



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

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Involvement with the juvenile justice system carries immense personal costs to youth: 30% of detained youth drop out of school (relative to 5% nationally) and 55% are re-arrested within one year. These personal costs are compounded by societal costs – both directly in \$214,000 of expenses per confined youth per year – and indirectly in lost social and economic productivity. While much of the extant research on the “school-to-prison pipeline” focuses on school disciplinary practices such as suspension, less attention has been given to understanding the impact of school referrals to the juvenile justice system on students’ relationship with school. 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 student academic and behavioral outcomes. We find that, even for the same offense type and circumstance, relative to students only punished for infractions internally in the school, students referred to juvenile justice experience lower academic achievement, increased absenteeism, and are more likely to be involved in future 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 examine demographic disparities in school-based referrals to juvenile justice and find that female students, Black students, and economically disadvantaged students are more likely to receive referrals even for the same offense type and circumstances.

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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 ends 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., 2019; 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; Sorensen et al., 2022), 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., 2019; 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 drive student juvenile justice contact (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 criminal justice system through school-based referrals to juvenile justice.

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 detention in juvenile justice facilities and contact 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 (SRO) to manage school safety, and police presence at schools can increase school-based arrests, particularly for students of color (Sorensen et al., 2023).

Policy disagreements at the national and state levels add new relevance to the well-documented disproportionate exposure to both school discipline and juvenile justice contacts along racial/ethnic and socioeconomic lines. In 2014, under the direction of the Obama Administration, the Office of Civil Rights in the Department of Education (OCR) and the Civil Rights Division of the Department of Justice (CRD) – jointly responsible for enforcing Title IV and Title VI of the Civil Rights Act to ensure schools do not discriminate against students – released guidance for schools regarding their disciplinary practices explicitly aimed at reducing these gaps in exclusionary disciplinary and recommending clearer definitions of behavioral infractions and lighter punishments for low-level behavioral infractions (OCR & CRD, 2014). In 2018, under the direction of the Trump Administration, the OCR and CRD jointly rescinded the guidance (OCR & CRD, 2018).

More recently, 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 newly permits escalation to suspensions for these more minor, subjective infractions (or, in the case

of West Virginia, an automatic suspension after three “disorderly conduct” infractions).¹ As an example, Senate Bill 244, in Florida, creates a legal right for teachers to: remove students for “disobedience” and being “disrespectful,” “press charges” against a student if they believe a crime has been committed at school, and require a disposition of referrals to be reported by the school administration.² In short, new directions in school discipline policy may create more possibilities for bias through poorly defined infractions that rely on subjective interpretation and increased discretion for escalation of school-based disciplinary actions into contact with the criminal justice system.

Meanwhile, there is little evidence about the impact of disciplinary intervention for school-based offenses through the juvenile justice system, in place of or in addition to internal school-based disciplinary interventions, on students’ academic and disciplinary trajectories. While 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), there is less direct evidence regarding the impact of being referred to juvenile justice intervention 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 (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 novel, linked administrative data from the state of North Carolina that links 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 includes information on disciplinary incidents and

¹ 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).

² The “disposition of referrals” is a legal term to describe a formal report describing the circumstances of a disciplinary referral a teacher submitted to a principal, the principal’s decision on the disciplinary outcome, and the reasoning for the decision at which the principal arrived.

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 juvenile justice intervention 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 disciplinary interventions, exposure to juvenile justice interventions after an infraction reduces student learning in math by 0.056 standard deviations and 0.054 standard deviations in reading. Beyond learning, exposure to juvenile justice interventions 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 and are much more likely to receive a juvenile justice complaint in the future. Finally, using a novel measure of school and police department propensity to refer students to the juvenile justice system, we document variation across schools 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 disciplinary interventions (such as suspensions).

This research can inform K-12 school policies and practices to reduce disparities in educational outcomes for these students. Contact with the juvenile justice system 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), a costly outcome as 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 the juvenile justice system 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.

In the following sections, we discuss the motivation for this research based on existing literature on school discipline, disproportionality in discipline, and juvenile justice contacts; describe our data and analytic methods; present our findings; and conclude with a discussion of our contributions to the literature and the policy/practice implications.

2 Background

2.1 Exclusionary discipline in schools

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 school-to-prison pipeline demonstrates how youth of color are often 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 more 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 either the intent or effect of student behavior can impact the differential frequency and type of discipline students receive. However, even when controlling for similar types of behavioral offenses, there is a body of research that demonstrates that students of color still often receive harsher disciplinary responses compared to their White counterparts (Skiba et al., 2011).

