On the Margin: Who Receives a Juvenile Referral in School and What Effect Does It Have?

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Abstract
Involvement with the juvenile justice system carries immense consequences both to detained youth and to society more broadly. Extant research on the "school-to-prison pipeline" often focuses on school disciplinary practices such as suspension with less attention on understanding the impact of school referrals to the juvenile justice system on students. Using novel administrative data from North Carolina, we link 3 years of individual educational and disciplinary infraction records to juvenile justice system records to identify the effect of juvenile justice referrals for school-based offenses on academic and behavioral outcomes. We find that, even for the same offense type and circumstance, relative to students only punished internally in the school, students referred to juvenile justice experience lower academic achievement, increased absenteeism, and are more likely to be involved in future disciplinary infractions and juvenile system contact. We show that these juvenile referrals are not inevitable and instead reflect a series of discretionary choices made by school administrators and law enforcement. Moreover, we find that female students, Black students, and economically disadvantaged students are more likely to receive referrals even for the same offense type and circumstances.

1 Introduction

How schools manage student behavior by defining rules for student conduct and disciplining students for misconduct carries important societal implications inside schools and beyond their walls. A troubling body of evidence shows that overly punitive environments at schools can trigger a cycle of escalating delinquency for students that results in contact with the criminal justice system (Okonofua et al., 2016). This phenomenon, commonly known as the "school-to-prison" pipeline (Bacher-Hicks et al., Forthcoming; Skiba, Chung, et al., 2014), disproportionately affects students of color at multiple stages of the pipeline – teacher referrals (Holt et al., 2022; Lindsay & Hart, 2017), exclusionary discipline (Okonofua & Eberhardt, 2015; Smolkowski et al., 2016), and juvenile justice contacts (Skiba et al., 2002; Zane & Pupo, 2021).

Although the links between school exclusionary discipline, such as suspensions and expulsions, and later criminal justice contact are well established (e.g., Bacher-Hicks et al., Forthcoming; Davison et al., 2022), less is known about the mechanisms underlying these links. Some scholars have identified indirect psychological and environmental mechanisms underlying the school-to-prison pipeline, such as changes in trust in institutions or changes to peer groups resulting from experiences with exclusionary discipline (Krezmien et al., 2014; Novak, 2019). Others have noted that school actions can directly initiate student's contact with the juvenile justice system (Goldman & Rodriguez, 2022; Hirschfield, 2018). Our study speaks to this understudied latter mechanism. Specifically, we use linked education and juvenile justice administrative records to examine how school-based offenses can translate into juvenile justice contact and to estimate the academic and behavioral effects of early contact with the juvenile justice system.

Recent work on the school-based disciplinary response to infractions from similarly situated students identifies substantial race-based differences wherein students of color receive harsher and longer punishments for the same offense as their White peers (Barrett et al., 2021; Liu et al., 2022;

Shi & Zhu, 2022a). Although nationally youth contacts with the juvenile justice system are down significantly from their historic highs in the mid-to-late 1990's (Puzzabchera et al., 2022; Rovner, 2023; The Annie E. Casey Foundation, 2022), the racial disparity remains, with Black youth 4.4 times as likely to be detained (Rovner, 2023). In North Carolina, the context for our study, Black students were referred to law enforcement by schools at 2.4 times the rate of White students, including 5 times the rate for more minor offenses such as disorderly conduct (NCACLU, 2023). Moreover, schools often turn to school resource officers (SROs) to manage school safety, and police presence at schools can increase school-based arrests, particularly for students of color (Sorensen et al., 2023).

Within the U.S., 8 states have introduced or passed legislation that expands teachers' and school administrators' ability to remove students from the classroom and school for a wider range of offenses, including subjective and minor offenses such as disrespectful and disorderly behavior, and allows escalation to suspensions for these more minor, subjective infractions.[4] Florida and Texas have also passed legislation requiring an armed police officer in each public school. These new directions in school discipline and policing may create more possibilities for bias and increased discretion for escalating school-based disciplinary actions into contact with the juvenile justice system.

Extant work provides robust evidence that exclusionary disciplinary approaches taken by schools (i.e., expulsion, suspensions) have a harmful effect on students (Noltemeyer et al., 2015). However, there is less direct evidence regarding the impact of being referred to the juvenile justice system in part due to a lack of available administrative data on juvenile justice contact. Prior research has documented associations between juvenile justice contact and adverse long-term outcomes

[4] The states include Nebraska (LB 811), Florida (SB 244), Texas (SB 245), Nevada (AB 194), North Carolina (HB 188), Arizona (HB 2640), West Virginia (HB 2890), and Kentucky (HB 538).

(Borrero, 2001; Cavendish, 2014; Cole & Cohen, 2013; Del Toro et al., 2019; Evans-Chase & Zhou, 2014; Gottlieb & Wilson, 2019; Kirk & Sampson, 2013), but has been unable to delineate the causal mechanisms through which these associations manifest. We contribute to this literature using linked administrative data from the state of North Carolina that matches student- and incident-level data from the North Carolina Education Research Data Center with juvenile justice court records from the North Carolina Department of Public Safety. Our data include information on disciplinary incidents and consequences in schools, juvenile justice complaints and court outcomes, and school data on attendance and achievement.

Using data from students who received disciplinary citations from 2007 to 2010, we estimate the effect of referral to the juvenile justice system for a school-based offense on student achievement, absenteeism, and future disciplinary issues. Importantly, we compare similarly situated students cited by their schools for the same disciplinary infraction but who differ only in their referral to the juvenile justice system in response to that infraction. We further make such comparisons using within-school, within-student, and even within-incident variation in referral to juvenile court. We find that, relative to school-based discipline alone, exposure to juvenile justice punishment after an infraction reduces student learning by over 0.05 standard deviations in both math and reading. Beyond learning, exposure to juvenile justice punishment leads to students missing an additional 2.6 days of school. Further, relative to students punished directly within the school, we find students referred to juvenile justice have no significant difference in their likelihood of receiving additional disciplinary citations from the school but are much more likely to receive a juvenile justice complaint in the future. Finally, using novel measures of school and police department propensities to refer students to the juvenile justice system, we document variation across schools and agencies in their discretionary use of referral. Our analysis shows that harsher

schools and police departments both negatively impact students' academic outcomes and seem to substitute juvenile justice referrals for school-based punishments (such as suspensions).

This research can inform K-12 school policies and practices to reduce disparities in educational outcomes. While contact with the juvenile justice system may be a rare outcome for school-based disciplinary infractions, the experience can be individually costly for offending youth – estimates from Washington state suggest detained youth are 56 percentage points less likely to graduate from high school, 14 percentage points less likely to enroll in any postsecondary education, and 24 percentage points less likely to enroll at a 4-year college (Gertseva, 2019). Nationally, 55% of detained youth are re-arrested within a year of release (OJJDP, 2017) and each detained youth costs states an average of $214,000 per year (Justice Policy Institute, 2020). Importantly, our results demonstrate that juvenile justice referrals lead to substantial learning losses and increase the likelihood of future contact with the juvenile justice system. They also directly contradict any notion that school referrals to juvenile court might benefit other students within the school through improvement to the overall safety of the school environment, for instance (Kirk & Sampson, 2011). In summary, schools changing their disciplinary posture towards leniency and de-escalation would benefit all students.

2 Background

2.1 School discipline, juvenile justice, and student outcomes

A rich and growing body of literature investigates the linkages between school discipline, academic outcomes, and criminal justice contact – often referred to as the "school-to-prison pipeline" (Snodgrass Rangel et al., 2020). The empirical literature on the school-to-prison pipeline demonstrates how youth of color are sanctioned more severely, with similar policies and effects occurring in school discipline and the criminal justice system (Wald & Losen, 2003). That is, for similar types of behaviors, White youth are often viewed as innocent compared to their Black and

Hispanic peers, who are often viewed as threatening, defiant or blameworthy (Morris, 2005; Okonofua & Eberhardt, 2015; Owens, 2022; Owens & McLanahan, 2020). As such, these initial perceptual differences in assessing the intent or effect of student behavior can impact the frequency and type of discipline students receive. However, even when controlling for similar types of behavioral offenses, research demonstrates that students of color still receive harsher disciplinary responses compared to their White peers (Skiba et al., 2011).

For instance, prior work using administrative data from Louisiana and North Carolina demonstrates that Black students are more likely to receive suspensions and receive longer suspensions than their White peers when involved in the same fight (Barrett et al., 2021) or same type of disciplinary infraction (Shi & Zhu, 2022; Liu et al., 2022) – even after controlling for prior disciplinary records and other student characteristics. These racial disparities in punishment are particularly troubling given the relationship between student discipline and academic disengagement – wherein student relationships with schools worsen, absenteeism increases, achievement declines, and disciplinary issues escalate (Mark et al., 2022; Noltemeyer et al., 2015; Okonofua et al., 2016; Skiba, Arredondo, et al., 2014). There is also a documented link between exclusionary discipline and higher rates of juvenile justice referral (Mittleman, 2018; Sorensen et al., 2022) and criminal arrest in adulthood (Bacher-Hicks et al., Forthcoming; Davison et al., 2022). Mark et al. (2022) note that institutional mechanisms (not individual student propensities or inclinations) account for declines in attendance following arrest due to suspensions and court appearances. Indeed, the impacts of exclusionary discipline are particularly damaging for students of color (Okonofua & Eberhardt, 2015; Skiba, Chung, et al., 2014; Skiba et al., 2011; Smolkowski et al., 2016), with some work estimating nearly 30% of the Black-White difference in young adult criminal justice outcomes – being charged with a crime, convicted, and incarcerated – can be attributed to Black-White differences in exposure to exclusionary discipline in school (Davison et al., 2022).

The racial disproportionality observed in school punishments is mirrored by the persistent disproportionate representation of Black students in the juvenile justice system (Skiba et al., 2002; Zane & Pupo, 2021; Abrams et al., 2021; Hockenberry, 2020, 2022) and referrals to police (Rapa et al., 2022). We observe a clear Black-White gap in our data in North Carolina – despite representing less than 30% of students in North Carolina, Black students make up 46% of the students with some form of juvenile justice contact.

As with exposure to exclusionary discipline, the racial gap in juvenile justice contact points to a troubling mechanism through which educational inequities might arise. Prior research on juvenile justice contact suggests a negative association with grades (Gottlieb & Wilson, 2019), attendance (Mark et al., 2022), likelihood of graduating high school (Cavendish, 2014; Cole & Cohen, 2013), and likelihood of college enrollment (Kirk & Sampson, 2013). Furthermore, extant work documents high recidivism and future offense rates among youth who come into contact with the juvenile justice system (Cavendish, 2014; Beardslee et al., 2019; Evans-Chase & Zhou, 2014). One limitation in this line of research, which our work aims to address, has been the lack of available data on students' corresponding disciplinary records, rendering apples-to-apples comparisons of youth exposed to juvenile justice with youth disciplined in school impossible. This limitation has confounded researchers' ability to disentangle the effect of juvenile justice contact from the effects of behavioral infractions or infraction severity on students' academic and future disciplinary outcomes.

In sum, school-based disciplinary infractions feed into adolescent and adult criminal justice exposure, prompt disengagement from school, disproportionately affect students of color and are shaped directly by school actors like principals and teachers. Beyond school-based disciplinary actions, referrals to juvenile justice may lead to even worse academic disruption through extended school absences and further disengagement for the referred student. However, we have less direct

knowledge identifying the impact of referring students to the juvenile justice system on their short- and long-run academic and disciplinary outcomes.

2.2 Juvenile Justice in North Carolina

In North Carolina, the juvenile justice system involves three primary decision-makers: the complainants reporting a juvenile offense, the police department receiving and investigating the complaint, and juvenile courts. Although technically, any member of the public can file a complaint against a juvenile, and schools sometimes directly refer students to the juvenile justice system for status offenses such as truancy, law enforcement inside or outside of schools are responsible for the majority of juvenile referrals (North Carolina Sentencing and Policy Advisory Commission, 2022; Puzzanchera & Hockenberry, 2022). After the police receive and investigate a complaint regarding a juvenile offense, they may decide to either release the juvenile, refer the complaint to alternative diversionary programs, or refer the juvenile to the court. Once referred to the court system, a court counselor receives the case and can again decide to either dismiss the complaint, refer the juvenile to diversionary programs, or proceed to prosecute the case in the courts for an ultimate adjudication of supervision, probation, or sentencing to a juvenile detention center.

