican aproximadamente solo un quinto de la variación geográfica en Brechas disciplinarias en blanco y negro y un tercio de la variación en las brechas disciplinarias hispano-blancas. Este estudio también encuentra una asociación modesta, estadísticamente significativa y positiva entre las brechas disciplinarias y las brechas de logros, incluso después de un amplio ajuste de covariables. Los resultados de este análisis proporcionan un importante paso adelante en la determinación de la relación entre dos formas de desigualdad persistente que durante mucho tiempo han afectado al sistema educativo de EE. UU.

Palabras-clave: disciplina escolar; brecha en el rendimiento; brecha disciplinaria; raza; etnia

Compreender as conexões entre lacunas de disciplina racial / étnica e lacunas de desempenho racial / étnico nos Estados Unidos

Resumo: Este estudo estima lacunas de disciplina racial / étnica, usando vários resultados dos resultados da disciplina escolar, em quase todos os distritos escolares dos Estados Unidos, com dados coletados pelo Escritório de Direitos Civis entre 2013 e 2014. lacunas nas conquistas raciais / étnicas As lacunas disciplinares também variam substancialmente, de negativos a mais de dois desvios-padrão, entre os distritos. No entanto, diferentemente dos correlatos das lacunas nas realizações raciais, o extenso conjunto de recursos em nível distrital disponíveis no Stanford Educational Data Archive (SEDA), incluindo características econômicas, demográficas, de segregação e escolares, explicam aproximadamente apenas um quinto da variação geográfica nas lacunas disciplinares em preto e branco e um terço da variação nas lacunas disciplinares hispânico-brancas. Este estudo também encontra uma associação modesta, estatisticamente significante e positiva entre lacunas disciplinares e lacunas de desempenho, mesmo após um amplo ajuste de covariáveis. Os resultados desta análise fornecem um importante passo à frente na determinação da relação entre duas formas de desigualdade persistente que há muito afetam o sistema educacional dos EUA. UU.

Palavras-chave: disciplina escolar; lacuna de desempenho; lacuna disciplinar; raça; etnia

Introduction

Nearly 2.7 million public school students in the United States received one or more out-of-school suspension in the academic year (AY) 2015-16 (U.S. DOE Office for Civil Rights [OCR], 2018). The overall levels of adverse disciplinary events—such as in-, out-of-school suspensions, and expulsions—declined over the last few years; however, the “discipline gap” remains stark. While Black male students represented just 8% of enrolled students, they accounted for 25% of all students who received an out-of-school suspension. Similarly, Hispanic male students who form 13% of all

student enrollment, nevertheless accounted for 15% of all students who received an out-of-school suspension. In contrast, white male students accounted for 24% of all students who received an out-of-school suspension despite forming one-fourth of all enrollment in the country in AY 2015-16 (U.S. Department of Education OCR, 2014; 2016). These disproportionalities linger across gender, special education status, and across other school discipline outcomes such as in-school suspensions, law-enforcement referrals, and expulsions. Yet, there is no consistent national-level analysis of the patterns, trends, and correlates of these racial/ethnic discipline gaps across the country.

These discipline gaps—disparities in rates of suspension/expulsion/law-enforcement referral across different racial/ethnic subgroups—are reminiscent of the widely acknowledged racial/ethnic achievement gaps—differences in average standardized test scores of students across different racial/ethnic subgroups. Specifically, stubborn Black-white and Hispanic-white achievement gaps¹ have been a disconcerting finding from education research for the last several decades in the US (see, for example, Fryer & Levitt, 2004, 2013; Reardon, Kalogrides, & Shores, 2019). Sociologists, economists, and education researchers have all documented the complex interplay of individual-, parental-, school-, and neighborhood-level factors that contribute to these persistent achievement gaps. Comparatively, fewer studies have explored the racial/ethnic discipline gaps (Gopalan & Nelson, 2019; Skiba et al., 2014), and fewer still have analyzed the joint gap dynamics between achievement and discipline (Hwang, 2018; Morris & Perry, 2016). Indeed, Morris and Perry (2016) argue that school discipline disparities are a “crucial but under-examined factor in achievement differences by race” (2016, p. 68).

Additionally, all studies above that explore racial/ethnic discipline gaps have used smaller (often single-district or single-state) convenience samples primarily because of data limitations. The OCR began collecting data on school discipline from the full-universe of school districts in the US only in 2011. Until then, counts of students, disaggregated by race, who received adverse discipline actions—such as in- and out-of-school suspensions, expulsions, law-enforcement referrals—were available only for a sample of school districts in the US. Similarly, there was also a lack of nationally-comparable achievement (test-scores) data across the various states in the country—a limitation that has only been recently mitigated with the Stanford Education Data Archive ([SEDA]; Reardon, Shear, Fahle, Kalogrides, & DiSalvo, 2017). No study to date has explored the empirical relationship between achievement gaps and discipline gaps using national-level data.²

Such a national analysis of discipline gaps is essential for two main reasons. First, a descriptive analysis of patterns and trends in racial/ethnic discipline gaps across the nation will help generate hypotheses regarding the antecedents and potential causal factors that may drive racial/ethnic inequality. Second, given consistent findings of the spatial variation in several other factors of access and opportunity in a broad range of outcomes across the country (Chetty, Friedman, Hendren, Jones, & Porter, 2018; Reardon, Kalogrides, & Shores, 2019), a national analysis becomes ever more important when attempting to document yet another growing source of educational inequality. Because school districts are local administrative units with substantial powers

¹ It is more appropriate to conceptualize the observed racial/ethnic achievement gaps—i.e. differences in average test scores—as representing racial/ethnic differences in the average availability of opportunities, access, and an “education debt” (Ladson-Billings, 2006, p 3). However, for consistency with prior literature, I refer to these differences in opportunity/access as achievement gaps.

² A notable exception is a recent study that was published after this present study was accepted for publication (Pearman, Curran, Fisher, & Gardella, 2019). The present study expands on the analysis and results from an unpublished dissertation chapter written by the author (Gopalan, 2018), which Pearman and colleagues cite in their study.

including the distribution of resources and adoption of practices and policies among schools, this study adopts the school districts (“districts” hereafter) as the primary unit of analysis. Also, given findings from past research that shows that districts vary substantially in educational practices and policies including school discipline (Steinberg & Lacoé, 2018), they are an appropriate unit of analysis for exploration of disparities in school disciplinary outcomes. Additionally, in terms of policy implications, questions regarding the relative contribution of various contextual factors in shaping racial/ethnic disparities in educational opportunity, defined broadly, benefits from a national focus.

That said, disentangling the causal relationships between achievement and discipline is challenging for a number of reasons, most notably—endogeneity at the student-, school-, and district-level. Students who experience a large number of punitive discipline actions tend to perform worse academically on average (Arcia, 2006; Hwang, 2018); on the other hand, out-of-school suspensions or expulsions that result in substantial lost instruction time (Losen, Hodson, Keith II, Morrison, & Belway, 2015) might have independent causal effects on achievement. Similarly, analyses at the district- or metropolitan-level indicates that the strongest correlates of racial/ethnic achievement gaps are racial/ethnic differences in parental education, segregation, and the overall level of parental income (Reardon, Kalogrides, & Shores, 2019). These factors have also been identified as correlates of high discipline gaps (Skiba et al., 2014) in smaller samples. Would a similar pattern be found in national data?

This present research contributes to this burgeoning literature in three ways: (1) It provides a descriptive characterization of the patterns of Black-white and Hispanic-white discipline gaps across school districts in the US using new national data from the OCR, that enables the examination of whether gap patterns at the national-level are consistent with those from earlier studies that use smaller convenience samples; (2) It presents a more complete picture of discipline gap dynamics by operationalizing the gap in a number of ways and exploring the structural correlates of those gaps across districts, guided by theory and past empirical work; and (3) It provides an initial estimation of the associations between racial/ethnic achievement gaps and racial/ethnic discipline gaps after extensive covariate adjustment.

The goal of this paper is not to estimate the causal effect of discipline on achievement or the causal linkage between discipline gaps and achievement gaps across districts. Instead, it provides a descriptive characterization of the landscape of discipline gaps. This will provide the basis for generating hypotheses regarding the correlates of those disparities and help us understand the linkages between two forms of persistent racial/ethnic inequality that can be tested in future work using more rigorous causal research designs.

Background and Brief Literature Review

Racial/Ethnic Achievement Gaps

Black-white achievement gap. Racial disparities in educational achievement has been a persistent reality in the U.S. educational system. White-Black achievement gaps—the difference between the average achievement of white and Black students measured using standardized test scores and other cognitive assessments—seem to emerge as early as kindergarten entry (Fryer & Levitt, 2004) and persist well into high school and college (Libassi, 2018). There is some consensus that the overall Black-white achievement gaps narrowed during 1970s and 1980s, but stagnated in 1990s, followed by more progress in narrowing gaps in reading and math since then (Reardon, Robinson, & Weathers, 2015). Within each cohort of students, however, research shows that the

Black-white achievement gaps widen with grade progression (Reardon et al., 2015) suggesting how schools (districts) might be exacerbating the Black-white disparities.