For instance, Barrett et al. (2021) examine racial and income disparities in exclusionary discipline across and within schools across Louisiana. To more precisely parse out potential discriminatory decision-making by school actors, Barrett et al. conduct specific analyses focusing on disciplinary outcomes for fighting between black/white and poor/non-poor students while controlling for prior disciplinary records and background characteristics. They find that when students who are Black (compared to White) engage in the same fight together, they receive slightly longer suspensions (i.e., more severe punishment despite being involved in a similar infraction).

Building off the prior Barrett et al. (2021) study and in the same context as our study of North Carolina schools, Shi & Zhu (2022) examine how students are treated for the same type of behaviors and document whether it varies by race/ethnicity in K-12 education in North Carolina. In assessing incidents where peers are committing disciplinary infractions together, they find that Black students are more likely to be suspended than White students and have longer suspensions than both White and Hispanic students. However, they do not find differences between White and Hispanic students in the likelihood of suspension or its length.

Liu et al. (2022) also build off (and confirm) the prior two studies by assessing a similar question using disciplinary infractions from an urban school district in California and focusing on office disciplinary referrals as well as suspension outcomes. Using a student-by-incident level analysis and focusing on multi-student interracial incidents specifically, they find that Black and Hispanic (as compared to White) students face more severe disciplinary consequences (i.e., likelihood of

suspension) when involved in similar incidents with similar achievement and disciplinary histories. This finding is further magnified for high school students and incidents reported as violent.

Moreover, to more accurately parse out the distinct effects of race/ethnicity on the likelihood of suspension or referral, Lehman (2023) uses individual student-level survey data and performs coarsened exact matching (using a variety of observables). In doing so, Lehman confirms prior research showing that Black youth are more likely to receive a suspension, expulsion, or office referral when compared to White youth. Further, Hispanic youth are only more likely to be suspended or expelled than White youth, but this does not apply to office referrals. While advancing the literature, this study is limited in the cross-sectional nature of the survey and focuses solely on individual-level factors while not being able to account for matching at other levels of analysis (such as school or neighborhood).

Scholars suggest that exclusionary discipline may trigger disassociation from academic life, worsened relationships with educators, and further behavioral infractions with escalating penalties – a vicious cycle that places students at-risk of dropping out of school entirely or escalating into criminal infractions (Noltemeyer et al., 2015; Okonofua et al., 2016; (Skiba, Arredondo, et al., 2014). More importantly, in light of our proposed work, exclusionary discipline in schools often leads to higher rates of juvenile justice referral (Mittleman, 2018; Sorensen et al., 2022) and criminal arrest in adulthood (Bacher-Hicks et al., 2019; Davison et al., 2022). Given the lasting impacts of exclusionary discipline on individual well-being, the well-documented disproportionate assignment of students of color to exclusionary punishment is concerning (Okonofua & Eberhardt, 2015; Skiba, Chung, et al., 2014; Skiba et al., 2011; Smolkowski et al., 2016). For instance, Davison and colleagues (2022) find that 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.

The racial disproportionality observed in school punishments is mirrored by the persistent disproportionate representation of Black students in the juvenile justice system (Abrams et al., 2021; Hockenberry, 2020, 2022). Indeed, we observe a 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.

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 factors like principals and teachers. Given the discretion schools and police departments hold over referral to the juvenile justice system, referral to juvenile justice may lead to even worse academic disruption through extended absence from school and further disengagement from the referred student.

2.2 Juvenile justice contact and youth outcomes

Though declining over time, children and youth still have contact with the juvenile justice system at high rates. Approximately 6% of all arrests made in the United States in 2020 involved youth under the age of 18, totaling approximately 424,300 arrests (Puzzanchera, 2022). Further, estimates suggest that half of all juvenile offenses that occur in the United States happen within schools (NC DPS, 2023). As with arrests of youth more broadly and school discipline described previously, research has established that students who have contact with the juvenile justice system – including for school-based offenses – are more likely to come from low socioeconomic backgrounds, be children of color, and/or have disabilities (Skiba et al., 2002; Zane & Pupo, 2021). After arrest, youth in the juvenile justice system face a range of potential consequences, including diversion programs, placement in a juvenile residential facility, probation, correctional facilities, and community-based sanctions, amongst others (OJJDP, 2023).