Complaints that would put youth in contact with police and, ultimately, the juvenile justice system can arise both in and out of school. Nationally, most violent offenses committed by youth happen during school hours on school days (OJJDP, 2022) and, before the COVID-19 pandemic, about 45% of the 24,282 juvenile complaints reported in North Carolina in 2019 were school-based offenses (The Annie E. Casey Foundation, 2022). A recent study using national juvenile offending data linked to school district calendar information shows that reported crimes by youth aged 10 to 17 increases by 47% on school days relative to days not in school (Jones & Karger, 2023). In our

data, from the 2007-08 to 2009-10 school years, nearly half (43.8%) of all juvenile complaints were labeled as school-based offenses.[5]

Important for our purpose of assessing the impact of juvenile justice contact on student outcomes, the path into the juvenile justice system involves discretion from schools in reporting students to police and discretion at police departments in routing students to alternative programs or the juvenile justice court system (Appendix Figure A1). While some juvenile complaints for school-based offenses result from more serious incidents, such as physical assault or drug possession or sales, many juvenile complaints result from students committing relatively minor and/or subjective offenses. For instance, over 14% of school-based complaints come from offense charges labeled simply as "disorderly conduct at school."[6]

3 Data and Methods

3.1 Data

We begin our sample construction with incident-level administrative data on all disciplinary referrals in North Carolina public schools from the 2007-2008 school-year through the 2009-2010 school-year provided by the North Carolina Education Research Data Center (NCERDC). The education data includes unique, anonymized student identifiers that can be linked with juvenile justice records from the North Carolina Department of Public Safety. We combine the student-incident-level discipline data with juvenile justice data using the student identifier and offense date to create a comprehensive dataset of all school-based offenses in North Carolina from 2007 to 2010 – including both offenses handled internally at the school and those referred to police and/or the

[5] School-based offenses refer to either offenses that occurred at school or offenses such as truancy that were reported by school personnel.
[6] This sums across a few different variations in exact wording of disorderly conduct. See Appendix Table A1 for complete summary statistics of the complaint offense types in our data.

juvenile justice system.[7] Figure 1 illustrates this data, with the gray bars (tracked on the left y-axis) showing the number of school-based disciplinary incidents occurring on each date in our sample. The number of school-based offenses increases modestly over this period and corresponds to the academic calendar. The purple line (tracked on the right y-axis) indicates the proportion of school-based incidents matched to a corresponding juvenile complaint by month. Although there is some fluctuation over time, in general, around 1.6% of all school-based offenses match a juvenile complaint.

We restrict our analysis to students with at least one school-based offense reported to draw comparisons using variation across students in schools' decisions on whether to refer the offense to the police. As previously described, when a student breaks school rules, teachers and administrators have some discretion in deciding whether to handle the offense internally or refer the student to the police, thereby putting the student in potential contact with the juvenile justice system. Our final analytic sample includes 1.57 million school-based offenses with 348,188 students from grades 3 through 10 across 2,661 schools.[8]

We focus our analysis on understanding the impact of juvenile justice system contact on student outcomes. To do so, we need to aggregate our data from the incident level to the student-year level. Because juvenile complaints are relatively rare, we select the first disciplinary incident for each student in each year to focus on the impacts of consequences for that single incident.[9] We

[7] Offense types as reported by schools are tabulated in Appendix Table A2.
[8] Appendix Table A3 provides a tabulation of number of observations by year and grade level.
[9] Using the first offense as a point of comparison accounts for the possibility of escalation of punishment for repeat offenses as the basis for school personnel decisions on punishment assignment. In a robustness check, we alternately choose the most severe offense for each student-year. Each of the 83 offense types is assigned a severity based on the probability that that offense type leads to an out-of-school suspension or other more serious consequence in the entire sample of incidents. Therefore, the severity of each offense type ranges from 0 to 1. For each student in each year, we select the incident with the highest severity offense type. If there are "ties," we select the first incident of that severity during the school year for that student. Results from the sensitivity test

measure contact with juvenile justice using a binary indicator equal to 1 if a student receives a complaint for the given school-based offense that is ultimately referred to a court counselor in the juvenile justice system and 0 otherwise. Table 1 summarizes our sample separately by whether a student was referred to the juvenile justice system for the first offense committed that year.

The statistics in Table 1 highlight a few dimensions of school responses to infractions. First, in our full sample of students with any reported disciplinary infractions, Black, economically disadvantaged, and students with disabilities are over-represented, consistent with disparities in punishment documented elsewhere (e.g., Barrett et al., 2021; Kinsler, 2011; Ritter & Anderson, 2018; Skiba et al., 2014). Notably, however, the descriptive differences in terms of student demographics and prior offenses between students with incidents referred to juvenile justice and those with incidents disciplined only in school are relatively small. Students with offenses that are ultimately referred to juvenile justice do come from different types of schools on average. For instance, juvenile justice referrals are more common in middle and high schools. Students referred to juvenile justice for their first offense are also more likely enrolled in rural schools and less likely enrolled in Title I-eligible schools (Table 1).

To explore the role of law enforcement in this school-to-juvenile-justice pipeline, we also construct a dataset on North Carolina law enforcement agencies using data from the Federal Bureau of Investigation's Uniform Crime Reporting (UCR) Program. We restrict the sample to all county sheriff's offices and municipal police departments in North Carolina between 2007 and 2010. This sample includes 99 county sheriff's offices and 348 municipal police departments, each tracked over the months that correspond to academic years 2007-2008 to 2009-2010.[10] Importantly, these data

using most serious offense instead of first offense are similar to our main results in direction, effect size, and statistical significance (see Appendix Table A4).

[10] Gaston County Sheriff's Office does not regularly report arrests data to UCR and as such is excluded from our sample of county-level police agencies.

contain monthly counts of the number of juveniles handled and released, the number of juveniles referred to juvenile court, and the number of juveniles referred to other agencies (such as welfare agency, adult court, or other police department). In each month for each police agency, we calculate the proportions of juvenile arrests that translate into formal referrals to juvenile court, which range from 0 to 1 with an average value of 0.69. We then link each school in the main disciplinary incident dataset to its corresponding county sheriff's office and municipal police department (see Appendix Figure A2 for police agency locations in relation to school locations).[11]

3.2 Methods

We begin our analysis by assessing disparities in the likelihood that a school-based offense is referred by the school to juvenile justice. Given the descriptive disparities in Table 1, we aim to account for school offense type and prior school-based infractions to isolate demographic and socioeconomic gaps in the propensity for an infraction to be referred to juvenile justice. Using a binary indicator for whether an offense was referred to juvenile justice (*Z*), and restricting the sample to only the first incident for each student in each year, we model referral as a linear function:

$$Z_{igst} = \alpha_1 X_i + \alpha_2 T_{it} + \alpha_3 O_{i,t-1} + \gamma_{sgt} + \varepsilon_{igst}, \quad (1)$$

where *i, g, s,* and *t* index student, grade, school, and year, respectively. In equation 1, α_1 captures the conditional difference in the probability that a student's first offense of the year is referred to juvenile justice across socioeconomic and demographic characteristics of the student (*i*) who committed the offense. Our approach accounts for two important sources of confounding. First,

[11] The question of whether schools report offenses to their municipal police department or their county sheriff's office is complex. Typically, phone calls to police are routed to the local municipal police department. However, many school resource officers (SROs) in North Carolina are employed by county sheriff's offices, which implies that county sheriff's offices likely play some role in juvenile referrals. We ultimately find that both municipal and county police affect school juvenile referral rates, and as such, link both agency types to schools and take average referral rates in cases where a school can be linked to both a municipal and county police agency.

since referrals to juvenile justice tend to be more common for severe offenses, we include fixed effects for the reported type of offense reported in a disciplinary infraction (*T*). Second, referral to juvenile justice may be a function of disciplinary escalation for students with repeated offenses or a history of severe infractions. Thus, O accounts for both the number and severity of offenses from the prior year reported for student *i*.[12] Finally, γ represents school-by-grade-by-year fixed effects.

After documenting inequities in juvenile justice referral, we examine the impact of juvenile justice contact on a variety of student outcomes potentially affected by the type of punishment a student receives. Our baseline specification estimates the effect of a juvenile justice complaint (Z) on student outcomes (Y) as the linear function:

$$Y_{igst} = \beta_1 Z_{it} + \beta_2 T_{it} + \beta_3 O_{i,t-1} + \beta_4 Y_{i,t-1} + \beta_5 X_{ist} + \varepsilon_{igst}, \quad (2)$$

where *i, g, s,* and *t* index students, grades, schools, and month-years, respectively, and *Z* represents a binary indicator for referral to the juvenile justice system for the first offense a student records in a given school year.[13] The inclusion of offense type fixed effects (*T*) and controls for the number and severity of offenses in the prior academic year (*O*) ensures β_1 estimates the effect of juvenile justice referral using comparisons of students with the same disciplinary record and committing the same offense. Finally, we include lagged measures of the outcomes and student and school characteristics to account for pre-existing differences in students' context and academic and behavioral trends.

[12]More specifically, we include three variables: the number of offenses committed by student *i* in year *t-1*, the number of serious offenses committed by student *i* in year *t-1* (defined as offenses that lead to an OSS or more serious consequence), and a dummy variable indicating that the student was not observed in the prior year's disciplinary data. This absence from the disciplinary data could signify either that the student did not commit any reported offenses or that the student was not in the NC public school system. Either way, we consider this situation a "blank slate" for the student. However, we cannot account for the possibility that some unobserved incorrect categorization of behaviors covaries with other student characteristics (e.g., a Black student may have the same behavior coded at a more severe infraction relative to a White student committing the same offence (Owens, 2022).

[13] We also estimate equations 2, 3, and 4 using students' most severe recorded offense in an academic year and the results are similar. See Appendix Table A4.

Here, our identification rests on the assumption that students with identical prior academic performance and identical disciplinary records committing the same reported offense type vary only in their exposure to the juvenile justice system in response to a given infraction.[14] If that assumption holds, β_1 identifies the differential effect of contact with the juvenile justice system, in place of only a school-based disciplinary punishment, on students' academic and behavioral outcomes.

We employ three additional model specifications to further relax this identifying assumption. First, we add school-grade-year fixed effects such that we are comparing students in the same school, grade, and year (who still committed the same type of reported offense and had similar prior academic and behavioral indicators), but one student received a juvenile complaint for their offense and another did not. This school-grade-year fixed effect accounts for the possibility that schools or principals more likely to refer incidents to juvenile court have other systematic differences not captured by our included control variables (school level, school type, geographic locale, student enrollment, pupil-teacher ratio, and proportion of students economically disadvantaged). Second, we add student fixed effects, thereby identifying the effect of interest using within-student comparisons across school years of offenses referred to juvenile court relative to offenses only addressed by the school internally. Third, our most tightly controlled model removes student fixed effects but adds incident fixed effects. This approach follows recent work on student discipline (e.g., Barrett et al., 2021; Shi & Zhu, 2022b) and restricts the sample of offenses to incidents in which multiple students were involved. This identifies the effect of interest using a comparison of outcomes between

[14] Racial bias in the discretionary sorting into i) documented disciplinary infraction, ii) school staff assessment of the severity of the infraction, and iii) school reporting to police and the juvenile justice system, can violate this assumption through the systematic bias of non-reporting analogous to those documented in policing research more broadly (see Durlauf & Heckman, 2020; Fryer, Jr., 2019; Knox et al., 2020 for a detailed documentation of this issue of working with administrative data). However, this bias attenuates the estimated impact of racial differences in both the exposure to and impact of juvenile justice punishments. As such, our estimates should be treated as conservative, lower-bound estimates of racial differences.

students involved in the same incident, at least one of whom receives a juvenile-justice complaint relative to other involved students receiving only discipline internally with the school. This accounts for potential biases arising from juvenile complaints being determined by different incidents than those that receive only internal disciplinary measures. However, we cannot rule out the possibility that within-incident differences in punishment response stem from differences in roles students had in the shared incident.

Each of these empirical strategies has unique strengths but also limitations. Importantly, as we sequentially add more fixed effects and control more tightly for school, student, and incident heterogeneity, we estimate effects of juvenile complaints using smaller samples with less variation in treatment. Of our 515,684-observation sample of first incidents committed by each student in a given school year, only 208,404 (40.4%) occur in school-grade-years in which some incidents receive juvenile complaints while others do not. Only 9,355 (1.8%) occur for students who, during their observed disciplinary record, have at least one year with the first incident receiving a juvenile complaint and another year with the first incident not receiving a complaint. And, finally, only 1,287 (0.3%) of our sample of first incidents involve multiple students for the reported offense, at least one of whom receives a juvenile complaint and at least one of whom does not. This loss in variation for the more tightly controlled approaches limits the statistical precision possible, and limits the generalizability possible, from the resulting estimates. Our preferred strategy is, therefore, the simplest – represented by equation 2 – but we will present results from all model specifications for the sake of comparison and to ensure that unobservable differences across schools, students, or incidents, are not driving our estimated effects.

Our estimates of the impacts of juvenile justice contact rely on an assumption that some variation in juvenile justice contact is driven by discretionary decisions of school personnel and law enforcement rather than by differences in student behavior. We seek to verify and examine the

specific role of school and law enforcement practices in driving the effects of juvenile justice complaints through a final analysis. To do so, we estimate two measures: (1) school propensity to report offenses to the police and (2) police propensity to refer offenses to juvenile court. The logic behind these measures is that we seek to disentangle school administrator and police decision-making from the contextual factors informing their decision-making.