There is much less consensus, however, on the causes or consequences of these achievement gaps. Many studies have attempted to disentangle the multitude of factors associated with achievement gaps using decomposition techniques to unpack the extent to which observed gaps can be explained by socioeconomic status (SES) and other school-level factors that systematically vary across students of different races/ethnicities. For example, Fryer and Levitt (2004) show that socioeconomic differences between the students of different races can explain a large portion of the observed raw Black-white achievement gaps, especially at kindergarten entry (with SES-factors explaining almost all of the gap at kindergarten, and about 60% of the raw Black-white achievement gaps in third grade). Few other studies have shown that SES-differences account for between 15-50% (across studies) of the overall Black-white achievement gaps (Murnane, Willett, Bub, & McCartney, 2006). More recently, studies using good proxy measures for long-run SES show that long-run/multigenerational measures of SES can explain a much larger percentage of the observed Black-white achievement gaps (Rothstein & Wozny, 2013). Similarly, there is converging evidence that the disparity in average school poverty rates between the schools attended predominantly by white and Black students is a very powerful correlate of Black-white achievement gaps (Duncan & Murnane, 2011; Reardon, Kalogrides, & Shores, 2019).

Scholars have also tried to understand the nature and pattern of racial/ethnic achievement gaps, in particular, the geographic distribution of achievement gaps in the US (Reardon, 2016). Decades of segregation followed by nonrandom sorting of ethnic minority students to certain school districts and schools within a region naturally complicates the disentanglement of the between- and within-school (district) components driving such geographic patterns. Again, there seems to be much less consensus in this regard with respect to the Black-white achievement gaps: Fryer and Levitt (2004) claim that between-school differences in school quality, operationalized using multiple observable teacher- and institutional- measures, between the schools that average Black and white students attend does not explain a large proportion of the achievement gaps. On the other hand, many recent studies reveal that observable differences in the allocation of beneficial instructional practices—such as experienced and/or demographically-matched teachers—both between and within-schools in favor of high-income and white students likely exacerbates the existing Black-white achievement gaps (Gershenson, Holt, & Papageorge, 2016).

Finally, using the SEDA, Reardon et al. (2019) document considerable variation of the magnitude of Black-white achievement gaps across schools, districts, and regions in the US. They also show that the strongest correlates of racial/ethnic achievement gaps are racial/ethnic differences in socioeconomic conditions such as—parental income, parental education levels, and patterns of racial/ethnic segregation, which cumulatively explain three-fourths of the overall geographical variation in achievement gaps.

Hispanic-white achievement gap. There is much less research available regarding the patterns and trends in white-Hispanic achievement gaps. Limited evidence suggest that the magnitude of the white-Hispanic achievement gap is smaller compared to the white-Black achievement gaps at kindergarten and that they continue to narrow until high school (Reardon et al., 2015). Reardon and colleagues also document the gradual decrease in the magnitude of the overall Hispanic-white achievement gaps across subsequent cohorts of students over the last two decades (2015). Despite such recent progress, racial/ethnic achievement gaps remain a salient topic of investigation because of the many downstream negative consequences—for example, in college, we observe racial/ethnic disparities in rates of persistence and graduation and disparities in achievement

explain a large proportion of the racial wage gap in labor markets (Carneiro, Heckman, & Masterov, 2005).

The evidence regarding the extent to which SES explains the Hispanic-white achievement gaps, however, is less mixed. Most studies document the large explanatory power of SES differences between Hispanic and white students. Results reveal an almost complete elimination of Hispanic-white gaps once SES differences are accounted for robustly (Fryer & Levitt, 2013; Reardon & Galindo, 2006).

Racial/Ethnic Discipline Gaps

The literature examining the patterns and trends in racial/ethnic discipline gaps is far less-extensive than that on achievement gaps in schools across the US. Beginning with the Children's Defense Fund's publication (1975) that first documented the widespread disparity in suspension rates among Black and white students across a majority of U.S. school districts, several studies have reported similar results. For example, Rocque (2010) finds evidence of a Black-white discipline gap in discipline referrals. A number of studies have reported racial disparities in in- and out-of-school suspensions (Gregory & Weinstein, 2008; Kinsler, 2011; Skiba et al., 2014) as well as in school arrests (Theriot, 2009). However, most of these studies analyze convenience samples of data pertaining to a few schools, school districts, or states. Far fewer studies have analyzed the Hispanic-white disparities in school disciplinary outcomes (Gopalan & Nelson, 2019; Ramey, 2018). On average, they find that Hispanic-white gaps in discipline are lower in magnitude when compared to the Black-white gaps.

Similar to the line of inquiry exploring the extent to which SES differences between minority students and white students account for the variation in achievement gaps, several studies have explored the differences in socioeconomic characteristics between minority students and white students, and its associated contributions to the discipline gaps. For example, minority students are disproportionately economically disadvantaged, and economically disadvantaged students are over-represented in adverse discipline outcomes (Brantlinger, 1991; Wu, Pink, Crain, & Moles, 1982). However, studies that control for student socioeconomic status (Skiba et al., 2014; Skiba, Michael, Nardo, & Peterson, 2002) find that measures of student poverty explain just a small portion of the variation in Black-white discipline gaps.

Previous studies also find that minority students are exposed disproportionately to punitive institutional environments (Anderson & Ritter, 2018; Gregory & Weinstein, 2008; Kinsler, 2011; Skiba et al., 2014). Therefore, studies suggested that cross-school variation in discipline policies explain a substantial portion of the discipline gap (Anderson & Ritter, 2018). More recently, however, research using more extensive data and empirical approaches have found that discipline gaps persist both across and within-schools and districts (Barrett, McEachin, Mills, & Valant, 2019; Gopalan & Nelson, 2019; Owens & McLanahan, 2019). Again, it is important to exercise caution when interpreting results from these studies given the use of convenience samples of data in almost all of these studies. Therefore, the variation in national trends, patterns, and correlates of discipline gaps remain under-explored—a gap this present study addresses.

Finally, similar to the negative downstream consequences of achievement gaps, scholars have documented the many negative consequences of these racial disparities in discipline. Students who experience these adverse discipline outcomes are much more likely to drop out from high school (Raffaele Mendez, 2003) and get caught in the juvenile justice system (Fabelo et al., 2011; Nicholson-crotty, Birchmeier, & Valentine, 2009), highlighting the need and importance for research such as those carried out in the present study.

Discipline and Achievement: Joint Distributions of Racial/Ethnic Achievement Gaps and Racial/Ethnic Discipline Gaps

Very few studies have empirically tested the relationship between school discipline and achievement due to the inherent complexity in disentangling the endogeneity between the two outcomes and high data requirements (Hwang, 2018; Laco & Steinberg, 2019; Morris & Perry, 2016). For example, research has shown that students who receive punitive discipline sanctions have lower achievement on average (Arcia, 2006). However, exclusionary discipline policies (e.g., out-of-school suspensions and expulsions) may further reduce a student's instruction time by precluding him/her from the learning environment. A recent report estimated that students across the US lost approximately 18 million days of instruction due to school suspensions in the AY 2011-12 (Losen et al., 2015). Such loss of instruction time likely has additional adverse effects on student achievement. On the other hand, a student who misbehaves may disrupt the learning environment for other students in the classroom and, subsequently, negatively affect their achievement (Carrell & Hoekstra, 2010; Figlio, 2007). Administrators also set school discipline policies that determine the likelihood and severity of various infraction types; thus, suspensions/expulsions are often enforced to effectively maximize achievement and provide a high-quality safe learning environment for the majority of students who attend the school. On the other hand, some studies have shown that students feel less safe in schools with punitive discipline policies as compared to students in schools with more tolerant policies (McNeely, Nonnemacher, & Blum, 2002). Furthermore, Perry and Morris (2014) find that extremely punitive discipline environments negatively affect the achievement of even non-suspended students by creating "collateral consequences"—meaning, these extremely punitive discipline environments disrupts school communities and negatively impacts overall student achievement.

Therefore, the relationship between discipline gaps and achievement gaps is theoretically ambiguous. While there are some reasons to theorize that discipline gaps may exacerbate existing racial achievement gaps (Gregory, Skiba & Noguero, 2012); some studies that have used simulation analysis suggest that the causality may be reversed (Kinsler, 2013). Till date, very few studies (Morris & Perry, 2016) have empirically examined the impact of school discipline outcomes on achievement gaps. Morris and colleagues (2016) find that school suspensions account for approximately one-fifth of the observed raw Black-white achievement gap using data from a single public school district in the US. Even though the authors use longitudinal models, several confounding, time-varying, omitted variables bias still persists warning us against making any causal interpretations from these models. While this present study does not make any causal claim either, it is the first to characterize the first-order association between valid measures of racial/ethnic achievement gaps and racial/ethnic discipline gaps empirically across the country. Understanding the contextual factors that may promote or prevent the causal pathways from shaping the joint linkages between achievement and discipline is important.