Research suggests that contact with the juvenile justice system is often associated with future recidivism (Beardslee et al., 2019; Evans-Chase & Zhou, 2014). In a longitudinal study of Black and Latino high school boys, Del Toro et al. (2019) found that youth who experience more frequent police stops are more likely to be involved in more frequent delinquent behavior after being stopped by the police and that this was in part due to psychological distress. Irrespective of future criminal engagement or delinquent behavior, contact with the juvenile justice system has deleterious impacts on youth's psychological well-being. Jackson and colleagues (2019) found that youth who were stopped by the police also reported emotional distress and mental health issues. Finally, and most relevant to the study herein, with regard to academic success, research shows that contact with the juvenile justice system reduces grade point averages (Gottlieb & Wilson, 2019), negatively affects likelihood of returning to school (Cavendish, 2014; Cole & Cohen, 2013), and enhances one's likelihood of dropping out and reduces likelihood of college enrollment (Kirk & Sampson, 2013). For instance, in an examination of youth three years after release from juvenile justice facilities in Florida, Cavendish (2014) found that only 44% returned to school after release. However, this work does not account for the systematically different characteristics of students exposed to juvenile justice intervention – particularly their disciplinary history and the nature of their juvenile justice contact.

Schools have different options when deciding how to discipline students, even when considering similar behavioral issues. One option is to deal with the issue “in-house” meaning an office disciplinary referral or suspension, while another is a referral to law enforcement (i.e., initiating the process for a formal juvenile complaint). Estimates show that Black students are over-represented in referrals to law enforcement compared to their proportionate makeup in the school population (Rapa et al., 2022). Research has already shown that racial disparities in student discipline are particularly large when considering discretionary or subjective disciplinary issues (as opposed to

objective student behavioral issues; (Girvan et al., 2017; Okonofua & Eberhardt, 2015; Shi & Zhu, 2022a). However, less is known about differences in student outcomes for those who are on the margins with similarly severe (or more objective) behavioral issues, where referral to the juvenile justice system is most likely.

Our proposed work will help fill several gaps in our knowledge about this particularly vulnerable and disadvantaged population of students. First, having access to rich administrative data will allow us to provide a clearer descriptive picture of this population of students both in terms of their academic and school disciplinary records. Prior work has been limited in this regard in either the depth of academic information available (e.g., national surveys with demographic snapshots), the lack of information about the school infraction that led to their juvenile justice contact, or the breadth of the sample of students (e.g., single schools or districts in a study). Second, we can examine patterns of student push-out into the juvenile justice system and test the consequences of that push-out on student outcomes. Finally, we can link in law enforcement agency data that allow us to discern the distinct roles of (1) school propensities to report incidents to police and (2) police propensities to refer juvenile arrests to juvenile court, in driving juvenile justice contact for school-based incidents.

2.3 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 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.³

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). 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.⁴ 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.”⁵ Troublingly, a recent American Civil Liberties Union (ACLU) report from North Carolina documents large racial gaps in juvenile complaints with these more subjective and less severe offenses, consistent with well-documented racial disparities in other forms of school discipline (NCACLU, 2023).

³ This juvenile referral process is illustrated simply in Appendix Figure A1. For a more detailed description of the juvenile justice system in North Carolina, see the summarizing guide created by Youth Justice North Carolina (Langberg & Robinson, 2014).

⁴ School-based offenses refer to either offenses that occurred at school or offenses such as truancy that were reported by school personnel.

⁵ 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.

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. Indeed, we will show that much of the variation in the frequency of school-based referrals to the juvenile justice system across schools exists not due to differences in youth behavior, nor due to differences in official school policies, but rather due to differences in the decision-making of personnel in schools and police agencies. First, we examine how these discretionary choices differ across students of different characteristics, such as race/ethnicity, gender, economic disadvantage, and disability. Then, we estimate the academic and behavioral impacts of these discretionary choices for students on the margin of either receiving or not receiving a juvenile referral. In doing so, we identify under what circumstances students would benefit from either more leniency – or more severity – in the juvenile referral decisions made by school administrators and police.