For instance, to estimate school propensity to report offenses to the police, we begin by performing a regression of the form:

$$P_{igstm} = \delta T_{it} + SPR_{stm} + \theta_g + \varepsilon_{igstm} \; if \; year = t \; and \; month \neq m \quad (3)$$

In this equation, *P* is an indicator of whether the first incident committed by student *i* in grade *g*, year *t*, and month *m* is reported to the police by school *s*, *T* is a series of dummy variables representing offense type, and θ are grade fixed effects. SPR is a school-year-specific effect estimated with empirical Bayes shrinkage[15] that reflects school-to-police reporting practices that cannot be explained by student offense severity. We use leave-month-out estimation, because when we estimate the effects of police reporting propensity for a school on student juvenile referrals and outcomes, we do not want the student's own disciplinary offense included in the estimation of the right-hand side variable, which might lead to simultaneity issues. To give an example, if a student committed an offense in October of 2007, we would calculate that student's corresponding school's propensity to report to the police (*SPR*) as the average of the school's propensity to report to the police for all incidents occurring in all months of the 2007-2008 school year except for October, adjusting for the types of offenses committed in that school during those months.

[15] In particular, we used mixed model estimation where the predicted school-year random effects were estimated with shrinkage such that random effects with less precision were adjusted toward the mean and random effects with more precision were less adjusted to the mean. This is essentially equivalent to shrinkage in a fully Bayesian setup as described in Clark (2019).

Following a school's reporting an incident to police, typically the next stage involves the police agency deciding whether to refer the incident to juvenile court. We therefore model police decisions similarly to how we modeled school personnel decisions by first performing the following regression in the monthly agency arrests data from UCR:

$$J_{ktm} = \lambda_1 T_{km} + \lambda_2 X_{km} + PCR_{ktm} + \varepsilon_{ktm} \; if \; year = t \; and \; month \neq m \quad (4)$$

This regression of the proportion of juvenile arrests referred to juvenile court *J* for agency *k* in month *m* of year *t* includes a series of controls for the composition of offense types represented in agency arrests (*T*)[16] and other agency characteristics such as demographic characteristics of arrested individuals and log population served (*X*). Like above, PCR is an agency-year-specific effect estimated with empirical Bayes shrinkage that represents the agency's likelihood of referring a juvenile to court (instead of releasing them) that cannot be explained by differences in the composition or types of juvenile arrests. Again, we use leave-month-out estimation. The distribution of school-to-police and police-to-court reporting propensity estimates, standardized to have mean 0 and standard deviation of 1, are presented in Appendix Figures A3 and A4.

Linking these measures of school personnel reporting-to-police behaviors and law enforcement referring-to-juvenile-court behaviors to our baseline dataset, we can use the same approach from equation 2 to estimate the direct effects of these behaviors on the likelihood of

[16] Specifically, we control for the proportion of arrests for each of the following categories in each agency in each month: murder or manslaughter; forcible rape; robbery; aggravated assault; burglary-breaking or entering; larceny-theft (not motor vehicles); motor vehicle theft; other assaults; arson; forgery and counterfeiting; fraud; embezzlement; stolen property – buy, receive, possess; vandalism; weapons – carry, possess; prostitution and commercialized vice; sex offenses (not rape or prostitution); sale/manufacturing – opium, coke, and their derivatives; sale/manufacturing – marijuana; sale/manufacturing – truly addicting synthetic narcotics; sale/manufacturing – other dangerous non-narcotic drugs; possession – opium, coke, and their derivatives; possession – marijuana; possession – truly addicting synthetic narcotics; possession – other dangerous non-narcotic drugs; gambling; offenses against family and children; driving under the influence; liquor laws; disorderly conduct; vagrancy; curfew and loitering violations; and runaways.

juvenile complaint for a school-based offense and downstream student educational and behavioral outcomes. We also add an interaction term of SPR and PCR to the equation to reflect the principle that school reporting practices and police referring practices might matter *jointly* for determining juvenile justice contact (see Figure 1 and Appendix Figure A1).

Even after controlling for student offense type, offending history, and school and community characteristics, we find that these school personnel and police behaviors directly affect the probability that a school-based offense ultimately turns into a juvenile complaint. Figure 2 depicts the predicted probability of a juvenile complaint for a school-based offense based on different values of school-to-police referral propensity (y-axis) and police-to-juvenile-court referral propensity (x-axis). The graph illustrates that school personnel and law enforcement behaviors jointly matter for whether students on the margin end up in the juvenile justice system. Specifically, the likelihood that a student's first school-based offense of the year will turn into a juvenile complaint is 0.9% for students in the lowest-referring schools linked to the lowest-referring police agencies, but 1.9% for students in the highest-referring schools linked to the highest-referring police agencies – or over double the rate. For a school with an average number of disciplinary incidents and average number of students (951 incidents for 239 students), this translates into around 10 additional student referrals to the juvenile justice system each year.

The following section presents our results regarding disparities in referral to juvenile justice, effects of juvenile justice contact on academic and behavioral outcomes, and linkages between school- and police-referring behaviors and these same student outcomes.

4 Results

4.1 Disparities in Referral to Juvenile Justice

First, we assess disparities in the likelihood of referral to juvenile justice for an offense conditional on offense type and student offending history. Estimates from equation 1, as previously described, are presented in gray bars in Figure 3 as percent differences in the likelihood of receiving a juvenile complaint by student characteristics. Appendix Table A5 presents the full regression results underlying each of these demographic or socioeconomic gaps. The results show that males are 17.5% less likely than females to receive a juvenile complaint, all else held equal, while Black and multiracial students are 7.1% and 22.8%, respectively, more likely than White students to receive a juvenile complaint. Mirroring racial gaps, Figure 3 further shows that economically disadvantaged students are 12.3% more likely than their more advantaged peers to receive a juvenile complaint for the same offense type and student offending history, consistent with prior work documenting higher juvenile justice contact rates by socioeconomic and disability status (Skiba et al., 2002; Zane & Pupo, 2021). Appendix Figures A5 and A6 present intersectional disparities in complaint by race and gender and by race and economic disadvantage.

While assault and fighting make up the two most common offenses to receive a complaint (see Appendix Table A1), the broad and ill-defined offense of "disorderly conduct at school" is the third most common offense. Given the subjective interpretation involved in determining both what constitutes disorderly conduct sufficient for punishment and the line at which such conduct warrants the additional step of submitting a juvenile complaint, potential disparities across groups of students in juvenile complaints arising from this offense category may be particularly suggestive of bias in school actions. The purple bars in Figure 3 present estimates of equation 1 in percent difference form, replacing the outcome variable with a binary indicator for whether a student receives a juvenile complaint specifically for disorderly conduct. (Appendix Table A6 presents the full underlying regression results.) Notably, the patterns of disparities across student groups follow the disparity patterns for juvenile complaints overall – in a given school year, female,

Black, multiracial, and economically disadvantaged students all find themselves more likely to receive a juvenile complaint for the broad offense of "disorderly conduct." Specifically, male students are 41.5% less likely, and Black, multiracial, and economically disadvantaged students 71.2%, 68.6%, and 6.7% more likely, respectively, to receive a disorderly conduct charge at the same school for the same reported offense type. These figures suggest that bias in juvenile complaints against disadvantaged student groups is uniformly larger for this more minor and subjective offense type.[17]

Given the documented racial gap in disciplinary referrals for in-school offenses (Hayes et al., 2023; Holt et al., 2022; Liu et al., 2021), and the documented racial gap in the use of within-school exclusionary discipline practices (Skiba et al., 2014), these differences reflect a continued racial/ethnic and socioeconomic disparity in the escalation of disciplinary response through reporting to police for investigation and referral to juvenile courts.[18] Since our analysis focuses only on reported disciplinary offenses, the size of the gaps documented here is attenuated by disproportionate selection into a disciplinary report of any kind.

4.2 Effect of Juvenile Complaints on Students

Since disparities in the propensity for schools to refer students to police and juvenile courts for the same offense presented in Figure 3 reflect a troubling differential treatment by race and SES, the potential for juvenile justice contact to disrupt student trajectories could contribute to widening

[17] Indeed, formal tests using seemingly unrelated regression show that the coefficients are significantly larger for disorderly conduct than for other complaint types for gender and race disparities.

[18] To explore the relative role of a single juvenile justice complaint from school, we conduct Gelbach (2017) decompositions of two policy-relevant academic outcome gaps, between Black and White students, and between economically disadvantaged and economically advantaged students. Among students with disciplinary incidents at the same type of school, a juvenile complaint alone explains 0.08% of socioeconomic gaps in reading, 0.12% of socioeconomic gaps in math, and 0.58% of socioeconomic gaps in absences. It explains 0.01% of Black-White gaps in reading, 0.02% in math, and 1.70% in absences. These are of course modest magnitudes; however, school-based referrals to juvenile court represent one link in a long chain of systems and practices that structurally disadvantage students of color and students from low-income families.

educational inequality. In Table 2, we present an estimate of different versions of equation 2, as previously described, to estimate the effect of a juvenile justice complaint on student achievement in reading and math, student absenteeism, and school offenses, suspensions, and additional juvenile complaints in the same year of the complaint but after the complaint was received. Each column presents each of the outcomes considered, while each row presents each model specification identifying the effect of a juvenile complaint along different sources of variation.

Across all models, the results provide consistent evidence of the deleterious academic and behavioral effects of receiving a juvenile justice complaint instead of (or in addition to) a school-based disciplinary punishment. In row 1, after accounting for a student's prior achievement, prior disciplinary offenses, and the type of offense the student committed, students who received a juvenile complaint for their first offense in the school year were absent 2.6 additional days and scored 0.054 standard deviations lower on reading tests and 0.056 standard deviations lower on math tests on average relative to students not receiving a juvenile complaint.

After accounting for the difference between schools and cohorts with school-grade-year fixed effects, the estimated effects remain sizable, negative, and statistically significant. In row 3, the inclusion of student fixed effects uses a student's own student-years with a disciplinary infraction not referred to juvenile courts as a comparison for student-years with a juvenile complaint.[19] The negative effect of a juvenile complaint largely remains even within-student – 1.46 additional days absent during the school year, a 0.035 standard deviation reduction in reading scores, and a 0.038 standard deviation reduction in math scores. Even relative to the negative effect of school disciplinary measures, the effect of a juvenile justice complaint is sizable. To interpret this

[19] Because of this requirement that we need within-student comparisons of multiple years with a reported disciplinary infraction between 2008 and 2010, we lose a significant portion of the sample. Sample sizes also differ across test scores and absences because test scores are only measured between grades 3 and 8, and absences are also measured in grades 9 and 10.

magnitude, we note that on average, students gain approximately 0.26 standard deviations in reading performance and 0.32 standard deviations in math performance during the median grade level in our sample (Bloom et al., 2008). This means that the learning loss from a juvenile complaint for a student on the margin represents 13-21% of an entire year's worth of learning lost in reading and the equivalent 12-18% of a year's worth of learning lost in math.

Finally, in row 4, we focus on the subset of incidents in which two or more students were involved in the same incident and include an incident fixed effect. This approach (following Barrett et al., 2022; Shi & Zhu, 2022) uses a student involved in the same incident who does *not* receive a juvenile complaint as the comparison student for estimating the treatment effect of a juvenile complaint. Given the focus on a subset of offenses and the resulting smaller sample size, the estimates are less precisely estimated. Notably, however, the size and direction of the estimated effect of juvenile complaints on academic outcomes in columns 1 through 3 is consistent with our main estimates.

The impacts of receiving a juvenile complaint on later student behavior and/or later school disciplinary responses to student behavior are theoretically ambiguous. There remains a possibility that the negative impacts on academic life are offset by a reduction in future disciplinary problems. That is, juvenile justice punishment might provide a deterrent for future rule-breaking behavior. On the other hand, juvenile justice contact could negatively affect either student attitudes or school staff or police attitudes toward the student, which could increase later disciplinary involvement. In columns 4, 5, and 6, the complaint coefficients capture the difference in outcomes between a student receiving a juvenile complaint for their first offense and a student being disciplined solely within the school for their first offense. Receiving a juvenile complaint has a slightly negative effect on later disciplinary offenses reported in the school (0.30 fewer offenses on average). This could be partially driven by the increase in absence following a juvenile complaint or it could reflect a slight

deterrence effect on later misbehavior.[20] However, students are no less likely to receive a suspension in three of the four models, and much more likely to receive additional juvenile complaints following their first contact with the juvenile justice system in all four models (0.09 additional complaints on average). This pattern supports the notion that contact with the juvenile justice system does not change individual behavior as much as it changes the behavior of school personnel and law enforcement toward that individual who now has a record.

Together, these results suggest that contact with the juvenile justice system reduces student achievement, increases their disengagement from school (via absenteeism), does not consistently deter future school disciplinary actions, and induces persistent contact with the juvenile justice system. These phenomena occur similarly across elementary, middle, and high school settings (Appendix Table A8). Given the known adverse effects of within-school disciplinary actions such as suspension on academic outcomes (Lacoe & Steinberg, 2019), we can think of these impacts of juvenile complaints on the margin as the lower bound of aggregate effects of all disciplinary actions taken against a student. Indeed, most students who receive a juvenile complaint are also suspended from school for the same disciplinary incident (Appendix Table A9). Students who commit similar offense types to those who receive a complaint, and attend similar schools, are also suspended from school for a majority of incidents.[21] We can, therefore, interpret the negative academic and

[20] To further investigate these two potential mechanisms, we run a sensitivity check where we include only school-based offenses that occurred more than 30 days after the initial incident. This would exclude any changes in student offending due to immediate absences following the incident. For example, if a student is suspended following the incident, they would be in school less and therefore less likely to accrue a new offense. Appendix Table A7 presents these findings and shows that most of the decrease in student offenses does occur more than 30 days after the initial incident (0.21 out of the 0.30 offense decrease), suggesting longer-term changes in either student behavior or school and police responses to student behavior.