Theoretical/Conceptual Framework

As noted in the literature review, racial/ethnic disparities in achievement and discipline are complex and multi-determined by proximal (at the individual-, school-level), and distal (district-, state-, and federal-level) factors. This study draws on Bronfenbrenner's socio-ecological model as a guiding conceptual framework to examine a set of complex risk factors (1979). In other words, I argue that educational outcomes as well as disparities in those outcomes are caused by a complex set of factors at the micro, meso, and exosystems that students are exposed to (Bronfenbrenner, 1979, 2005). Much of the prior work has focused on key individual and school-level factors using student-

level analyses of convenience samples of data. In contrast, this national-level analysis focuses on structural factors at the district-level—such as segregation, socioeconomic factors, racial/ethnic disparities in socioeconomic factors, and school-level—such as school resources, and others. It is important to note that these structural factors also need to be explored within the context of federal educational policies and landscape—the “macrosystem” (Bronfenbrenner, 1979). For example, the zero tolerance policy borrowed by schools from criminal justice systems and the increasing presence of school resource officers have pernicious effects in exacerbating the racial discipline gaps (Curran, 2016; Weisburst, 2019). Yet, policies notwithstanding, the critical role of the contexts within which such policies are made and how they interact with student outcomes needs to be analyzed at multiple levels/units of analysis such as schools, districts, and states. Indeed, it becomes paramount to understand the contribution of such structural factors that influence the disparities in school disciplinary outcomes in order to generate hypotheses and interventions targeting the reduction of these gaps.

This conceptual framework is also closely aligned with the critical race theory (CRT) paradigm that several scholars have used to understand racial disparities across a wide variety of outcomes (Crenshaw, 2011). Specifically, this analysis adopts the lens that “social and historical context is very important in any particular analysis of racial issues” (Simson, 2014). Therefore, by exploring the association between structural factors at the district-level and discipline gap, this study provides a counterpoint to other studies that have primarily focused on student- and school-level analysis of discipline gaps. Furthermore, as hypothesized by CRT, research has also found that the racial/ethnic disparities in schools cannot be explained by differences in individual-level factors—such as differential rates of misbehavior by students across races/ethnicities (Owens & Mcalanahan, 2019; Skiba et al. 2015). Rather, differential treatment (Owens & Mcalanahan, 2019), across- and within-school differences (Gopalan & Nelson, 2019) as well as implicit racial biases (Riddle & Sinclair, 2019) at the county-level are significantly associated with racial/ethnic discipline gaps. In other words, this study calls for a closer look at such contextual factors using national data.

Together, using the above framework(s) as a guide, this study asks and answers these following research questions:

- R1: How do the Black-white and Hispanic-white discipline gaps vary across districts in the US?
- R2: What are the strongest correlates of Black-white and Hispanic-white discipline gaps?
- R3: How much of the geographic variation in discipline gaps is explained by the observed correlates?
- R4: How does the linkage between racial/ethnic achievement gaps and racial/ethnic discipline gaps vary across districts in the US?

First, a descriptive model that characterizes the geographic variation of Black-white and Hispanic-white discipline gaps will provide insights into the size and trends of these gaps across the country. Given that what is not measured cannot be understood, the first step towards understanding the linkages between achievement gap and discipline gap is the characterization of the distributions of such gaps across the country. While such characterizations exist for achievement gaps (Reardon et al., 2019), no such characterization is available to visualize discipline gaps across the country. Additionally, characterizing the discipline gaps in appropriate units of measurement that would enable comparisons and valid interpretations is a crucial step in any rigorous descriptive analysis (Loeb et al., 2017).

Second, this study examines the extent to which discipline gaps are associated with other structural, district-level characteristics. Based on past theoretical and empirical evidence (Carter, Skiba, Arredondo, & Pollock, 2017; Ramey, 2015; Skiba et al., 2014), I hypothesize that the discipline gaps will also be partly dependent on local socioeconomic conditions, segregation patterns, racial composition of teachers/administrators, school policies, school finance, and other practices. The geographic variation in the above correlates across the country will be used to model the variation in the discipline gap measures using extensive covariate adjustment available from SEDA to answer R2. For example, SEDA provides a rich set of district covariates including measures of socioeconomic, segregation, racial/ethnic composition, and school quality that this study draws on. Results from this analysis will also illuminate the strength of the various correlates of the discipline gaps and the extent to which the observed covariates explains these gaps. The results from this analysis will also provide insight into the contextual factors and potential mechanisms through which these gaps can be reduced, which can be tested in subsequent analysis.

Finally, this study explores the association between discipline gaps and achievement gaps across the country. As explained in the first section, the joint dynamics between achievement gap and discipline gap is under-explored. High levels of achievement and discipline gaps may co-vary based on other structural inequalities in the districts (as captured by the district-level covariates). However, a first step towards understanding the causal relationship (if any) between these two measures of educational inequality and how it co-varies with other structural factors is a descriptive analysis. This descriptive analysis of the linkages between achievement and discipline gaps will be informative; however, will not provide causal estimates due to omitted variable bias.

Data and Methods

Data Source

Data for this article come from two main sources—the OCR's CRDC and the SEDA Version 2.1 (Reardon et al., 2018 [SEDA] hereafter). The OCR-CRDC is a federal initiative led by the U.S. Department of Education. All school discipline-related measures are available from the CRDC. This is the only national database that includes school discipline related information disaggregated by race/ethnicity in the country. The OCR collects this data from all school districts in the country biennially. The CRDC 2013-14 data is used for all analyses in this present study. All achievement-related measures and district-level covariates included in this paper are from the SEDA. The SEDA is a private data collection/curation effort led by researchers at the Center for Education Policy Analysis at Stanford University. SEDA has released this data four times with the latest version—2.1, as used in this study being the current data release. The achievement gap and discipline gap measures are described in greater depth in the “Measures” section below.

Measures

Discipline gap measures. Broadly, I estimate two discipline gap measures—Black-white and Hispanic-white gap measures for each discipline outcome—such as in-, out-of-school suspensions, expulsions (with and without educational services), and school-related arrests and law enforcement referrals in each school district in AY 2011-12 and 2013-14 and their associated standard errors using the publicly-available dataset from CRDC.³ Using counts of

³ Unlike the SEDA, I treat charter schools as separate districts when they have a unique school district identifier in the CRDC for the basic stand-alone discipline gap analysis (i.e., those analyses that do not include racial achievement gaps) for two reasons. First, high magnitudes of racial discipline gaps in “No-excuse” charter schools has been a salient topic of investigation. Second, any ranking of school districts with high/low

students in each race who receive each of the above discipline sanction, I calculate the two gap measures. For example, I estimate, say d^{susp} , the difference between the percentages of Black (Hispanic) and White students who received one or more out-of-school suspensions in each year in each district available from the CRDC.

$$\begin{aligned} d^{susp} \\ = & \text{Percentage of Black (Hispanic) students suspended (expelled)} \\ - & \text{Percentage of White students suspended (expelled)} \end{aligned}$$

The above percentages can be transformed using an inverse normal transformation to get a standard-deviation-unit-metric

$$\begin{aligned} d^{tsusp} \\ = & \phi^{-1}(\text{Percentage of Black (Hispanic) students suspended (expelled)}) \\ - & \phi^{-1}(\text{Percentage of White students suspended (expelled)}) \end{aligned}$$

The above measure implicitly assumes that the underlying suspension measure is normally distributed with equal variance within the sub-groups of students, which is inaccurate by definition given the dichotomous nature of most discipline outcome measures. In other words, the above measure still suffers from the shortcomings described in Ho and Reardon (2012) such as—non-normality and unequal variances. However, an assumption of a latent normal distribution made above provides a better specification than simple percentage differences. Also, the above specification is interpretable as a Z-score type standard-deviation unit making it readily amenable for national-level comparisons. In the absence of multiple cut-scores, however, the above probit-transformed measure is a reasonable approximation of a non-parametric gap measure like the V-statistic racial achievement gap estimates derived from coarsened data (Ho & Reardon, 2012). Here $P_{a>b}$ denotes the probability that a randomly drawn Black (Hispanic) student has a greater likelihood of suspension (expulsion, school-related arrests, etc.) than a randomly drawn white student as shown below.

$$(1) V^{tsusp} = \sqrt{2} \phi^{-1}(P_{\text{Black (Hispanic)} > \text{White}})$$

I also calculate a maximum likelihood (ML)-based standard error of the above discipline gap. This essentially amounts to estimating the probit model specified in (2) below for each school district in the analytic sample using the counts of students in each race who experienced an adverse discipline event and estimating the standard error of β .

$$(2) \phi^{-1}(Y) = \beta X_i + \varepsilon$$

racial discipline gaps will likely mask such charter school trends if the charter schools are combined with the traditional school district in which they are geographically located. However, I use the charter crosswalk table available in the SEDA to match the charter school identifier to the traditional school district in which they are geographically located to match the relevant district-level covariates from the American Community Survey (ACS) because there are no ACS tabulations for schools that do not have a geographic catchment area. In all analyses that include achievement gap measures from the SEDA, I follow the data approach of the SEDA—I assign the charter schools to the traditional school district in which they are physically located. This results in the differing analytic sample sizes for the two sets of analyses.

For example, in the above model, Y is an indicator variable for whether a student experienced an adverse discipline event; X_i denotes the minority race indicator (white race is the omitted race category); and ϵ the residual error term. The estimate of β from the various district-level models will provide an estimate of the Black (Hispanic)-white discipline gap measure (DG_d) and σ_d is the ML-based standard error of β , which is an estimate of the standard error of the discipline gap measure for each district.