3 Data and Methods

3.1 Data

Using unique administrative data from North Carolina, we investigate the effects of juvenile justice system contact on student achievement and behavioral proxies for rehabilitation and continued engagement with schools. 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 juvenile justice system.⁶ 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 to 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.⁷

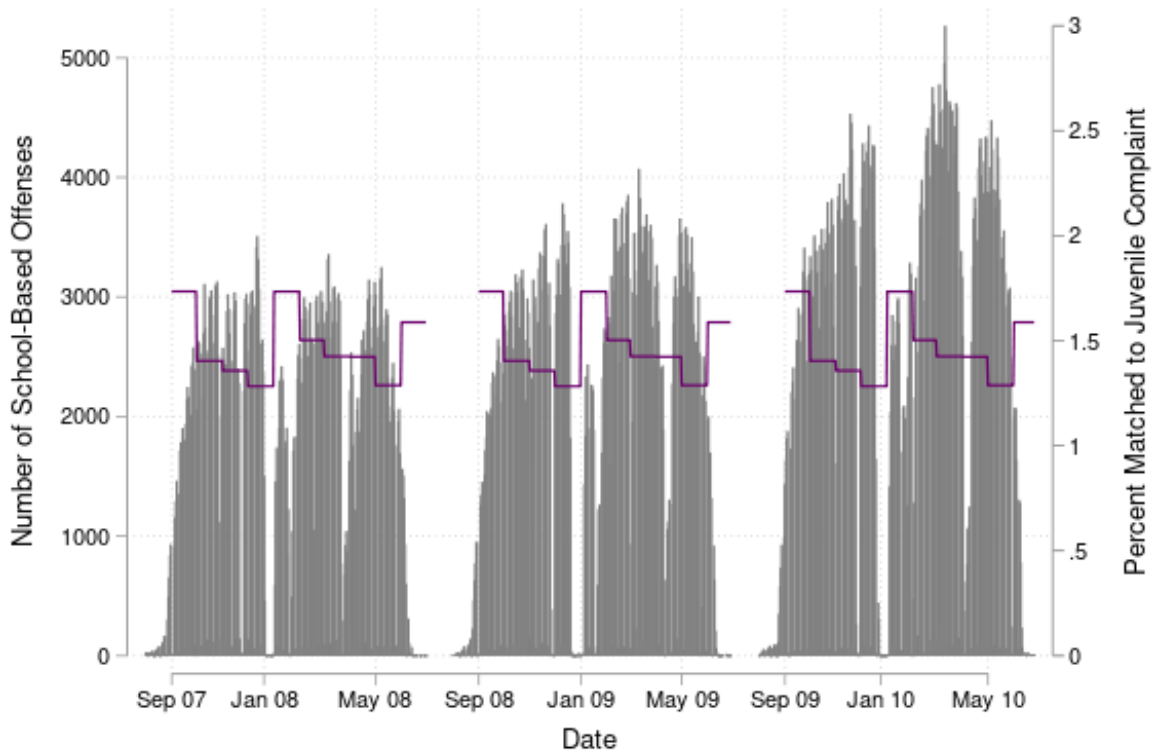
We focus our analysis on understanding the impact of juvenile justice system contact on student outcomes. To do so, we need to aggregate our data from the incident level to the student-year level. Because juvenile complaints are relatively rare— approximately 1.6% of all student disciplinary incidents result in a juvenile complaint – we select the first disciplinary incident for each student in each year to focus on the impacts of consequences for that single incident.⁸ We measure

⁶ Offense types as reported by schools are tabulated in Appendix Table A2.

⁷ Appendix Table A3 provides a tabulation of number of observations by year and grade level.

⁸ 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-

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.

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. Table 1 summarizes our sample separately by whether a student was referred to the juvenile justice system for the first offense committed that year.

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 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).

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

| Variables | No complaint | | Juvenile complaint | | Total | |
|--------------------------------|--------------|--------|--------------------|--------|--------|--------|
| | 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 | 1.000 | 0.000 | 0.001 | 0.038 |
| 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/miss. prior offenses | 0.637 | 0.481 | 0.582 | 0.493 | 0.637 | 0.481 |
| School referring (SDs) | -0.003 | 0.965 | 0.232 | 2.524 | 0.000 | 1.000 |
| Police referring (SDs) | -0.002 | 1.001 | 0.134 | 0.947 | 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 | 13.900 | 2.192 | 14.405 | 1.493 | 13.906 | 2.185 |
| 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 |

| Variables | No complaint | | Juvenile complaint | | Total | |
|---------------------|----------------|---------|--------------------|---------|----------------|---------|
| | Mean | SD | Mean | SD | Mean | SD |
| Magnet | 0.056 | 0.230 | 0.036 | 0.185 | 0.056 | 0.230 |
| 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 | 857.772 | 476.915 | 850.571 | 477.386 | 857.683 | 476.921 |
| <i>Observations</i> | <i>509,291</i> | | <i>6,393</i> | | <i>515,684</i> | |