[21] Specifically, Appendix Table A9 presents three columns. The first column shows the most common within-school disciplinary consequences reported by schools for student offenses that do not lead to a juvenile complaint. The third column shows the most common within-school disciplinary consequences reported by schools for student offenses that *do* lead to a juvenile

behavioral effects uncovered in this analysis as incremental consequences due to juvenile justice contact above and beyond the first-order consequences to students of committing an offense or receiving a school disciplinary punishment.

The prior section on disparities in juvenile justice referrals noted a difference between complaints for more serious, objectively defined offense types, as opposed to more minor, subjectively defined offense types, such as "disorderly conduct at school." Considering recent state policy changes to expand the range of exclusionary disciplinary options for schools to include more subjective infractions like disorderly conduct and disobedience, there is a policy interest in knowing the effect of escalated disciplinary responses to these looser categories of infractions. We replicate our main analyses restricting to only disorderly conduct complaints (Appendix Table A10). Overall, the negative effects on academic and behavioral outcomes remain – and are slightly larger for most outcomes – in the restricted sample of disorderly conduct complaints. Appendix Table A11 conversely shows these same analyses for the 16 most serious school-based offense types (called "reportable offenses" in North Carolina).[22] Interestingly, there are few consistent or significant adverse effects of a juvenile complaint on absenteeism or academic outcomes within the sample of most serious offenses. These disaggregated results suggest that when schools issue juvenile complaints for more minor, subjective offenses – such as disorderly conduct – students respond

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complaint. Finally, the second column includes a weighted sample of disciplinary incidents based on exact match to the sample of offenses that lead to complaints on offense type and distance match for other covariates such as number of prior offenses, number of serious prior offenses, and student characteristics. As can be seen in this table, the within-school disciplinary consequences of the matched sample look relatively similar to those of the complaint sample.

[22] These reportable offenses are: assault resulting in serious injury, assault involving use of a weapon, assault on school personnel, bomb threat, burning of a school building, death by other than natural causes, kidnapping, possession of alcohol, possession of a controlled substance, possession of a firearm or explosive, possession of a weapon, rape, robbery without a dangerous weapon, robbery with a dangerous weapon, sexual assault, sexual offense, and indecent liberties with a minor. We cannot include school-grade-year fixed effects in this model because reportable offenses are not common enough for there to be within-school-grade-year variation. We instead use separate school, grade, and year fixed effects.

with even more disengagement from the school than they do for more serious infractions. It is possible that these estimates reflect, in part, students' reactions to perceived (or actual) unfairness in the reporting of a minor offense to police, particularly given observed differential treatment by race/ethnicity, gender, and socioeconomic status.

Of course, we cannot entirely rule out the possibility that worse academic outcomes and higher average juvenile contact problems reflect some selection issue not accounted for in any of our identification approaches. Even within the same incident committed by two students, there could be differences in offense severity across the two students that are not captured in the disciplinary record. Similarly, even within the same student committing the same reported offense type across multiple years, time-varying shocks could lead to both a juvenile complaint and other contemporaneous events not reflected in our controls that affect learning and behavior. We conduct two falsification exercises to check for potential endogeneity issues. The first, presented in Appendix Table A12, is a reverse causality test. In particular, we run all four regression models of academic and behavioral outcomes in year t-1 on receipt of a complaint in year t, with the usual set of controls and fixed effects. The logic underlying this falsification exercise is that current events should not be able to affect past events. Any significant association detected might indicate unobservable selection into the juvenile complaint. However, eleven of the twelve regressions show null results, with point estimates neither systematically positive nor systematically negative. The one statistically significant result is the effect of a complaint on reading test scores in the incident fixed effects model, with a coefficient of -0.000, so it still does not suggest any meaningful bias.

Our second falsification test considers the possibility that the estimated effect of a juvenile complaint actually reflects effects from a "bundle" of treatments: both the complaint itself but also the disciplinary response chosen by the school. Indeed, incidents that receive a juvenile complaint are also more likely to receive a harsh school punishment (e.g., long-term out-of-school suspension)

and less likely to receive a minor, informal punishment (e.g., detention or a parent-teacher conference) (Appendix Tables A9 and A13). We conducted all regression analyses while simultaneously controlling for the type of disciplinary action taken by the school (informal, ISS, short-term OSS, long-term OSS, or other). Results are presented in Appendix Table A14. Reassuringly, all of our main findings remain even once we control for the simultaneous school disciplinary action type. This analysis does not suggest that suspension from school doesn't matter for student outcomes. Instead, it suggests that the choice to report an incident to police or to otherwise initiate contact with the juvenile justice system has immediate academic harms above and beyond any harms imposed by the school disciplinary action.

4.3 Effect of School and Law Enforcement Behaviors on Student Outcomes

Thus far, our analyses have investigated the relationship between individual experiences of contact with the juvenile justice system and subsequent individual educational and behavioral trajectories. In this section, we seek to determine the role of central actors in the school-to-juvenile-justice pipeline, such as school personnel and law enforcement, in contributing to juvenile referral likelihood and educational and behavioral outcomes for all students. We estimate leave-month-out school-to-police referral rates and police-to-juvenile-court referral rates for each school and police agency conditional on offense type as described in the Methods section, normalized to have a mean of zero and standard deviation of one (see Appendix Figures A3 and A4). In Table 3, we present estimates from regressions of student outcomes on these school-referring and police-referring practice measures using our preferred estimation approach from equation 2.

The first thing to note in column 1 is that higher school referral rates to the police and higher police referral rates to juvenile court increase the likelihood that a student receives a juvenile complaint for the average school-based offense type. Specifically, a one standard deviation increase in school-police referring alone increases juvenile complaint likelihood by 0.27 percentage points, a

one standard deviation increase in police-court referring alone increases juvenile complaint likelihood by 0.16 percentage points, and the interaction of both school and police referring practices increases juvenile complaint likelihood by 0.24 percentage points. With an average juvenile complaint rate of 1.2% for the first offense of the school year, this means that one standard deviation increases in both school and police reporting practices would increase the likelihood of receiving a complaint by over 50% from the average incidence.

School and police referring practices also significantly affect attendance and end-of-year achievement for students who commit any disciplinary infraction. Column 2 shows that a one standard deviation increase in police-to-court reporting increases average student absenteeism by 0.12 days. However, school-to-police reporting does not appear to have the same negative effect, perhaps due to the pressure this practice places on students to avoid truancy. Both school and police reporting practices consistently reduce average reading and math scores (with varying levels of statistical significance). If we generate a one standard deviation increase in school-to-police referring and police-to-court referring simultaneously, reading scores would decrease by 0.015 standard deviations and math scores would decrease by 0.011 standard deviations.

There are two important things to note from these findings. First, school and law enforcement actors matter in translating school-based offenses to formal juvenile justice complaints. This is apparent from the significant interaction terms in Table 3 and logically arises from the nature of the process through which a juvenile complaint occurs (see Figure 2 and Appendix Figure A1). Both school actors and law enforcement actors also harm students academically when they choose to send more school disciplinary incidents into the juvenile justice system.

Second, the effect sizes presented in this table reflect intent-to-treat estimates averaging across a large set of students, most of whom experience no juvenile contact. If we assume that the only students affected by school and police reporting practices are those who receive complaints

based on these practices (which is admittedly a strong assumption), then the treatment-on-the-treated effects would be much larger. Specifically, students receiving a juvenile complaint due to potentially exogenous differences in school and police reporting behaviors would be absent from school for over two additional weeks and would score over 1 standard deviation lower in both reading and math. For school administrators on the fence as to whether to report a student incident to police, and for law enforcement officers on the fence as to whether to refer a juvenile offense to the juvenile court system, our findings suggest erring on the side of leniency could benefit all students. More specifically, our evidence suggests that the negative impacts of increasing discretionary student contact with juvenile justice overwhelms any potential benefits to unaffected students, lowering average student outcomes at the school level. Indeed, the increase in the likelihood of receiving a juvenile complaint that we document suggests that such punitiveness does not create meaningful deterrence against misbehavior.

5 Conclusions

The school-to-prison pipeline as a phenomenon presents an enormous challenge to policy-makers and educators seeking to improve equity and justice in the treatment of students. It is possible, however, to break this overarching phenomenon apart into a series of choices made by a specific set of actors. We show that school and law enforcement personnel often choose to unnecessarily escalate certain disciplinary situations, including minor or subjective offenses such as disorderly conduct, to the juvenile justice system. They do so in a biased manner – making decisions that systematically discriminate against female, Black, Native American, multiracial, and economically disadvantaged students. Two students with the same prior academic and behavioral record, committing the same reported offense type, can face different outcomes in the juvenile justice system for no reason other than being enrolled in a school with a principal who calls the

police more often or living in a municipality with a police department that refers more juveniles to the court system. Since unobserved biases in formally documented disciplinary incidents likely shape selection into administrative records (Knox et al., 2020), our estimates demonstrating racial bias in the escalation of punishment likely reflect a lower bound if White and economically advantaged students face a higher behavioral infraction threshold for administrative documentation of infractions.

We further show that these choices on the margin have consequences. Receiving a juvenile complaint reduces student test scores in both reading and math, increases absenteeism from school, and increases student likelihood of receiving further juvenile complaints. In this way, a minor incident at school can easily snowball into a series of larger academic, behavioral, and environmental problems for students if referred to the juvenile justice system. This confirms many of the descriptive findings of prior studies on students experiencing juvenile justice contact (Cavendish, 2014; Gottlieb & Wilson, 2019; Jackson et al., 2019). It also speaks to the need for clearer guidelines and best practices for school administrators and law enforcement agencies in handling school-based offenses.

One practice that might pose problems for the escalation of minor school-based offenses into juvenile complaints is the placement of school resource officers in school settings. This placement of police in schools can act to accelerate the criminalization of student misconduct by strengthening the existing link between schools and police agencies (Homer & Fisher, 2020). A recent report from North Carolina noted that over 80% of all juvenile complaints from school-based offenses leading to either diversion or probation came from school resource officer referrals (North Carolina Sentencing and Policy Advisory Commission, 2022). Recent evidence from Chicago suggests that substituting school resource officer funding with alternative social-emotional supports

can reduce student discipline and police referrals without any deterioration of physical safety (Arneson et al., 2024).

Our results suggest that policymakers should be cautious in granting discretion to school districts regarding both whether to refer student infractions to police at all and which infractions schools can report to police. The bias we document suggests such latitude is likely to lead to growing gaps in exposure to police and further juvenile justice contact among students of color and economically disadvantaged students, exacerbating extant gaps in academic outcomes between these students and their peers. Taking some cues from interventions aimed at curbing gaps in the use of exclusionary discipline within schools, perhaps policymakers should instead explore providing school and district administrators with resources for training in more experimental interventions, such as empathetic mindset exercises for teachers, which have been shown to be effective at reducing racial gaps in disciplinary actions (Okonofua et al., 2022).

This study has several limitations. First, the reporting of disciplinary incidents involves subjective judgments of school personnel. There is likely bias against certain groups of students in who shows up in disciplinary referral data in the first place (e.g., Holt et al., 2022; Lindsay & Hart, 2017; Liu et al., 2022) and how behavior is classified and interpreted by educators (Owens, 2022; Skiba et al. 2011). As such, the bias we find in the juvenile referral stage of the disciplinary process alone represents a lower bound of bias in the entire disciplinary system. Second, because the classification of offense type during reporting is imperfect, some offense categories (such as "disruptive behavior") can reflect a wide variety of behaviors. Therefore, there may be differences in offense severity that we cannot account for merely through the reported offense type indicator variables. Third, our data from 2007-08 to 2009-10 represent a short and outdated time span. This limits our ability to explore the effects of changing school or law enforcement practices over time or to explore the effects of juvenile justice contact in a more modern context. Fourth, although we can

observe counts of juvenile arrests, juvenile releases, and referrals to juvenile courts by police agencies, we cannot observe how police handle each individual incident, limiting the extent to which we can explore police-related mechanisms. Finally, we have not yet examined the impacts of the many discretionary choices that happen after a juvenile complaint is filed in court, such as court counselor decisions regarding adjudication or judge sentencing decisions. Each of these limitations presents opportunities for future research.