Achievement gap measures. I use the pooled (across grades, years, and subjects) achievement gap measures available in the SEDA version 2.1 for all analyses. The achievement gap measures are derived from the U.S. Department of Education's EDFacts data system, which provides aggregated test score data (on over 200 million standardized tests in English/language arts (ELA) and math taken by students in grades 3-8 from AY 2008-2009 to AY 2012-2013) from each state's standardized testing program. To make the achievement data comparable across states and years, they are linked to the National Assessment of Educational Progress (NAEP; Reardon, Kalogrides, & Ho, 2019; Reardon et al., 2018). These achievement gap measures can be interpreted as effect sizes or Z-score-type standard deviation units. The district-level achievement gap measures are derived by pooling the subject-year-grade gap estimates across grades, years, and subjects. In all, the white-Black and white-Hispanic achievement gap measures are available for—roughly one-fourth of the total number of districts in the US. However, it is important to note that this geographic coverage results in the availability of gap estimates in districts that serve the majority of minority students (92-93%) enrolled in public schools in grades 3-8 in the US, as mentioned in the SEDA documentation.

Measures of school district characteristics. The district-level measures are curated by SEDA primarily from three data sources—the American Community Survey (ACS) profile tables for years 2006-2010, the Common Core of Data (CCD) universe surveys and finance surveys (F-33) for years 2009-2013. Please refer to the SEDA documentation for a detailed compilation of the full set of covariates available in the SEDA and their respective data sources. Following Reardon et al. (2019), I adopt the grouping of these district-level covariates into five broad categories—socioeconomic composition, racial/ethnic composition, racial and socioeconomic disparities, segregation, and school characteristics. This categorization is aligned with the theoretical/conceptual framework that guides this analysis. Table A2 in the appendix provides a description of the full set of covariates (and the categorization) curated from the publicly-released SEDA and included in the below analyses in the appendix (see Appendix Table A2).

Analysis

To examine the geographic variation in the estimated discipline gap measures across the country, I use multiple model specifications that include alternative measures of the discipline gaps—based on, in-, out-of-school school suspensions, expulsions, and school-related arrests and law enforcement referrals.

Second, to explore the associations between discipline gaps and the various measures of structural factors summarized at the district-level, the following model is used:

$$(3) DG_d = \alpha + \beta X_d + \mu_d + \epsilon_d$$

In separate specifications, the dependent variable DG_d denotes, the estimated Black (Hispanic)-white discipline gap for each school-district d from (2); X_d denotes a vector of district-

level covariates including socioeconomic composition, racial/ethnic composition, racial and socioeconomic disparities, segregation, and school characteristics available from the SEDA, μ_d denotes the residual error term, and ϵ denotes the sampling error term. We assume that the two error terms are independent and follow normal distributions: $\mu_d \sim N(0, \tau^2)$ and $\epsilon_d \sim N(0, \sigma_d^2)$ where σ is the standard error of the racial discipline gap estimated for each district using (2) above; and τ^2 is the between-district variance in racial discipline gap estimated by the random-effects meta-analytical model. Coefficients on the state fixed effects indicate how the outcome measures vary with systematic features of particular states that are constant over time, and capture variation in discipline outcomes across states.

Second, to explore the association between racial discipline gaps and racial achievement gaps across school districts in the US, a similar meta-analytic random effects model is used. However, in this case, the dependent variable of interest is the racial achievement gap and the focal independent variable of interest is the racial discipline gap. I include the full set of district-level covariates available in the SEDA as additional control variables.

$$(4) AG_d = \alpha + \delta X_d + \gamma DG_d + \psi_d + v_d$$

In separate specifications, the dependent variable AG_d denotes the estimated white-Black (Hispanic) achievement gap for each school-district d available from the SEDA; X_d denotes a vector of district-level covariates including socioeconomic composition, racial/ethnic composition, racial and socioeconomic disparities, segregation, and school characteristics available from the SEDA, ψ_d denotes the residual error term, and v_d denotes the sampling error term. We assume that the two error terms are independent and follow normal distributions: $\psi_d \sim N(0, \tau^2)$ and $v_d \sim N(0, \varphi_d^2)$ where φ is the standard error of the racial achievement gap available from the SEDA; and τ^2 is the between-district variance in racial achievement gap estimated by the random-effects meta-analytical model in (4).

Results

Descriptive Results

Table 1 reports descriptive summary statistics for the discipline gaps and other key district-level characteristics used in the core model specifications for the Black-white and Hispanic-white gap analytic samples. Out of the approximately 17,000 districts included in CRDC, districts that have very low minority enrolments, following the minimum group size conventions for reporting gaps (at least 20 students of each race in each district) are excluded. In addition, a small number of districts with discipline outcome proportions (such as suspension/expulsions/school-related arrests rates) that are out of the possible range (>1) are removed. Finally, the analytic sample is restricted to those districts for which there are no missing data for any of the district-level covariates from the SEDA. In all, the analytic samples are 3,707 and 4,779 respectively for Black-white and Hispanic-white discipline gap analyses.

Table 1
Descriptive Statistics

	Black-White Analytical Sample		Hispanic-White Analytical Sample	
	Mean	SD	Mean	SD
Discipline Gaps				
Based on one or more out-of-school suspensions	0.501	0.319	0.099	0.297
Based on expulsions (with and without educational services)	0.111	0.732	-0.092	0.676
Based on school-related arrests and law enforcement referrals	0.138	0.693	-0.111	0.717
Based on one or more in-school suspensions	0.414	0.633	-0.021	0.713
Achievement Gaps				
White-Black Achievement Gap	0.600	0.223	0.611	0.225
White-Hispanic Achievement Gap	0.462	0.232	0.469	0.223
Socioeconomic Composition				
Median Income (in \$100,000)	0.574	0.255	0.626	0.274
Proportion of Adults, Aged 25+ with Bachelor's Degree or Higher	0.266	0.146	0.273	0.149
Proportion of Households Receiving Food Stamps or SNAP	0.197	0.125	0.162	0.113
Single Parent Household Rate	0.304	0.123	0.254	0.112
Racial/Ethnic Composition				
Proportion Black in District	0.238	0.228	0.125	0.177
Proportion Hispanic in District	0.187	0.207	0.260	0.237
Racial Socioeconomic Disparities				
White-Minority Income Gap	0.641	0.505	0.625	0.502
White-Minority Education Gap	0.192	0.375	0.697	0.444
Minority-White Single Parent Household Rate Difference	0.269	0.192	0.041	0.175
Segregation				
Between School Racial Segregation	0.097	0.124	0.066	0.091
Between School Free Lunch, Not Free Lunch Segregation	0.059	0.068	0.051	0.066
Minority-White Free Lunch Rate Difference	0.054	0.077	0.048	0.074

Table 1 cont.

Descriptive Statistics

	Black-White Analytical Sample		Hispanic-White Analytical Sample	
	Mean	SD	Mean	SD
School Characteristics				
Per Pupil Instructional Expenditures in Average Student's School (in \$100,000)	0.064	0.022	0.064	0.024
Average Student-Teacher Ratio	16.70	16.64	16.87	5.65
Proportion Attending Charter Schools	0.048	0.095	0.041	0.085
Minority-White Student-Teacher Ratio Difference	-0.265	2.484	-0.244	1.1336
Minority-White Charter School Enrollment Rate Difference	0.006	0.078	-0.010	0.057
Number of Observations (N)	3707		4779	

Note: The entries are means and standard deviations (SD) of the various measures in the Black-white and Hispanic-white analytic samples in columns 2-3 and 4-5, respectively.

The top rows of Table 1 report the mean racial discipline gaps across the districts included in the analytic samples and show considerable variation. Across districts, the average Black-white and Hispanic-white discipline gap (based on proportion of students who received one or more out-of-school suspensions in 2013-14) are approximately 0.5 and 0.1 standard deviations, respectively. The associated standard deviations of these gaps are 0.32 and 0.28, respectively. The Hispanic-white discipline gaps are significantly lower than the Black-white discipline gaps across all discipline gap outcome measures. Except for the out-of-school suspension based discipline gap measure, the remaining Hispanic-white gaps are negative i.e., favoring Hispanics. The remaining rows of Table 1 report similar summary statistics for the discipline gaps based on in-school suspensions, expulsions (with and without services), school-related arrests and law enforcement referrals, achievement gaps, and the various district-level covariates available from the SEDA.

Spatial Variation of Racial/Ethnic Discipline Gaps

Figures 1-2 illustrate the geographical variation of racial/ethnic discipline gaps, based on the OCR-CRDC data from AY 2013-14, at the commuting zone-level of analysis.⁴ The discipline gap measures estimated at the district-level are collapsed to the commuting zone level for better visualization on nation-wide maps because some school districts are too small to be visible as an independent geographic unit on the map.⁵ The geographic variation in achievement gaps is shown in Figure 3 using the SEDA to provide a visual comparison to the variation in discipline gaps.

⁴ I obtain the census 2000-based commuting zone identifier from the SEDA. I use Stata's user written-maptile-(Stepner, 2017) command to develop these maps. The map itself is drawn using commuting zone-based shape files that I created using the county-shape files provided by the US Census Bureau and the county-commuting zone mapping that is publicly-available.

⁵ I also include the focal discipline gap measures (based on out-of-school suspensions) for the 20 largest school districts in a table in the appendix (see Table A1).