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 disparities in terms of student demographics and prior offenses between students with incidents referred to juvenile justice and those with incidents disciplined in school are relatively small. Second, students with offenses that are ultimately referred to juvenile justice come from different types of schools on average. For instance, juvenile justice referrals are more common in middle and high schools. Perhaps surprisingly, students referred to juvenile justice for their first offense are more likely enrolled in rural schools and less likely from Title I-eligible schools.

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 2009-2010.⁹ Importantly, these data 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).¹⁰

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), we model referral as a linear function:

$$Pr(Z = 1 | X)_{digst} = \alpha_1 X_i + \alpha_2 T_d + \alpha_3 O_{i,t-1} + \theta_g + \gamma_s + \tau_t + \varepsilon_{digst}, \quad (1)$$

where d , i , g , s , and t index disciplinary incident, student, grade, school, and year, respectively. In equation 1, α_1 captures the conditional difference in the probability that an offense (d) is referred to

⁹ 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.

¹⁰ 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 agencies to schools and take average referral rates in cases where a school can be linked to both a municipal and county police agency.

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, 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 .¹¹ Finally, θ , γ , and τ represent grade, school, and year fixed effects. We estimate equation 1 using linear probability models to accommodate the fixed effects necessary for a consistent estimate of β .

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 punitive intervention a student receives. Among students with a documented offense, we estimate the effect of a juvenile justice complaint (Z) on student outcomes (Y) as the linear function:

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

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.¹² 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

¹¹More 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.

¹² 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.

offense. Finally, we include lagged measures of the outcomes and student characteristics to account for pre-existing differences in students' academic and behavioral trends. Here, our identification rests on the assumption that students in the same school¹³ 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. If that assumption holds, β identifies the differential effect of contact with the juvenile justice system in place of (or in addition to) a school-based disciplinary intervention on students' academic and behavioral outcomes.

We complement equation 2 with a within-student estimate of the effect of juvenile justice contact on academic and behavioral outcomes.

$$Y_{igst} = \vartheta_1 Z_{it} + \vartheta_2 T_{it} + \vartheta_3 X_{it} + \varphi_i + \theta_g + \tau_t + \varepsilon_{igst}, \quad (3)$$

Equation 3 replaces the lagged outcome from equation 2 with a student fixed effect (φ_i), thereby identifying ϑ_1 using within-student comparisons of an offense referred to juvenile justice relative to offenses addressed by the school internally and accounting for unobserved, student-specific and time-invariant factors that may influence the school's referral decision.

Finally, following more recent work on student discipline (e.g., Barrett et al., 2021; Shi & Zhu, 2022b), we restrict the sample of offenses to incidents in which multiple students were involved to allow for the inclusion of an incident fixed effect in our model from equation 2.

$$Y_{digst} = \pi_1 Z_{it} + \pi_2 O_{i,t-1} + \pi_3 Y_{i,t-1} + \pi_4 X_{it} + \theta_g + \tau_t + \omega_d + \varepsilon_{digst}, \quad (4)$$

¹³ We also estimate equation 2 replacing the school fixed effects with detailed school covariates: school level indicators, geographic locale indicators, school type (charter/magnet/alternative) indicators, student enrollment, pupil-teacher ratio, and proportion of students economically disadvantaged. The model without school fixed effects uses variation in juvenile referral likelihood across school environments for otherwise similar students. The model with school fixed effects uses variation in differential juvenile referral treatment of similar students in the same school.

Equation 4 replaces the student fixed effect with an incident fixed effect (ω_d), identifying β using a comparison of outcomes between 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 systematically different incidents than those that receive internal disciplinary measures. However, this approach carries two limitations. First, the subset of incidents that involve multiple students committing their first offense of the year is inherently smaller, introducing potential efficiency issues in estimating the model. Second, and more importantly, we cannot rule out the possibility that the difference in punishment response arose from differences in roles students had in shared incident d .