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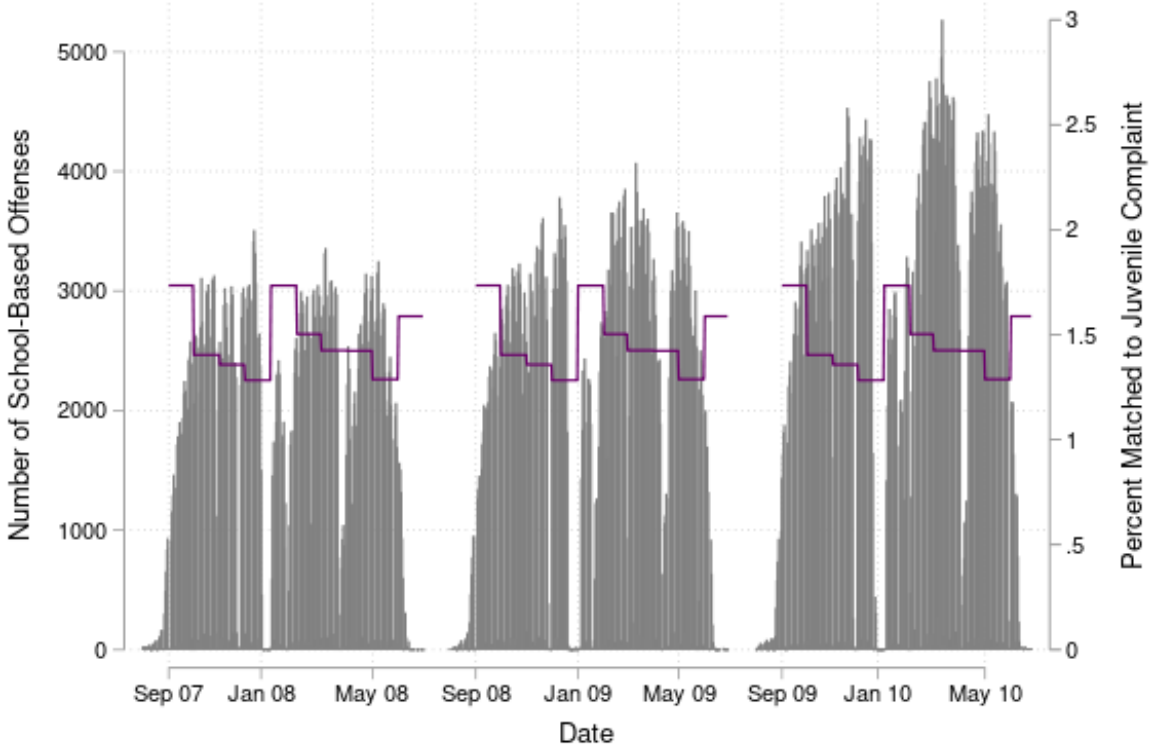
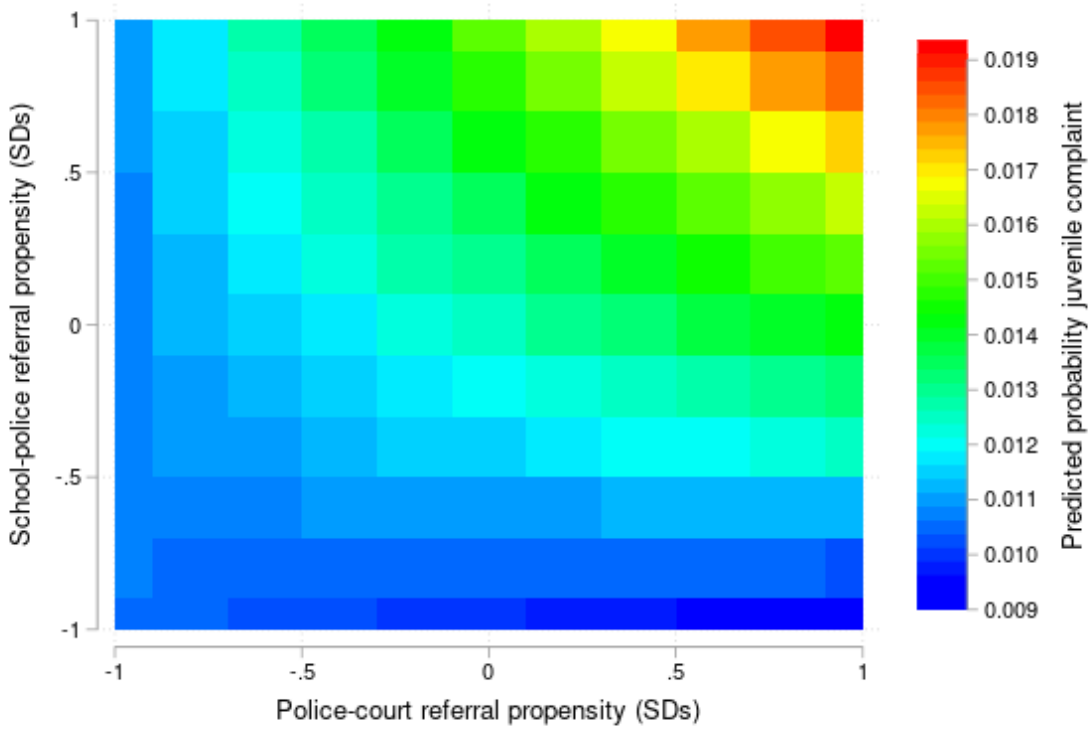
Tables and Figures

Figure 1. School-Based Offenses for Students in Grades 3 to 10 from 2007-08 to 2009-10



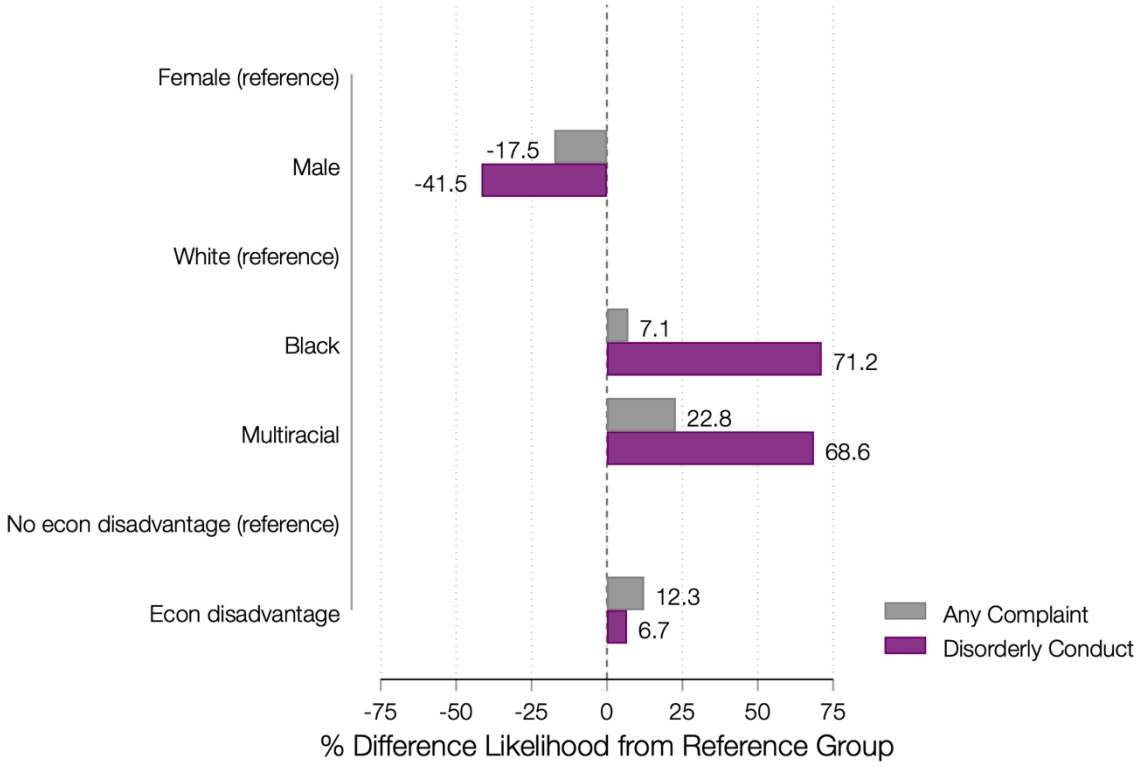
Note. The gray bars (left y-axis) represent the number of school-based offenses recorded on each date. The purple line (right y-axis) represents the percent of school-based offenses in each month that were matched to a corresponding juvenile complaint with the same student and offense date.

Figure 2. Effects of School and Police Referring Behaviors on Juvenile Complaint Likelihood



Note. This figure shows marginal effects of the continuous interaction term of leave-month-out school referral propensity to the police and leave-month-out police referral propensity to juvenile court on the likelihood of a juvenile complaint for school-based offenses. The underlying regression controls for offense type, prior offense counts, prior offense severity, student characteristics, school characteristics, and grade, month, and year fixed effects.

Figure 3. Disparities in Juvenile Complaints for School Offenses by Student Characteristics



Note. Each of these bars represents the estimated percent difference in likelihood of receiving a juvenile complaint for an incident as compared to the reference category, conditional on offense type, prior offending history, and school-by-grade-by-year fixed effects and offense month fixed effects. Excluded reference categories were chosen based on the group with the largest sample size. All coefficients plotted here are statistically significant at the 95% level. Non-significant coefficients (on Hispanic, Asian, Native American, and Exceptionality indicators) are excluded. Full results in Appendix Tables A5 and A6.

Table 1. Descriptive Statistics for Student-Year Level Data, by Complaint Status of First Offense

	No complaint		Juvenile complaint		Total	
Variables	Mean	SD	Mean	SD	Mean	SD
Outcomes						
Reading (SDs)	-0.465	0.975	-0.629	0.968	-0.467	0.975
Math (SDs)	-0.478	0.935	-0.683	0.905	-0.480	0.935
Absences	11.150	11.552	17.535	15.344	11.226	11.625
Later offenses	2.051	3.453	1.458	2.675	2.044	3.445
Later suspensions	0.743	1.515	0.813	1.600	0.744	1.516
Later complaints	0.027	0.237	0.132	0.537	0.029	0.243
Disciplinary						
Any complaint	0.000	0.000	1.000	0.000	0.012	0.111
Disorderly conduct	0.000	0.000	0.120	0.315	0.001	0.037
Prior offenses	1.267	2.865	1.522	2.998	1.270	2.867
Prior serious offenses	0.554	1.362	0.839	1.661	0.557	1.366
No/missing prior	0.637	0.481	0.582	0.493	0.637	0.481
School referring (SDs)	-0.003	0.968	0.245	2.449	0.000	1.000
Police referring (SDs)	-0.003	1.001	0.203	0.922	0.000	1.000
Student characteristics						
Male	0.656	0.475	0.667	0.471	0.656	0.475
American Indian	0.020	0.141	0.022	0.147	0.020	0.141
Asian	0.007	0.083	0.008	0.087	0.007	0.083
Black	0.427	0.495	0.399	0.490	0.426	0.495
Hispanic	0.089	0.285	0.086	0.280	0.089	0.285
Multiracial	0.036	0.186	0.040	0.195	0.036	0.187
White	0.421	0.494	0.446	0.497	0.421	0.494
Econ. disadvantaged	0.643	0.479	0.670	0.470	0.643	0.479
Exceptional	0.200	0.400	0.185	0.388	0.200	0.400
English Learner	0.058	0.234	0.050	0.218	0.058	0.234
Age	13.838	2.247	14.387	1.522	13.844	2.240
Grade	7.374	2.005	8.011	1.470	7.381	2.001
School characteristics						
Elementary	0.190	0.393	0.070	0.256	0.189	0.391
Middle	0.430	0.495	0.446	0.497	0.431	0.495
High	0.346	0.476	0.425	0.494	0.347	0.476
Other grades	0.029	0.168	0.057	0.231	0.029	0.169
Title one	0.449	0.497	0.339	0.473	0.447	0.497
Charter	0.006	0.074	0.001	0.037	0.006	0.074
Magnet	0.056	0.230	0.036	0.185	0.056	0.230

	No complaint		Juvenile complaint		Total	
Variables	Mean	SD	Mean	SD	Mean	SD
Alternative	0.010	0.099	0.030	0.170	0.010	0.101
Special	0.000	0.006	0.000	0.018	0.000	0.006
Urban	0.234	0.423	0.183	0.387	0.233	0.423
Suburban	0.135	0.342	0.117	0.321	0.135	0.341
Town	0.166	0.372	0.165	0.371	0.166	0.372
Rural	0.461	0.499	0.532	0.499	0.462	0.499
Enrollment	857.774	476.914	850.571	477.386	857.684	476.920
Observations	*509,291*		*6,393*		*515,684*	

Note. Reading and math test scores are standardized in the full student population by subject, grade, and year, to have mean of zero and standard deviation of one. They are not re-standardized in this sample of only students with disciplinary incidents. The school referring measure and police referring measure are estimated by authors as the likelihood of a school reporting an incident to the police and the likelihood of a police agency referring an incident to juvenile court, conditional on the severity of the offense and other controls. These are also standardized to have mean of zero and standard deviation of one. Details of estimation of these measures are provided in the methods section.