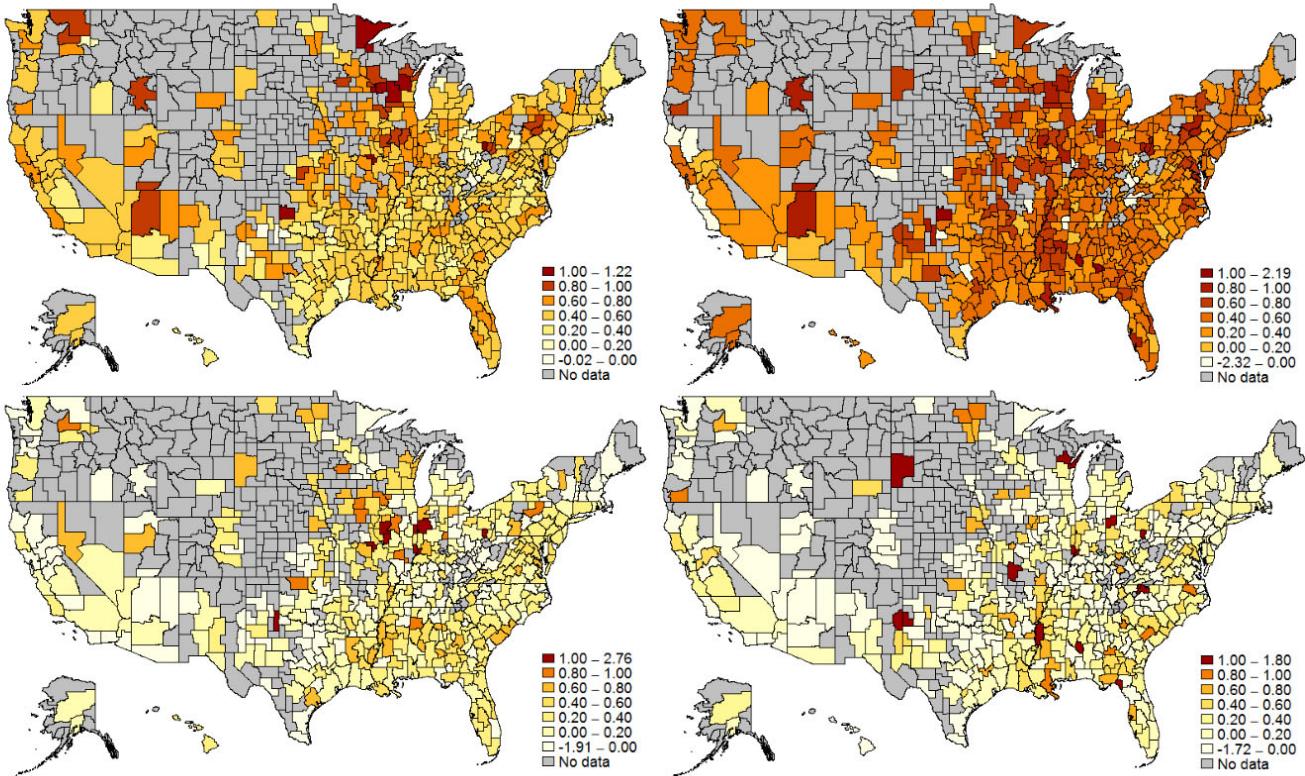


Figure 1. Mean Black-white Discipline Gaps (2013-14) Across US Commuting Zones

Note: Upper Left Panel: Gaps based on Out-of-School Suspension Rates; Upper Right Panel: Gaps based on In-School Suspension Rates; Lower Left Panel: Gaps based on School-Related Arrests and Law Enforcement Referrals; Lower Right Panel: Gaps based on Expulsion Rates.

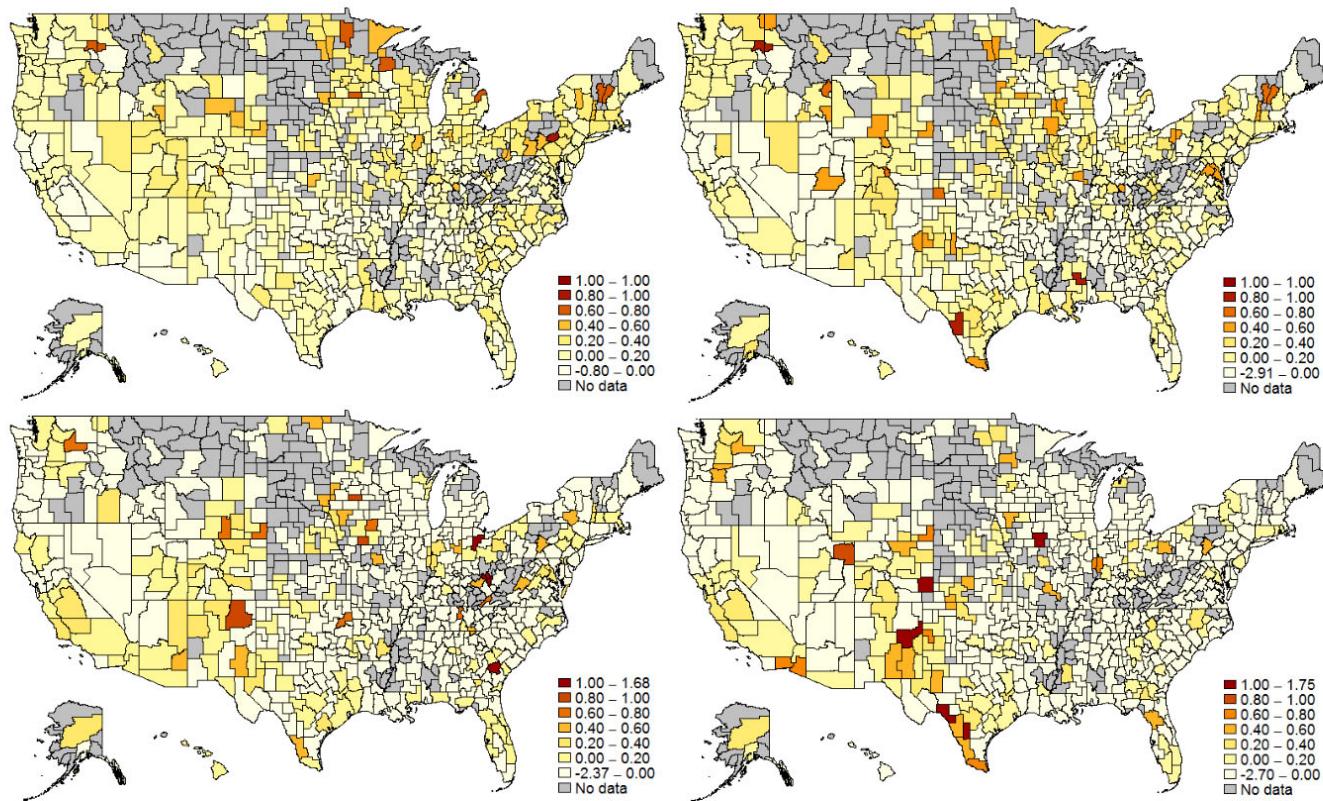


Figure 2. Mean Hispanic-white Discipline Gaps (2013-14) Across US Commuting Zones

Note: Upper Left Panel: Gaps based on Out-of-School Suspension Rates; Upper Right Panel: Gaps based on In-School Suspension Rates; Lower Left Panel: Gaps based on School-Related Arrests and Law Enforcement Referrals; Lower Right Panel: Gaps based on Expulsion Rates.

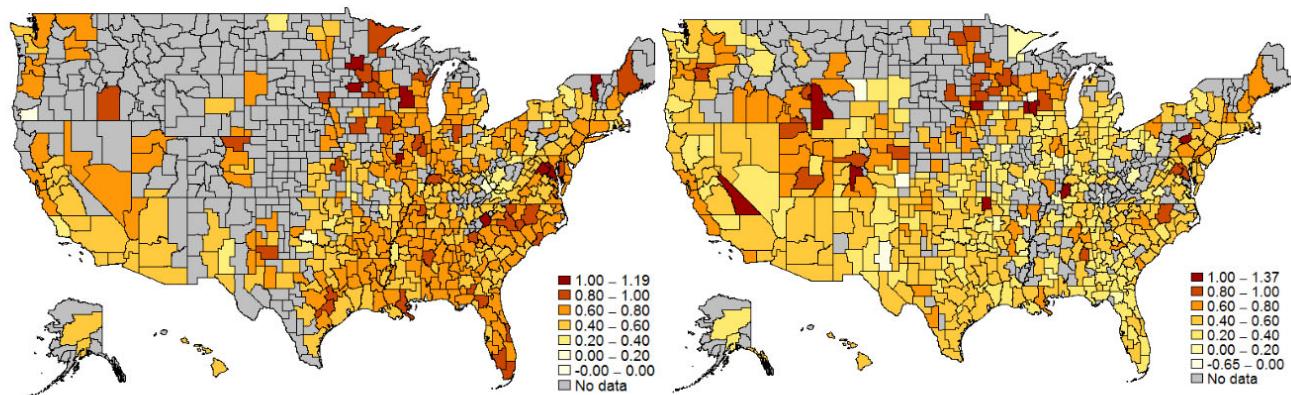


Figure 3. Mean Racial/Ethnic Achievement Gaps (2009-13) Across US Commuting Zones

Note: Left Panel: White-Black Achievement Gap; Right Panel: White-Hispanic Achievement Gap.