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 the following regression:

$$P_{digstm} = \delta T_d + \theta_g + \tau_{tm} + \varepsilon_{digstm} \quad (5)$$

In this equation, P is an indicator of whether incident d 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 and τ are grade and month-year fixed effects. We then capture the residuals from this

equation ($P_{digstm}^r = P_{digstm} - \widehat{P_{digstm}}$) to capture the variation in reporting to police that cannot be explained by student offense severity. Finally, we calculate the following leave-month-out average of police reporting for each school s in each month m from the residuals from above:

$$PR_{stm} = \frac{1}{10} \sum_{j \neq m} P_{digstj}^r \quad (6)$$

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 (PR) 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 severity of offenses committed in that school during those months. The reason we use a leave-month-out measure is because when we estimate effects of police reporting propensity for a school on student juvenile referrals and outcomes, we do not want the student's own disciplinary offense to be included in the estimation of the right-hand-side variable, which might lead to simultaneity issues.

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:

$$J_{ktm} = \lambda_1 T_{km} + \lambda_2 X_{km} + \tau_{tm} + \varepsilon_{km} \quad (7)$$

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)¹⁴, other agency characteristics such as demographic characteristics of arrested

¹⁴ 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 –

individuals and log population served (X), and month-year fixed effects (τ). Once again, we calculate the residuals from this equation as $J_{km}^r = J_{km} - \widehat{J_{km}}$ and aggregate to the police agency month level as follows:

$$JR_{ktm} = \frac{1}{10} \sum_{j \neq m} J_{ktj}^r \quad (8)$$

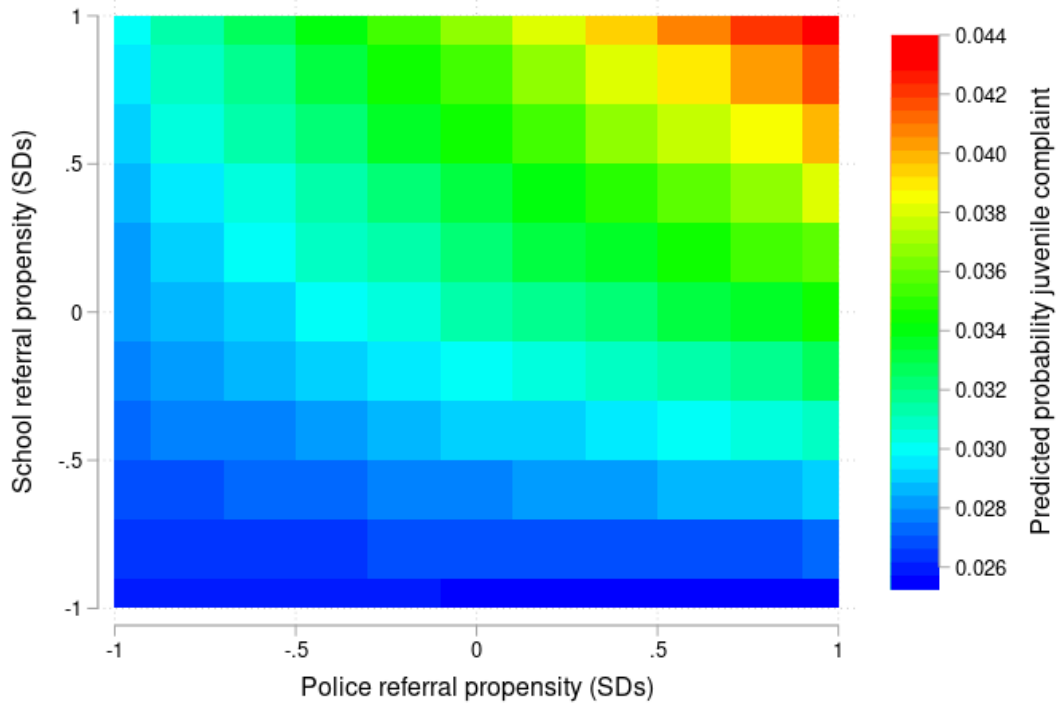
JR here represents the leave-month-out average propensity of police agency k to refer juveniles to juvenile court, as opposed to releasing them without referral, in a given school year t . The distribution of school-to-police and police-to-court reporting propensity estimates, standardized to have mean 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 juvenile complaint for a school-based offense and on downstream student educational and behavioral outcomes. We find, even after controlling for student offense type and offending history and school and community characteristics, 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 the average school-based offense will turn into a juvenile complaint is 2.6% for

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.

students in the lowest-referring schools linked to the lowest-referring police agencies, but 4.4% for students in the highest-referring schools linked to the highest-referring police agencies.