Table 2. Effects of a Juvenile Complaint on Student Outcomes

Model	(1) Absences	(2) Reading (SDs)	(3) Math (SDs)	(4) Later Offenses	(5) Later Removals	(6) Later Complaints
(1) Lagged DV	2.6261**	-0.0537**	-0.0561**	-0.2970**	0.0054	0.0928**
	(0.189)	(0.013)	(0.012)	(0.031)	(0.019)	(0.007)
	456,109	254,484	256,463	512,946	512,946	512,946
(2) School-year FE	2.2959**	-0.0419**	-0.0439**	-0.1536**	0.0049	0.0651**
	(0.188)	(0.013)	(0.012)	(0.031)	(0.019)	(0.007)
	456,225	253,971	255,935	513,415	513,415	513,415
(3) Student FE	1.4584**	-0.0348+	-0.0380*	-0.4691**	-0.1266**	0.0727**
	(0.279)	(0.019)	(0.018)	(0.058)	(0.032)	(0.011)
	276,676	149,292	150,656	295,102	295,102	295,102
(4) Incident FE	2.0976*	-0.0642	-0.0014	-0.1661	0.0276	0.1057**
	(0.893)	(0.072)	(0.052)	(0.125)	(0.070)	(0.023)
	68,003	40,726	41,217	80,328	80,328	80,328

Note. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables in all models include prior number of offenses, prior number of serious offenses, economic disadvantage, exceptionality, and English learner status. Models 1, 2, and 4 also contain student age, race/ethnicity indicators, gender, and the lagged dependent variable. School control variables in Model 1 include indicators of school type (charter/magnet/alternative/Title 1), school level, geographic locale, and student enrollment.

** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 3. Effects of School and Police Reporting Propensities on Student Outcomes

Variables	(1) Juvenile Complaint	(2) Days Absent	(3) Reading (SDs)	(4) Math (SDs)
School-police referral (SDs)	0.0026**	0.0086	0.0016	0.0001
	(0.000)	(0.025)	(0.002)	(0.002)
Police-court referral (SDs)	0.0016**	0.1229**	-0.0074**	-0.0061**
	(0.000)	(0.018)	(0.001)	(0.001)
School referral (SDs) x	0.0024**	-0.0086	-0.0064**	-0.0052**
Police referral (SDs)	(0.000)	(0.025)	(0.002)	(0.002)
Observations	347,992	310,045	175,061	176,380

Note. Robust standard errors in parentheses, clustered by student. The model contains offense type, offense month, year, and grade fixed effects. Student control variables include lagged dependent variable, number of prior offenses, cumulative prior offense severity, economic disadvantage, exceptionality, English learner status, age, race/ethnicity indicators, and gender. School control variables include indicators of school type (charter/magnet/alternative/Title 1), school level, geographic locale, and student enrollment.

** p<0.01, * p<0.05, + p<0.1

Appendix

Figure A1. Chain of Events of Juvenile Referrals for School-Based Offenses

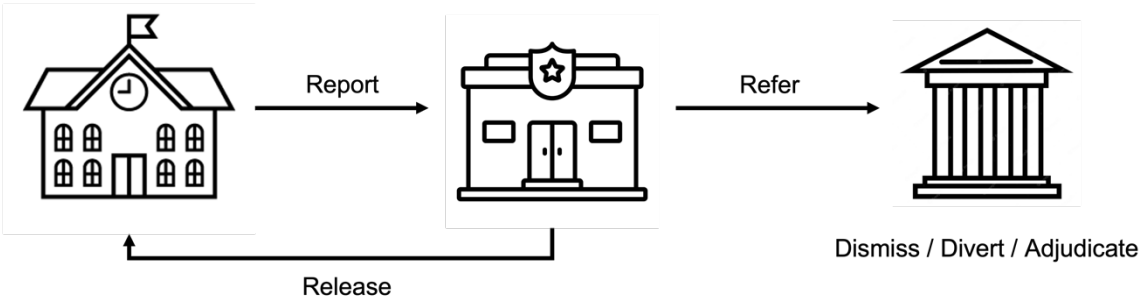
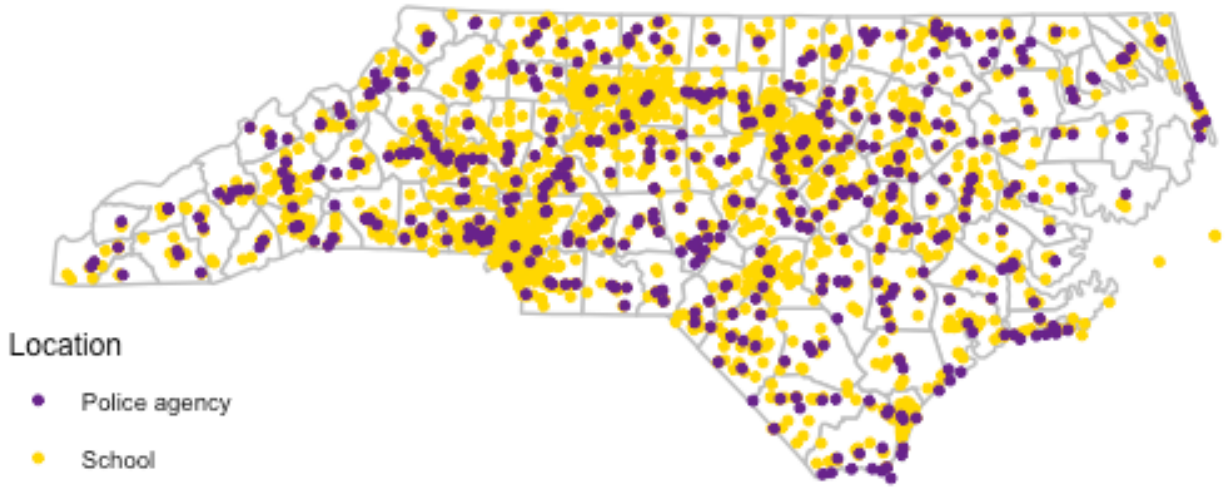
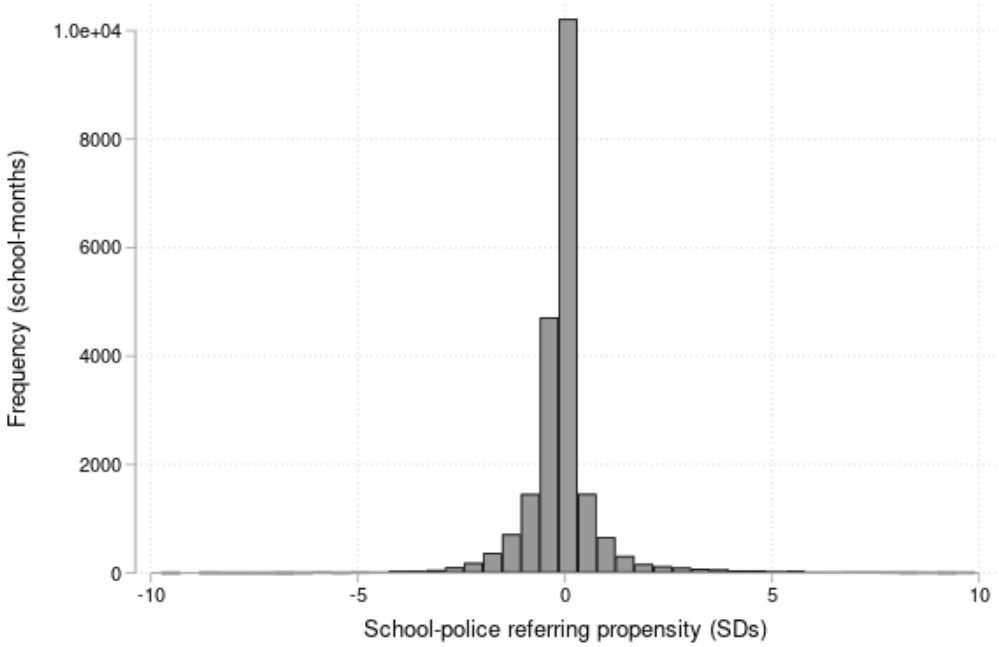


Figure A2. Locations of North Carolina Schools and Police Agencies in Sample



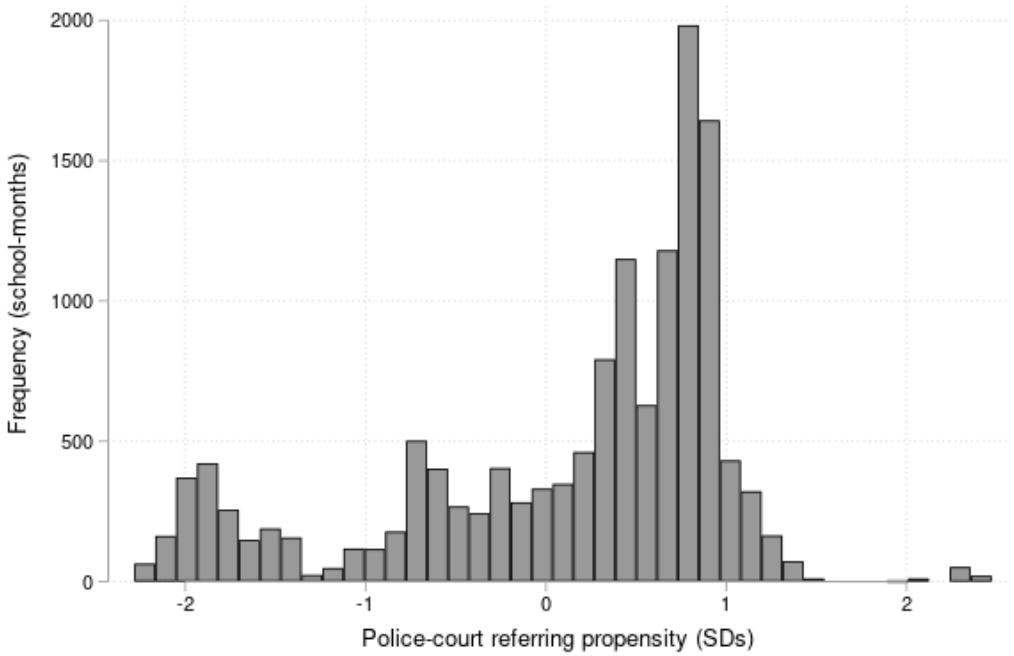
Note. This map plots the location of 2,315 public schools containing at least one grade in grades 3-10 linked to 448 police agencies by city/town and county (348 municipal police departments and 100 county sheriff's offices).

Figure A3. Histogram of School-to-Police Referring Propensity



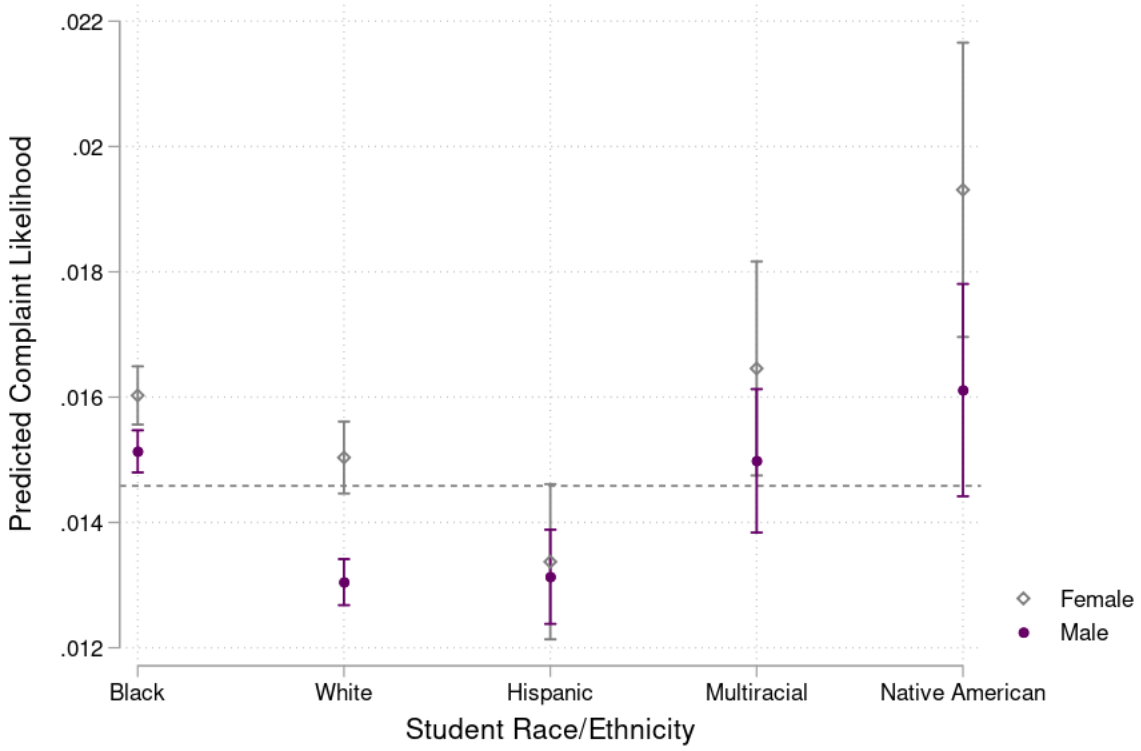
Note. This plots the distribution of school-to-police referring estimates. These are leave-month-out empirical Bayes shrunk estimates of school-year random effects from regressions of school police reports on offense type indicators and student grade level indicators.