Similar to the spatial variation in achievement gaps, districts with relatively large Black-white discipline gaps are concentrated in the southeast part of the country and inner-city school districts. There is however substantial variation within state as well. Similar to the within-state versus between-state variation in district-level racial achievement gaps, only a small portion of the variance (6% for the Black-white discipline gaps and 15% for the Hispanic-white discipline gaps) of the district-level racial discipline gaps is due to time invariant differences across states—measured using state fixed effects in the models (results not shown, available upon request). This further shows that districts within states differ substantially in their discipline actions and policies—a result borne out of past research.

In all subsequent analyses, the focal discipline gap measure is based on the outcome *one or more out-of-school suspensions* as reported by CRDC. I restrict the analysis to that measure for three reasons: (1) to economize on space; (2) because out-of-school suspensions are the most commonly-used discipline outcome measure in other past studies; and (3) because the other racial gap measures show significantly lower magnitudes of disadvantage to the minority group.

Correlates of Racial Discipline Gaps

Given the large variation in the magnitudes of discipline gaps across school districts, this next section explores the correlates of those gaps using the rich set of district-level covariates available in the SEDA. First, the direction and magnitude of bivariate correlations between discipline gaps and each of the district-level covariates are examined. As mentioned earlier, these covariates include measures on socioeconomic conditions, socioeconomic disparities, racial/ethnic composition, school characteristics, and segregation measures.

Table 2
Pair-wise Correlation Coefficients Between Discipline Gaps and District-level Characteristics

	Black- White Discipline Gap	Hispanic- White Discipline Gap
Socioeconomic Composition		
Median Income (in \$100,000)	0.214***	0.235***
Proportion of Adults, Aged 25+ with a Bachelor's Degree or Higher	0.225***	0.286***
Proportion of Households Receiving Food Stamps or SNAP	-0.228***	-0.205***
Single Parent Household Rate	-0.188***	-0.106***
Racial/Ethnic Composition		
Proportion Black in District	-0.195***	-0.054***
Proportion Hispanic in District	-0.124***	-0.253***
Racial and Socioeconomic Disparities		
White-Minority Income Gap	0.147***	0.083***
White-Minority Education Gap	0.124***	-0.116***
Minority-White Single Parent Household Rate Difference	0.074***	0.141***
Segregation		
Between School Racial Segregation	-0.074***	0.010
Between School Free Lunch, Not Free Lunch Segregation	-0.002	0.071***
Minority-White Free Lunch Rate Difference	0.072***	0.070***

Table 2 cont.

Pair-wise Correlation Coefficients Between Discipline Gaps and District-level Characteristics

	Black- White Discipline Gap	Hispanic- White Discipline Gap
School Characteristics		
Per Pupil Instructional Expenditures in Average Student's School (in \$100,000)	0.061***	0.134***
Average Student-Teacher Ratio	-0.009	-0.064***
Proportion Attending Charter Schools	-0.164***	-0.040**
Minority-White Student-Teacher Ratio Difference	-0.017	-0.022**
Minority-White Charter School Enrollment Rate Difference	-0.0181	0.031*
Achievement Gaps		
White-Black Achievement Gap	0.241***	0.209***
White-Hispanic Achievement Gap	0.136***	0.259***
Number of Observations (N)	3707	4779

Note. The correlations are precision-weighted correlation coefficients between discipline gaps and a selected set of district-level correlates shown in column 1. Each entry is a separate pair-wise correlation and includes state fixed effects and should therefore be interpreted as within-state correlations.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2 reports the precision-weighted correlation coefficients between discipline gaps and a selected set of district-level correlates used in subsequent analyses.⁶

Socioeconomic Disparities and Discipline Gaps

In this section, the extent of the variation in discipline gaps across districts that can be accounted for by variation in racial/ethnic socioeconomic disparities is explored. Figures 4 and 5 display the association between district-level Black-white and Hispanic-white discipline gaps, respectively, and the corresponding racial/ethnic socioeconomic disparities.⁷

⁶ I use the same precision weights as used by the meta-analytic random effects regression models estimation for the correlation coefficients. The weights are: $1/(\tau^2 + \sigma_d^2)$ where τ^2 is the estimated between-district variance in racial discipline gaps from each bivariate model and σ_d^2 is the ML-based variance of the estimated discipline gap in each district.

⁷ I use the same set of covariates and methodology as used by Reardon et al. (2019) to measure socioeconomic disparities. These include—white-minority differences in: family income, parental education, occupation type, unemployment rates, poverty rates, SNAP receipt rates, single-parent household rates, homeownership rates, and one-year housing mobility rates. All variables are centered to the analytical sample means to enable easy interpretations of the intercept.

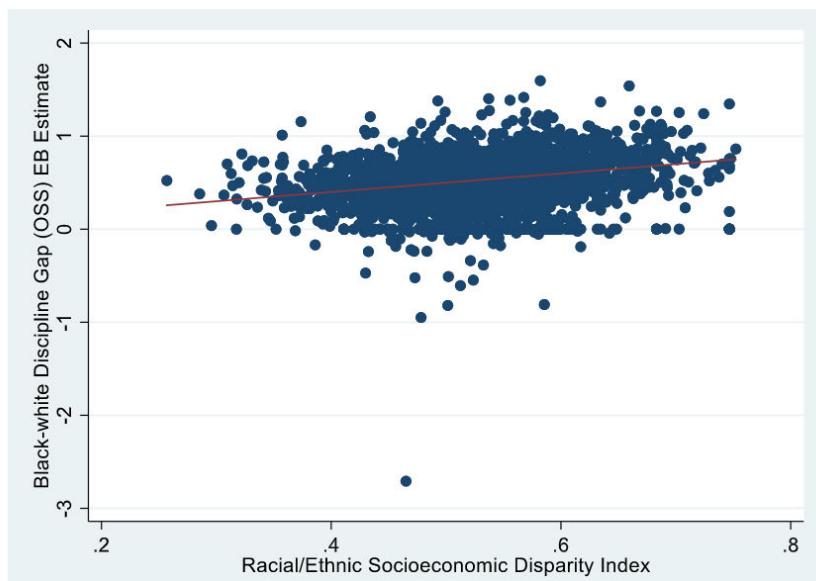


Figure 4. Association Between Black-white Discipline Gaps and Racial/Ethnic Disparities in Socioeconomic Conditions

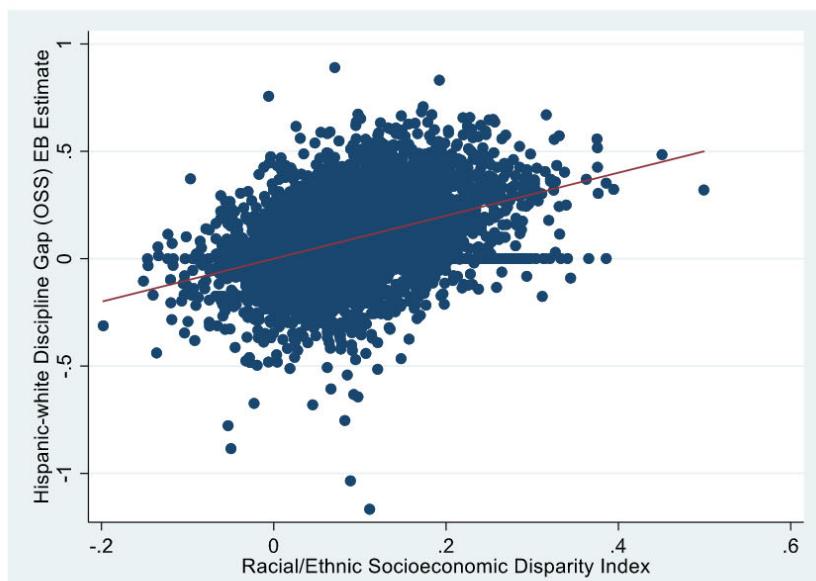


Figure 5. Association Between Hispanic-white Discipline Gaps and Racial/Ethnic Disparities in Socioeconomic Conditions

As expected, we see a modest positive relationship between the combined index of racial socioeconomic disparity and racial/ethnic discipline gaps—i.e., discipline gaps are larger in districts where the differences between the average socioeconomic conditions between minority students (and families) and white students (and families) are larger. However, some features are worth noting in these graphs. First, racial/ethnic socioeconomic disparities explain a larger variation in the Hispanic-white discipline gaps as compared to the Black-white discipline gaps. Second, in both Black-white and Hispanic-white analytic samples, the intercept of the fitted lines are 0.44 and 0.11 respectively. This shows that even in districts where the racial socioeconomic disparities are absent, the average racial discipline gaps are positive. Third, the proportion of variation in discipline gaps across districts accounted for by racial/ethnic socioeconomic disparities is significantly low—adjusted R-square in discipline gap models are 0.05-0.11. Do other district-level factors explain more variation in racial/ethnic discipline gaps? The analysis below explores that hypothesis.

Multivariate Regression Model

Table 3 reports the adjusted R-square from various model specifications.

Table 3
Adjusted R-Square across Model Specifications

	Black-white Discipline Gap	Hispanic-White Discipline Gap
Socioeconomic Composition	0.11	0.23
Racial/Ethnic Composition	0.10	0.21
Racial and Socioeconomic Disparities	0.06	0.10
Segregation	0.06	0.03
School Characteristics	0.04	0.04
Racial Socioeconomic Disparities + Socioeconomic Composition	0.16	0.25
Racial Socioeconomic Disparities + Socioeconomic Composition +		
--Racial/Ethnic Composition	0.18	0.31
--Segregation	0.18	0.27
--School Characteristics	0.17	0.25
All	0.21	0.32
Number of Observations (N)	3707	4779

Each row represents separate model specifications that include a subset of district-level covariates, shown in the first column, alternatively as predictors. Columns 2 and 3 of Table 3 report the adjusted R-squares from models that specify the discipline gaps as the dependent variable. We find that a large share of the variation remains unexplained.