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, and grade and year fixed effects.

The following section presents our results in terms of 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

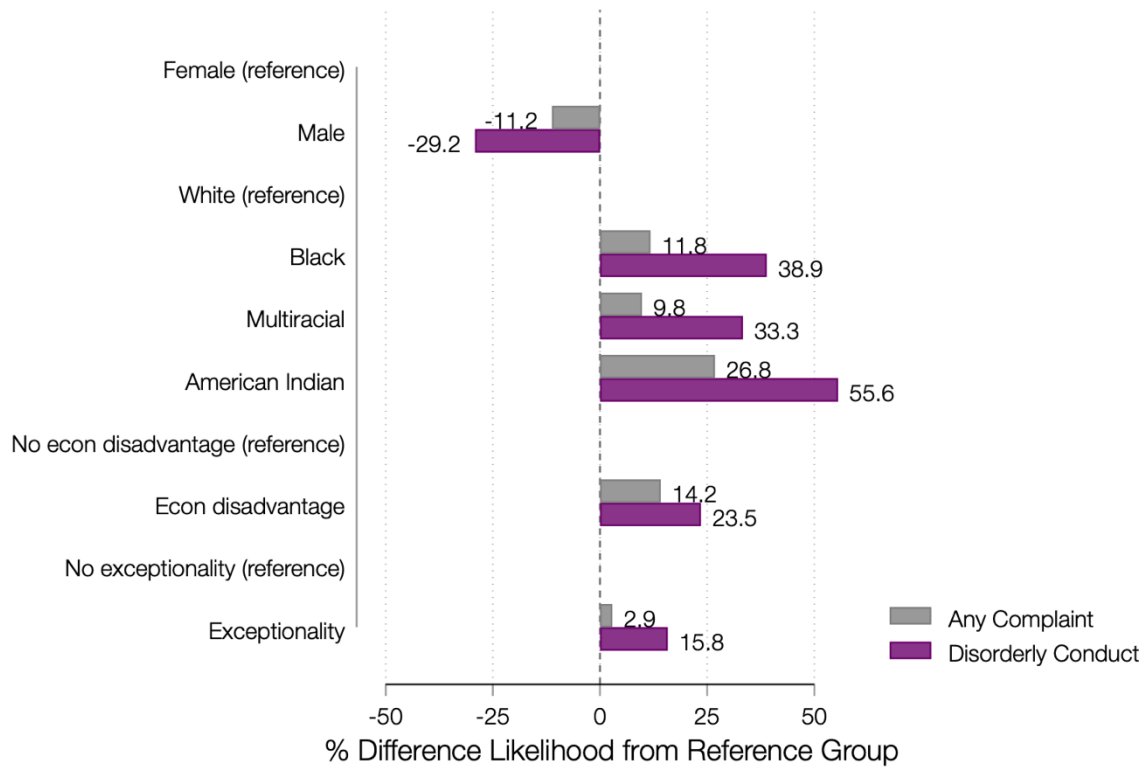
4.1 Disparities in Referral to Juvenile Justice

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 1 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 11.2% less likely than females to receive a juvenile complaint, all else held equal, while Black and Multi-racial students are 11.8% and 9.8% more likely, respectively, to receive a juvenile complaint. Native Americans face a particularly high level of punitiveness, receiving a complaint rate for the same offenses that is 26.8% higher than White students. Mirroring racial gaps, Figure 3 further shows that the economically disadvantaged students are 14.2% more likely than their more advantaged peers to receive a juvenile complaint for the same offense type and student offending history. Appendix Figures A5 and A6 present intersectional disparities in complaint by race and gender and by race and economic disadvantage. Finally, exceptional children have a slight, marginally significant higher likelihood of receiving a juvenile complaint for a given school-based offense.¹⁵

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 responses to offenses. The purple bars in Figure 3 present estimates of equation 1 in

¹⁵ Exceptional children is the term the North Carolina Department of Public Instruction uses primarily to refer to students with documented disabilities.

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, grade, and month-year 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 99% level, except for the exceptionality coefficient for any complaint, which is significant at a 90% level. Non-significant coefficients (on Hispanic and Asian indicators) are excluded. Full results in Appendix Tables A5 and A6.