Figure A4. Histogram of Police-to-Juvenile-Court Referring Propensity



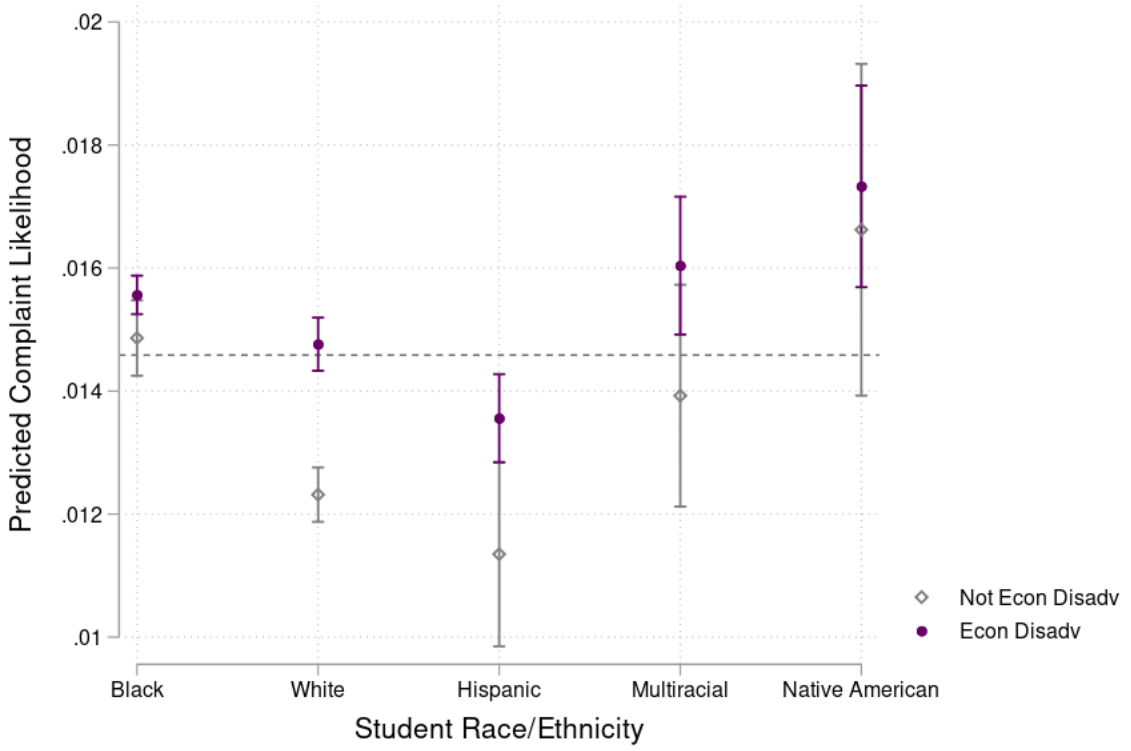
Note. This plots the distribution of police-to-juvenile-court referring estimates. These are leave-month-out empirical Bayes shrunk estimates of agency-school-year random effects from regressions of police percent of juvenile arrests referred to juvenile court on offense composition measures and juvenile sex and age composition measures.

Figure A5. Disparities in Juvenile Complaints by Student Race-Gender Interactions



Note. This graph presents marginal estimates of race-by-gender effects on the likelihood of receiving a juvenile complaint for a given disciplinary referral, controlling for offense type indicators, school, grade, and year fixed effects.

Figure A6. Disparities in Juvenile Complaints by Student Race-Economic-Disadvantage Interactions



Note. This graph presents marginal estimates of race-by-economic-disadvantage effects on the likelihood of receiving a juvenile complaint for a given disciplinary referral, controlling for offense type indicators, school, grade, and year fixed effects.

Table A1. Number of School-Based Offenses by Charge Reported by Juvenile Justice

Charged offense	Frequency	Percent
Simple assault	3,423	14.92
Simple affray	2,954	12.88
Disorderly Conduct at School	2,205	9.61
Weapons on educational property / aid..	1,572	6.85
Larceny - Misdemeanor	1,204	5.25
Communicating threats	1,096	4.78
Simple possession (up to 1/2 ounce of..	777	3.39
Assault government official / employee	710	3.1
Possess marijuana up to 1/2 oz	676	2.95
Disorderly Conduct by engaging in fig..	567	2.47
Possess drug paraphernalia	494	2.15
Possess or carry,openly or concealed,..	449	1.96
Resisting public officer	436	1.9
Possess stolen goods / property (m)	416	1.81
Assault school employee / volunteer	356	1.55
Truant < 16	338	1.47
Injury to personal property	287	1.25
Sexual battery	281	1.22
Injury to real property	261	1.14
Assault inflicting serious injury (A..	224	0.98
Second degree trespass	208	0.91
Disorderly Conduct using any utteranc..	189	0.82
Disorderly conduct by engaging in con..	175	0.76
Disorderly conduct	163	0.71
Injury to Personal Property in excess..	157	0.68
Simple possession schedule II control..	145	0.63
Simple possession schedule IV control..	138	0.6
Assault with a deadly weapon	137	0.6
Possess Fortified Wine, Liquor, Malt ..	116	0.51
Simple possession (up to 1/2 ounce of..	109	0.48
Breaking and or entering (f)	97	0.42
Possess / consume beer / wine on unau..	96	0.42
Consume any alcoholic beverage by a p..	90	0.39
Assault and battery	86	0.37
Possess with intent to manufacture, s..	86	0.37
Carrying concealed weapon	69	0.3
Giving false fire alarms; molesting f..	69	0.3

Charged offense	Frequency	Percent
Larceny after breaking or entering	68	0.3
Indecent exposure	63	0.27
Possess with intent to manufacture, s..	60	0.26
Ungovernable and Truant < 16	55	0.24
Deliver schedule II controlled substa..	52	0.23
Possess marijuana > 1/2 to 1 1/2 oz	51	0.22
Simple possession schedule III contro..	51	0.22
Breaking or entering (m)	50	0.22
Sell or deliver counterfeit controlle..	50	0.22
Unlawfully write or scribble on, mark..	50	0.22
Break or enter a motor vehicle	42	0.18
Sell / deliver marijuana	42	0.18
Larceny - Felony	40	0.17
Possess with intent to manufacture, s..	40	0.17
Possess with intent to sell or delive..	37	0.16
False bomb report public building - 1..	35	0.15
False bomb report	33	0.14
Possess Malt Beverage / Unfortified W..	33	0.14
Ungovernable < 16	33	0.14
Burning of School Houses or Buildings..	32	0.14
Possess with intent to manufacture, s..	32	0.14
Sell / deliver schedule II controlled..	32	0.14
Sell / deliver schedule VI controlled..	31	0.14
Common law robbery	30	0.13
First degree trespass	30	0.13
Possess / consume fortified wine / li..	29	0.13
Possess with intent to manufacture, s..	28	0.12
Sell / deliver schedule IV controlled..	26	0.11
Deliver schedule IV controlled substa..	24	0.1
Deliver schedule VI controlled substa..	24	0.1
Felony Possession of Stolen Property	24	0.1
Make any rude or riotous noise, or be..	24	0.1
Possess / consume beer / wine unautho..	23	0.1
Crime against nature	21	0.09
Dispensing a Prescription Drug by som..	21	0.09
Gun rifle pistol or other firearm on ..	20	0.09
Felony possession of cocaine	19	0.08
Possess with intent to manufacture, s..	19	0.08
Assault on a child under 12	17	0.07

Charged offense	Frequency	Percent
Assault inflicting serious bodily inj..	16	0.07
Assault inflicting serious bodily inj..	16	0.07
Create counterfeit controlled substance	16	0.07
Burning personal property	15	0.07
Carelessness with fire	15	0.07
False imprisonment	15	0.07
Demolish, destroy, deface, injure, bu..	14	0.06
Inhale toxic vapors	14	0.06
Possess or carry, whether openly or c..	14	0.06
Inciting to riot - Misdemeanor	13	0.06
Possess schedule II controlled substa..	13	0.06

Note. Offense types representing fewer than 0.05 percent of all school-based offenses linked to juvenile complaints are excluded from this tabulation but not from the analyses.

Table A2. Number of School-Based Offenses by Type Reported by School

Primary act (school defined)	Frequency	Percent
Disruptive behavior	328,240	20.87
Insubordination	164,558	10.46
Inappropriate language/disrespect	111,716	7.1
Fighting	99,240	6.31
Bus misbehavior	97,750	6.22
Disrespect of faculty/staff	90,328	5.74
Aggressive behavior	86,067	5.47
Excessive tardiness	74,593	4.74
Other School Defined Offense	71,791	4.56
Late to class	56,457	3.59
Skipping class	51,688	3.29
Other	39,741	2.53
Cell phone use	30,678	1.95
Dress code violation	22,172	1.41
Theft	21,139	1.34
Disorderly conduct (G.S. 14-288.4(a)(6	17,485	1.11
Bullying	16,135	1.03
Leaving class without permission	14,208	0.9
Truancy	13,122	0.83
Communicating threats (G.S. 14-277.1)	11,826	0.75
Skipping school	11,722	0.75
Inappropriate items on school property	10,660	0.68
Use of tobacco	9,161	0.58
Property damage	8,673	0.55
Assault on student	8,398	0.53
Being in an unauthorized area	7,547	0.48
Leaving school without permission	7,547	0.48
Harassment - verbal	7,415	0.47
Honor code violation	7,152	0.45
Harassment - sexual	6,904	0.44
Cutting class	6,783	0.43
Possession of a weapon (excluding fire	6,536	0.42
Possession of tobacco	6,135	0.39
Assault on student w/o weapon and not	6,070	0.39
Possession of controlled substance - m	4,545	0.29
Excessive display of affection	4,413	0.28
Falsification of information	4,103	0.26

Primary act (school defined)	Frequency	Percent
Gang activity	4,009	0.25
.	2,747	0.17
Misuse of School Technology	2,604	0.17
Affray (G.S. 14-33)	2,071	0.13
Possession of counterfeit items	1,932	0.12
Assault on school personnel not result	1,571	0.1
Use of controlled substances 09	1,412	0.09
Immunization	1,364	0.09
Possession of controlled substance - o	1,270	0.08
Mutual sexual contact between two stud	1,112	0.07
Assault - other	1,099	0.07
Alcohol Possession (G.S. 18B) 08	953	0.06
Possession of chemical or drug paraphe	952	0.06
Assault on non-student w/o weapon not	945	0.06
Use of alcoholic beverages 08	910	0.06

Note. Offense types representing fewer than 0.05 percent of all school-based offenses are excluded from this tabulation but not from the analyses.

Table A3. Grade and Year Coverage of School-Based Offenses

Grade level	Year			
	2007-08	2008-09	2009-10	Total
3	15,084	18,022	23,478	56,584
4	19,997	22,817	27,785	70,599
5	24,726	27,810	35,177	87,713
6	56,658	64,272	80,663	201,593
7	71,769	77,433	98,641	247,843
8	77,085	80,889	98,223	256,197
9	117,666	133,657	155,846	407,169
10	63,952	80,676	99,280	243,908
Total	446,937	505,576	619,093	1,571,606

Table A4. Effects of a Juvenile Complaint for Most Serious Offense in Academic Year on Student Outcomes

Model	(1) Absences	(2) Reading (SDs)	(3) Math (SDs)	(4) Later Offenses	(5) Later Removals	(6) Later Complaints
(1) Lagged DV	2.4585**	-0.0538**	-0.0582**	0.2057**	0.3501**	0.7902**
	(0.148)	(0.010)	(0.009)	(0.039)	(0.020)	(0.009)
	456,421	254,634	256,617	513,335	513,335	513,335
(2) School-Year FE	2.2636**	-0.0473**	-0.0507**	0.3137**	0.3558**	0.7886**
	(0.148)	(0.010)	(0.009)	(0.036)	(0.019)	(0.009)
	456,562	254,125	256,098	513,825	513,825	513,825
(3) Student FE	1.4984**	-0.0379**	-0.0297*	0.0265	0.1950**	0.8609**
	(0.197)	(0.013)	(0.013)	(0.059)	(0.028)	(0.012)
	277,036	149,490	150,857	295,516	295,516	295,516
(4) Incident FE	1.5749**	-0.0885+	-0.0682+	0.2748*	0.3197**	0.7522**
	(0.527)	(0.046)	(0.039)	(0.122)	(0.064)	(0.025)
	76,682	46,564	47,090	91,458	91,458	91,458

Note. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables in all models include prior number of offenses, prior number of serious offenses, economic disadvantage, exceptionality, and English learner status. Models 1, 2, and 4 also contain student age, race/ethnicity indicators, gender, and the lagged dependent variable. School control variables in Model 1 include indicators of school type (charter/magnet/alternative/Title 1), school level, geographic locale, and student enrollment.

** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A5. Disparities in Juvenile Complaints for School Offenses by Student Characteristics

Variables	(1) Complaint	(2) Complaint	(3) Complaint	(4) Complaint
Female	(Omitted)			
Male	-0.0024**			
	(0.000)			
White		(Omitted)		
Black		0.0008*		
		(0.000)		
Hispanic		0.0006		
		(0.001)		
Asian		0.0021		
		(0.001)		
American Indian		0.0012		
		(0.002)		
Multiracial		0.0027**		
		(0.001)		
Not Economically Disadvantaged			(Omitted)	
Economically Disadvantaged			0.0014**	
			(0.000)	
Not Exceptional Child				(Omitted)
Exceptional Child				-0.0021**
				(0.000)
Reference group mean	0.0120	0.0131	0.0115	0.0126
Observations	513,415	513,415	513,415	513,415
R-squared	0.157	0.157	0.157	0.157

Robust standard errors in parentheses, clustered by student. All models control for prior number of offenses, prior number of serious offenses, and offense type, offense month, and school-by-grade-by-year fixed effects.