Multivariate Regression Model Exploring Linkages between Racial Discipline Gaps and Racial Achievement Gaps

Finally, as specified in model (4), this section explores the linkage between achievement gaps⁸ and discipline gaps below.

Table 4

Linkages between Achievement Gap and Discipline Gaps

	White-Black Achievement Gap	White-Hispanic Achievement Gap
Black-white Discipline Gap	0.12*** (0.013)	
Hispanic-white Discipline Gap		0.16*** (0.012)
All district-Level Covariates included	X	X
<i>Adjusted R</i> ² (Before Inclusion of Discipline Gap)	0.63	0.58
<i>Adjusted R</i> ²	0.65	0.61
Number of Observations (N)	2217	2896

Note. Standard errors in parentheses.

* $p < .05$. ** $p < .01$. *** $p < .001$.

To economize on space, Table 4 reports the coefficients from model (4) on just the independent variable of interest—discipline gaps; however, all district-level covariates described in appendix Table A2 are included as additional controls. There is a modest, yet statistically significant, positive relationship between discipline gaps and achievement gaps even after controlling for the extensive set of district-level confounds. A one standard deviation increase in Black-white discipline gap (as measured by out-of-school suspension rates) is associated with a 0.12 standard deviation increase in the white-Black achievement gap of a district. Similarly, a one standard deviation increase in Hispanic-white discipline gap is associated with a 0.16 standard deviation increase in the white-Hispanic achievement gap of a district. The adjusted R-square of the model increases by approximately 2-3 percentage points (from 0.63 to 0.65 in the Black-white models and from 0.58 to 0.61 in the case of Hispanic-white models) when the discipline gap measures are added—this provides some evidence for the marginal contribution of racial/ethnic discipline gap to racial/ethnic disparities in achievement.

Discussion

Contribution to Prior Literature

Over the last few years, the role racial/ethnic discipline gaps play in the school-to-prison pipeline has received significant attention as a critical educational inequality issue in the US. Yet,

⁸ As recommended in the SEDA technical documentation, I use the OLS estimates of the pooled, gap measures rather than the shrunken empirical bayes (EB) estimates as the achievement gap measures are included in the final model primarily as a dependent variable.

there is no study that has estimated the magnitudes of these discipline gaps and or characterized the geographical variation in these discipline gaps across the US in a consistent manner. This study estimates nationally-comparable measure of discipline gaps using newly-available national data and finds (1) considerable variation in discipline gaps using multiple school discipline measures across the country; and (2) lower magnitude of Hispanic-white discipline gaps as compared with Black-white discipline gaps.

As a result of a lack of such consistent national measurement and characterizations, there was also much less evidence on the correlates of discipline gaps based on national-data. This study reveals several interesting observations. For example, from the bivariate relationships in Table 2, four distinct features emerge. First, just as observed in the case of racial/ethnic achievement gaps, discipline gaps are larger in more affluent areas. Even though the comparisons of the correlates of achievement gaps and discipline gaps are not straight-forward, it is interesting to note that the strength of the relationship between the average socioeconomic condition-covariates and racial/ethnic discipline gaps is much lower—ranging between -0.19 and 0.22 as compared to those ranging between -0.05 and 0.6—the analogous correlations of the average socioeconomic factors and racial/ethnic achievement gaps.

Second, we observe a puzzling pattern of negative correlations between measures of racial/ethnic composition, segregation, and discipline gaps. Even though, districts with a higher proportion of minority students and/or that are highly segregated show large absolute magnitudes of adverse discipline outcomes, the relative differences in those outcomes between white and minority students seem muted. This observed pattern could simply be a result of low numbers of non-minority students in those districts with high segregation. However, this relationship merits further attention in future studies.

Third, there is a mixed pattern—in terms of direction, strength of associations, and levels of statistical significance—between school characteristics and discipline gaps. The school characteristics that include measures of average school quality, school finance, and other educational practices—operationalized using measures of average class-size, per-pupil student expenditures (total and instructional), and charter school enrolment—show an inconsistent pattern of correlations. This inconsistent pattern is largely similar to the observed relationships between school characteristics and achievement gaps providing suggestive evidence for measurement error/omitted variable bias in these models.

Fourth, districts with larger racial/ethnic and socioeconomic disparities have larger discipline gaps, as expected, except in the case of the correlation between Hispanic-white discipline gaps and white-Hispanic differences in parental education, which is negative. Again, the overall strength of the correlations between racial/ethnic socioeconomic disparities and discipline gaps seem smaller than the correlations between these measures and achievement gaps. This is consistent with evidence from past research describing the relationship between socioeconomic conditions and racial/ethnic discipline gaps—that measures of socioeconomic status explain just a small portion of the discipline gap (e.g., Skiba et al., 2002). In all, this study finds that even after controlling for the rich set of district-level characteristics available from the SEDA, a significant portion (70-80%) of the racial/ethnic discipline gaps remains unexplained.

Finally, the relationship between discipline gaps and achievement gaps using national-level data remains under-explored. This study merged newly available nationally-comparable racial/ethnic achievement gaps available from the SEDA with consistent, national-level, discipline gap measures estimated from discipline data available from OCR enabling an exploration of the joint linkages between discipline and achievement gaps. Even after extensive covariate-adjustment, this study finds a modest positive association between achievement gaps and discipline gaps—districts with larger

achievement gaps also tend to have higher discipline gaps. As described earlier, none of these relationships can be interpreted causally—we need other research designs to tease out the causality. However, these results show that the under-examined relationship between achievement gaps and discipline gaps merits further attention. Racial disparities in school discipline by itself is hugely problematic; however, if these discipline gaps exacerbate the racial disparities in achievement further, it is a cause for much greater concern. The results of this analysis provide an important step forward in determining the relationship between two forms of persistent inequality that have long plagued the US education system.

Limitations and Future Directions

Despite the national focus and empirical contributions of this study described above, it suffers from a few limitations. First, this study is purely descriptive in nature and subject to omitted-variable bias—at the district-level, there may be many more factors that are correlated with discipline gaps and achievement gaps but unobserved in this dataset. For example, one potentially important source of omitted variable bias comes from the exclusion of teacher and principal demographics and measures of their attitudes and policies towards school discipline. Future work should include these measures to see if they can explain a larger portion of the variation in discipline gaps across the country. Second, most (if not all) of the structural factors analyzed in this study are complex and bi-directional. Thus, the correlational analyses included here are limited in scope and intent. While such analysis reveals interesting patterns, trends, and correlates of discipline gaps for the whole country for the first time, in particular, the potential for unobserved endogenous factors associated with discipline and achievement warrants cautious interpretation of the results.

Discipline gap measures that have been developed in this paper may be noisier, especially, in comparison to the well-calibrated achievement gap measures derived from a large number of individual standardized test scores. Therefore, direct comparisons of the extent to which district-level covariates explain variation in these different gap measures may not be appropriate. However, within model comparisons of the explanatory power of various sets of structural factors is still valid and provide unique insights that can be tested in the future using better research designs and deeper theoretical predictions. For example, school characteristics including student-teacher ratios, per-pupil expenditures, and others do not explain a large variation in discipline gaps. How can we better measure and incorporate other differences in the opportunities and experiences of students across schools, and neighborhoods that may affect school discipline outcomes in future analyses? Will they explain a larger variation in these discipline gap measures? Will discipline gap measures using alternative outcomes such as length of suspensions/expulsions be more informative (also, see Gopalan & Nelson, 2019; Barrett et al., 2019 who explore these measures using statewide data)? These are questions ripe for future explorations.

Furthermore, even among observably similar districts (demographically and socioeconomically) with comparable patterns of segregation, discipline gaps vary substantially. A deeper-look into the specific disciplinary practices in districts (and schools) that are observationally similar will yield more insights. Specific analyses that study exceptional districts with low(high) suspension/expulsion rates, but high (low) racial/ethnic differences in socioeconomic characteristics might also reveal interesting patterns.

Yet, given the relatively large share of the variation in discipline gaps that remains unexplained, researchers need to develop a more rigorous conceptual model that explores the proximal forces that drive these discipline gaps. The analyses here suggests that socioeconomic differences, racial/ethnic socioeconomic disparities, and segregation patterns are associated with discipline gaps in districts. However, even after the inclusion of an extensive set of structural factors,

79% of the variation in Black-white discipline gap and 67% of the variation in Hispanic-white discipline gap remains unaccounted for. In other words, the present study identifies a set of distal structural factors that are somewhat predictive of discipline gaps, but they do not identify the more proximal mechanisms that produce and/or exacerbate these gaps. The finding that a larger portion of Hispanic-white discipline gap is accounted for by socioeconomic factors and ethnic disparities in average socioeconomic conditions is consistent with prior work using other data and research methods (Morris & Perry, 2016). That said, future research should focus on uncovering better measures of intermediate mechanisms, using appropriate research designs, to differentiate between alternative processes and the proximal pathways through which discipline gaps gets exacerbated.