** p<0.01, * p<0.05, + p<0.1

Table A6. Disparities in Disorderly Conduct Complaints by Student Characteristics

Variables	(1) Disorderly Conduct	(2) Disorderly Conduct	(3) Disorderly Conduct	(4) Disorderly Conduct
Female	(Omitted)			
Male	-0.0008**			
	(0.000)			
White		(Omitted)		
Black		0.0007**		
		(0.000)		
Hispanic		0.0002		
		(0.000)		
Asian		0.0003		
		(0.001)		
American Indian		0.0008		
		(0.001)		
Multiracial		0.0007*		
		(0.000)		
Not Economically Disadvantaged			(Omitted)	
Economically Disadvantaged			0.0001	
			(0.000)	
Not Exceptional Child				(Omitted)
Exceptional Child				0.0000
				(0.000)
Reference group mean	0.0018	0.0010	0.0011	0.0014
Observations	507,754	507,754	507,754	507,754
R-squared	0.049	0.049	0.049	0.049

Robust standard errors in parentheses, clustered by student. All models control for prior number of offenses, prior number of serious offenses, and offense type, offense month, and school-by-grade-by-year fixed effects.

** p<0.01, * p<0.05, + p<0.1

Table A7. Effects of a Juvenile Complaint on Disciplinary Incidents Over 30 Days Later

Model	Later Offenses	Later Removals	Later Complaints
(1) Lagged DV	-0.2081**	0.0251	0.0728**
	(0.028)	(0.017)	(0.006)
	512,946	512,946	512,946
(2) School-Year FE	-0.0868**	0.0280	0.0513**
	(0.028)	(0.018)	(0.006)
	513,415	513,415	513,415
(3) Student FE	-0.3299**	-0.0774**	0.0596**
	(0.052)	(0.030)	(0.010)
	295,102	295,102	295,102
(4) Incident FE	-0.1091	0.0382	0.0866**
	(0.112)	(0.065)	(0.020)
	80,328	80,328	80,328

Note. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables in all models include prior number of offenses, prior number of serious offenses, economic disadvantage, exceptionality, and English learner status. Models 1, 2, and 4 also contain student age, race/ethnicity indicators, gender, and the lagged dependent variable. School control variables in Model 1 include indicators of school type (charter/magnet/alternative/Title 1), school level, geographic locale, and student enrollment.

** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A8. Effects of a Juvenile Complaint on Student Outcomes by School Level

School Level	Absences	Reading (SDs)	Math (SDs)	Later Offenses	Later Removals	Later Complaints
Elementary	2.6600**	-0.0537	-0.0595	-0.2370**	0.0183	0.0304*
	(0.426)	(0.039)	(0.041)	(0.089)	(0.055)	(0.014)
	90,557	62,262	63,153	97,374	97,374	97,374
Middle	2.8116**	-0.0563**	-0.0546**	-0.2596**	0.0526+	0.1019**
	(0.256)	(0.014)	(0.013)	(0.046)	(0.027)	(0.011)
	204,379	187,006	188,099	221,742	221,742	221,742
High	1.7395**	N/A	N/A	-0.2460**	0.0089	0.0669**
	(0.311)			(0.051)	(0.030)	(0.009)
	149,242			178,629	178,629	178,629
Other	5.2156**	0.0440	-0.0699	-0.7282**	-0.2751**	0.1920**
	(1.393)	(0.069)	(0.067)	(0.131)	(0.099)	(0.043)
	11,931	4,745	4,736	15,200	15,200	15,200

Note. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables include lagged dependent variable, prior number of offenses, cumulative prior offense severity, economic disadvantage, exceptionality, English learner status, age, race/ethnicity indicators, and gender.

** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A9. Most Common School Disciplinary Actions by Juvenile Complaint Status

Disciplinary outcome	No complaint		Complaint
	Unmatched	Matched	
Out-of-school suspension < 10 days	0.354	0.701	0.848
In-school suspension	0.320	0.157	0.047
Detention	0.109	0.026	0.006
Student/parent conference	0.093	0.055	0.047
Bus suspension	0.041	0.013	0.011
Verbal or written warning	0.040	0.008	0.002
Time out	0.039	0.013	0.002
Transfer to alternative school	0.009	0.045	0.071
Report to police	0.005	0.108	0.166
Work detail	0.004	0.002	0.001
Out-of-school suspension > 10 days	0.003	0.035	0.058
Supervised activities	0.003	0.002	0.001
Corporal punishment	0.001	0.001	0.000
Observations	1,549,829	1,294,756	22,939

Note. The matched sample of incidents is constructed using the "ultimatch" function in Stata, where weights are calculated based on exact match by reported offense type and student demographic characteristics and distance-based match by student lagged absences and test scores to the complaint sample of incidents.

Table A10. Effects of a Juvenile Complaint for Disorderly Conduct at School on Student Outcomes

Model	(1) Absences	(2) Reading (SDs)	(3) Math (SDs)	(4) Later Offenses	(5) Later Removals	(6) Later Complaints
(1) Lagged DV	4.0033**	-0.0831*	-0.0575+	-0.4581**	-0.0209	0.1341**
	(0.539)	(0.039)	(0.035)	(0.086)	(0.057)	(0.022)
	451,254	252,057	254,020	507,293	507,293	507,293
(2) School-Year FE	3.4598**	-0.0784+	-0.0405	-0.3316**	-0.0180	0.0915**
	(0.520)	(0.041)	(0.035)	(0.085)	(0.058)	(0.022)
	451,360	251,530	253,481	507,752	507,752	507,752
(3) Student FE	2.7063**	-0.0387	-0.0588	-0.8396**	-0.2798**	0.0692*
	(0.763)	(0.052)	(0.048)	(0.154)	(0.088)	(0.032)
	271,663	147,195	148,543	289,496	289,496	289,496
(4) Incident FE	6.2233+	-0.0796	0.0973	0.0201	0.2159	0.2509**
	(3.593)	(0.205)	(0.151)	(0.363)	(0.208)	(0.096)
	66,816	40,195	40,676	78,805	78,805	78,805

Note. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables in all models include prior number of offenses, prior number of serious offenses, economic disadvantage, exceptionality, and English learner status. Models 1, 2, and 4 also contain student age, race/ethnicity indicators, gender, and the lagged dependent variable. School control variables in Model 1 include indicators of school type (charter/magnet/alternative/Title 1), school level, geographic locale, and student enrollment.

** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A11. Effects of a Juvenile Complaint for Most Serious Offense Types on Student Outcomes

Model	(1) Absences	(2) Reading (SDs)	(3) Math (SDs)	(4) Later Offenses	(5) Later Removals	(6) Later Complaints
(1) Lagged DV	-0.1477	-0.0417	-0.0448+	-0.1013*	0.0044	0.0677**
	(0.334)	(0.026)	(0.025)	(0.046)	(0.029)	(0.011)
	6,587	3,185	3,215	8,078	8,078	8,078
(2) School FE	0.1270	-0.0477	-0.0576+	-0.1063*	0.0086	0.0613**
	(0.401)	(0.033)	(0.032)	(0.054)	(0.033)	(0.012)
	6,179	2,860	2,887	7,691	7,691	7,691
(3) Student FE	-0.7513	0.4360*	1.3160**	-1.0068	-0.4262	0.1706*
	(2.938)	(0.203)	(0.072)	(0.699)	(0.263)	(0.080)
	157	55	55	185	185	185
(4) Incident FE	-0.6194	0.1073	0.1330	-0.2636	-0.0430	0.0659+
	(1.738)	(0.173)	(0.135)	(0.174)	(0.090)	(0.035)
	977	514	517	1,222	1,222	1,222

Note. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables include prior number of offenses, prior number of serious offenses, economic disadvantage, exceptionality, English learner status, age, race/ethnicity indicators, gender, and the lagged dependent variable in all models except student fixed effects. The most serious offenses include: assault resulting in serious injury, assault involving use of a weapon, assault on school personnel, bomb threat, burning of a school building, death by other than natural causes, kidnapping, possession of alcohol, possession of a controlled substance, possession of a firearm or explosive, possession of a weapon, rape, robbery without a dangerous weapon, robbery with a dangerous weapon, sexual assault, sexual offense, and indecent liberties with a minor.

** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A12. Effects of a Juvenile Complaint in Year T on Student Outcomes in Year T-1

Model	Absences	Reading (SDs)	Math (SDs)
(1) Lagged DV	1.0060+	0.0036	-0.0602
	(0.534)	(0.049)	(0.044)
	35,482	16,458	16,593
(2) School-Year FE	0.4534	0.0064	-0.0383
	(0.545)	(0.054)	(0.046)
	34,981	15,942	16,086
(3) Student FE	0.0049	0.0122	-0.0160
	(0.225)	(0.020)	(0.018)
	258,523	127,641	128,799
(4) Incident FE	0.0000	-0.0000**	0.0000
	(0.000)	(0.000)	(0.000)
	68,019	40,977	41,395

Note. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables in all models include prior number of offenses, prior number of serious offenses, economic disadvantage, exceptionality, and English learner status. Models 1, 2, and 4 also contain student age, race/ethnicity indicators, gender, and the lagged dependent variable. School control variables in Model 1 include indicators of school type (charter/magnet/alternative/Title 1), school level, geographic locale, and student enrollment.

** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A13. Associations Between Juvenile Complaint and School Internal Punishment Type Received

Model	(1) Informal	(2) ISS	(3) Short OSS	(4) Long OSS	(5) Other
(1) Lagged DV	-0.0267**	-0.1156**	0.1440**	0.0893**	-0.0008
	(0.004)	(0.003)	(0.005)	(0.005)	(0.001)
	512,946	512,946	512,946	512,946	512,946
(2) School-Year FE	-0.0202**	-0.0966**	0.1101**	0.0868**	-0.0008
	(0.004)	(0.004)	(0.005)	(0.005)	(0.001)
	513,415	513,415	513,415	513,415	513,415
(3) Student FE	-0.0187**	-0.1172**	0.1250**	0.0850**	0.0043*
	(0.007)	(0.007)	(0.009)	(0.006)	(0.002)
	295,102	295,102	295,102	295,102	295,102
(4) Incident FE	-0.0119+	-0.0321**	0.0479**	0.0461**	-0.0014
	(0.006)	(0.009)	(0.014)	(0.011)	(0.005)
	80,328	80,328	80,328	80,328	80,328

Note. ISS = in-school suspension; OSS = out-of-school suspension. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables in all models include prior number of offenses, prior number of serious offenses, economic disadvantage, exceptionality, and English learner status. Models 1, 2, and 4 also contain student age, race/ethnicity indicators, gender, and the lagged dependent variable. School control variables in Model 1 include indicators of school type (charter/magnet/alternative/Title 1), school level, geographic locale, and student enrollment.

** $p<0.01$, * $p<0.05$, + $p<0.1$

Table A14. Effects of a Juvenile Complaint on Student Outcomes, Controlling for Internal School Punishments

Model	(1) Absences	(2) Reading (SDs)	(3) Math (SDs)	(4) Later Offenses	(5) Later Removals	(6) Later Complaints
(1) Lagged DV	2.0501**	-0.0434**	-0.0395**	-0.1716**	-0.0423*	0.0911**
	(0.190)	(0.013)	(0.013)	(0.031)	(0.019)	(0.007)
	456,109	254,484	256,463	512,946	512,946	512,946
(2) School-Year FE	1.9246**	-0.0379**	-0.0349**	-0.1158**	-0.0055	0.0638**
	(0.189)	(0.013)	(0.012)	(0.031)	(0.019)	(0.007)
	456,225	253,971	255,935	513,415	513,415	513,415
(3) Student FE	1.1456**	-0.0348+	-0.0338+	-0.2883**	-0.1191**	0.0743**
	(0.280)	(0.019)	(0.018)	(0.058)	(0.032)	(0.011)
	276,676	149,292	150,656	295,102	295,102	295,102
(4) Incident FE	1.7737*	-0.0642	0.0133	-0.1376	0.0218	0.1061**
	(0.891)	(0.072)	(0.053)	(0.125)	(0.070)	(0.023)
	68,003	40,726	41,217	80,328	80,328	80,328

Note. Robust standard errors in parentheses, clustered by student. All models contain offense type, offense month, year, and grade fixed effects. Student control variables in all models include controls for the type of internal school punishment received (informal/ISS/short-term OSS/long-term OSS or transfer/other), prior number of offenses, prior number of serious offenses, economic disadvantage, exceptionality, and English learner status. Models 1, 2, and 4 also contain student age, race/ethnicity indicators, gender, and the lagged dependent variable. School control variables in Model 1 include indicators of school type (charter/magnet/alternative/Title 1), school level, geographic locale, and student enrollment.

** $p<0.01$, * $p<0.05$, + $p<0.1$