Finally, the associations between discipline gaps and other racial/ethnic disparities such as achievement (at the student-, school-, and district-levels of analyses) needs to be more thoroughly examined to understand the causal mediating factors more precisely. The present study provides suggestive evidence in support of prior hypotheses that reducing discipline gaps can improve achievement gaps modestly. But the causal linkages and mediational theory of change still remain unclear. For example, some recent work using rigorous randomized control trials shows that restorative justice interventions, when implemented with high fidelity, reduces adverse school disciplinary outcomes, improves school climate, and teachers' as well as students' perceptions of school safety, connectedness, and teacher-student relationships. However, the impact of such interventions on racial/ethnic discipline gaps was muted. Furthermore, the interventions' impact on racial/ethnic achievement gaps was small but in the opposite direction (Augustine et al., 2018). Specifically, qualitative implementation research uncovered that schools, especially those with high proportion of minority students, did not implement the restorative justice interventions with high fidelity. Only schools that implemented these interventions with high fidelity experienced beneficial reductions in discipline gaps and achievement gaps at least in the short-term (two years post-intervention). Research has highlighted issues of fidelity with respect to the adoption of suspension-limiting policies as well resulting in negligible effects on racial/ethnic discipline gaps (Steinberg & Laco, 2018). Future research must therefore focus on longer-term follow-up, implementation fidelity, and incorporate the contextual moderators uncovered in this present study to further understand some of the mediating processes.

Policy Implications

The Every Student Succeeds Act (ESSA) outlines five specific strategies that schools should use to curtail exclusionary discipline policies. That includes—strict discipline data monitoring as well as funds to support the use of restorative justice interventions targeting the reduction of discipline gaps (Every Student Succeeds Act, 2015). This present study supports such a call. Data monitoring and accurate data reporting by schools and districts is extremely important to help move research forward in this area. Without such data availability, we will not be able to understand the proximal causes, mechanisms, and consequences. Additionally, given the finding from the present study that a large variation in discipline gaps lies within states, efforts and incentives to promote the development of detailed, statewide, longitudinal, data systems that include disaggregated school discipline data should be encouraged by federal and state policymakers.

To the extent that socioeconomic disparities, school characteristics, and non-random sorting of minority students in highly punitive districts causally influence adverse disciplinary outcomes, policies aimed at reducing income inequality, providing support to low-income families, and reducing segregation across neighborhoods and schools should reduce observed discipline gaps. However, a potential reason for the large unexplained portion of district-level racial/ethnic gaps in discipline could be that unobserved within-school practices and processes might dominate in

explaining such variation. Indeed, experimental research shows that teacher perceptions of student behavior may suffer from implicit racial biases (Okonofua & Eberhardt, 2015) and might result in differential treatment discrimination when it comes to school discipline (Owens & McLanahan, 2019). Policy makers and practitioners must pay close attention to such local processes. The OCR must continue to investigate and monitor cases of civil rights complaints including those related to school discipline within schools and districts. Furthermore, the OCR should continue issuing policy guidance documents, support data collection efforts, and engage in monitoring discipline disparities to ensure educational equity within schools and districts (Lewis, Garces, & Frankenberg, 2018).

Finally, the ESSA earmarked specific federal funds for schools and districts to implement evidence-based, restorative justice and other locally-designed programs to reduce exclusionary disciplinary outcomes and racial/ethnic discipline gaps (see [Welsh & Little 2018] for a review of successful restorative justice approaches). Researchers should support local education agencies in such design and implementation processes using sustained research-practice partnerships given the finding that implementation fidelity seems to be a key mediating factor. Finally, population-based analysis such as those used in this present study can help inform policymakers of hotspots and high-level trends. However, such analyses must be complemented with in-depth case-studies and mixed-methods research approaches to fully appreciate and understand the inherent complexity of this issue.

Conclusion

This study began with a purely descriptive approach to understanding the variation in racial/ethnic discipline gaps and its linkages with racial/ethnic achievement gaps across the country using newly-available, nationally-comparable, gap measures. In particular, it demonstrates how there is substantial heterogeneity in racial/ethnic discipline gaps across the country adding to the growing evidence of inequality in educational opportunity especially along racial/ethnic dimensions across regions in the US. Furthermore, this study presents evidence that an extensive set of district-level correlates explain just one-fifth of the total variation in discipline gaps. Together, these findings suggest that local processes, practices, and policies that may be exacerbating racial/ethnic discipline gaps merits further attention.

Acknowledgement

I gratefully acknowledge the support of the Russell Sage Foundation and the William T. Grant Foundation (award #83-17-03) that partially funded this project. Any opinion expressed are my own and should not be construed as representing the opinions of either foundation.

Appendix

Table A1

Focal Discipline Gaps (Based on out-of-school Suspension Rates) in 20 Largest School Districts in the US

District Name	Black-White Discipline Gaps		Hispanic-White Discipline Gaps	
	Mean	SE	Mean	SE
Los Angeles Unified	0.551	0.021	-0.033	0.019
Chicago Public Schools	1.187	0.013	0.332	0.013
Dade	0.550	0.017	0.024	0.016
Clark County School District	0.642	0.011	0.123	0.010
Broward	0.353	0.017	-0.011	0.020
Houston Independent School District	0.863	0.019	0.226	0.019
Hillsborough	0.640	0.011	0.179	0.012
Orange	0.652	0.012	0.213	0.013
Palm beach	0.665	0.012	0.161	0.013
Fairfax County Public Schools	0.636	0.021	0.328	0.019
Hawaii department of education	0.307	0.035	0.098	0.023
Gwinnett county	0.590	0.014	0.365	0.015
Wake County Schools	0.796	0.014	0.363	0.017
Montgomery county public schools	0.678	0.022	0.348	0.023
Dallas Independent School District	0.689	0.025	0.011	0.025
Charlotte-Mecklenburg Schools	0.877	0.014	0.395	0.017
Philadelphia City	0.584	0.014	-0.522	0.021
Prince George's County Public Schools	0.541	0.028	0.007	0.030
Duval	0.531	0.013	0.107	0.022
San Diego Unified School District	0.645	0.021	0.267	0.017

Note: The 20 largest school districts in terms of enrollments in 2015-16 identified from CCD - Local Education Agency (School District) Universe Survey Geographic Data (EDGE). School districts in New York City are divided into 32 different geographic districts with none of them showing large enough enrollments to be included in the table above.

Table A2
Full List of Covariates Used

Covariate Name	Data Source
Discipline Gaps	
Based on one or more out-of-school suspensions	OCR-CRDC
Based on expulsions (with and without educational services)	OCR-CRDC
Based on school-related arrests and law enforcement referrals	OCR-CRDC
Based on one or more in-school suspensions	OCR-CRDC
	SEDA
Achievement Gaps	
Socioeconomic Composition	
Median Income (in \$100,000)	SEDA
Proportion of Adults, Aged 25+ with a Bachelor's Degree or Higher	SEDA
Proportion of Households Receiving Food Stamps or SNAP	SEDA
Single Parent Household Rate	SEDA
Proportion Managerial/Professional Occupation	SEDA
Proportion Free Lunch	SEDA
Poverty Rate, Households with 5-17 Year Olds	SEDA
Unemployment Rate	SEDA
90/10 Income Ratio	SEDA
Rental Rate	SEDA
One-Year Housing Stability Rate	SEDA
Racial/Ethnic Composition	
Proportion Black in District	SEDA
Proportion Hispanic in District	SEDA
Hispanics, Speak English Well or Very Well	SEDA
Hispanics, Foreign Born	SEDA
Proportion of Hispanic Population that is Mexican	SEDA
Proportion of Hispanic Population that is Puerto Rican	SEDA
Proportion of Hispanic Population that is Cuban	SEDA
Proportion of Hispanic Population that is Central American	SEDA
Proportion of Hispanic Population that is South American	SEDA
Racial Socioeconomic Disparities	
White-Minority Income Gap	SEDA
White-Minority Education Gap	SEDA
Minority-White Single Parent Household Rate Difference	Author's calculation using data from SEDA
White-Minority Managerial/Professional Occupation Difference	Author's calculation using data from SEDA
Minority-White Unemployment Rate Difference	Author's calculation using data from SEDA
Minority-White Poverty Rate Difference	Author's calculation using data from SEDA
Minority-White SNAP Rate Difference	Author's calculation using data from SEDA
Minority-White Single Parent Household Rate Difference	Author's calculation using data from SEDA
Minority-White Rental Rate Difference	Author's calculation using data from SEDA

Table A2(Cont'd.)

Full List of Covariates Used

Covariate Name	Data Source
White-Minority One-Year Housing Stability Rate Difference	Author's calculation using data from SEDA
Segregation	
Between School Racial Segregation	SEDA
Between School Free Lunch, Not Free Lunch Segregation	SEDA
Minority-White Free Lunch Rate Difference	SEDA
School Characteristics	
Per Pupil Instructional Expenditures in Average Student's School (in \$100,000)	SEDA
Per Pupil Total Expenditures in Average Student's School (in \$100,000)	SEDA
Average Student-Teacher Ratio	SEDA
Proportion Attending Charter Schools	SEDA
Minority-White Student-Teacher Ratio Difference	Author's calculation using data from SEDA
Minority-White Charter School Enrollment Rate Difference	Author's calculation using data from SEDA

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Volume 27 Number 154

December 9, 2019

ISSN 1068-2341



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