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, Multi-race, Native American, and economically disadvantaged students, as well as students with disabilities, all find themselves more likely to receive a juvenile complaint for the broad offense of “disorderly conduct.” Specifically, male students are 29.2% less likely, and Black, Multi-racial, and Native American students 38.9%, 33.3%, and 55.6% more likely, respectively, to receive a disorderly

conduct charge at the same school for the same reported offense type. Similarly, economically disadvantaged and exceptional students are 23.5% and 15.8% more likely to receive disorderly conduct charges. These figures suggest that bias in juvenile complaints against disadvantaged student groups is uniformly larger for this more minor and subjective offense type.

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 use of within-school exclusionary discipline practices (Skiba, Chung, 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. Since our analysis focuses on disciplinary offenses, the size of the gaps documented here is attenuated by the 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 may contribute to widening educational inequality. In Table 2, we present an estimate of equations 2 through 4, 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 estimates the model for each of the outcomes considered, while each row presents estimates of the model 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 intervention. In row 1, after accounting for a student's prior achievement, prior

disciplinary offenses, and accounting for the type of offense the student committed in year t , 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 with school 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 referral.¹⁶ The negative effect of a juvenile complaint largely remains even within-student – 1.65 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. 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 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 as another student who does *not* receive a juvenile complaint as the comparison student for estimating the treatment effect of a juvenile complaint. Given the focus on only a subset of offenses and resulting smaller sample

¹⁶ 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.

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 within-students estimates.

The impacts of receiving a juvenile complaint on later student behavior and/or later 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 court intervention 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 effect 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. 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. However, students are no less likely to receive a suspension in two of the three models, and much more likely to receive additional juvenile complaints following their first contact with the juvenile justice system. 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 A7). 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, the majority of students who receive a juvenile complaint are also suspended from school for the same disciplinary incident (Appendix Table A8). 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.¹⁷ We can therefore interpret the negative academic and 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.” This latter category is poorly defined and involves subjective interpretation from teachers and administrators to determine when to escalate their disciplinary response to the level of a juvenile complaint. 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 A9). Overall, the negative effects on academic and behavioral outcomes remain – and are slightly larger

¹⁷ Specifically, Appendix Table A8 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 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.

for most outcomes – in the restricted sample of disorderly conduct complaints. Appendix Table A10 conversely shows these same analyses for the 16 most serious school-based offense types (called “reportable offenses” in North Carolina).¹⁸ 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 with even more disengagement from the school than they do for more serious infractions. It is possible therefore 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 police 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 A11, 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

¹⁸ 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.

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** (0.189) 456,109 | -0.0537** (0.013) 254,484 | -0.0561** (0.012) 256,463 | -0.2970** (0.031) 512,946 | 0.0054 (0.019) 512,946 | 0.0928** (0.007) 512,946 |
| (2) School FE | 2.4654** (0.186) 457,868 | -0.0421** (0.013) 255,484 | -0.0443** (0.012) 257,457 | -0.2434** (0.031) 514,960 | -0.0022 (0.019) 514,960 | 0.0768** (0.007) 514,960 |
| (3) Student FE | 1.4584** (0.279) 276,676 | -0.0348+ (0.019) 149,292 | -0.0380* (0.018) 150,656 | -0.4691** (0.058) 295,102 | -0.1266** (0.032) 295,102 | 0.0727** (0.011) 295,102 |
| (4) Incident FE | 2.0976* (0.893) 68,003 | -0.0642 (0.072) 40,726 | -0.0014 (0.052) 41,217 | -0.1661 (0.125) 80,328 | 0.0276 (0.070) 80,328 | 0.1057** (0.023) 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

and fixed effects. 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.

In a second falsification check, we run regressions separately by the time period in which the first offense occurred during the school year (Appendix Table A12). Although estimates fluctuate, in general it appears as if stronger effects on absenteeism occur for offenses happening in August/September, whereas stronger effects on test scores occur for offenses happening near the end of the year (April through June). This is consistent with the notion that complaints happening earlier in the year have more time to affect a student's attendance record, but that complaints happening later in the year are more disruptive to test-taking and test review. We would not expect to see these differences across time if it were entirely selection into receiving a juvenile complaint driving our results.

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 important 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 both 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 0.12 percentage points, and the interaction of both school and police referring practices increases juvenile complaint likelihood by 0.20 percentage points. With an average juvenile complaint rate of 1.2% for the first offense of the school year, this means that joint one standard deviation increases in both school and police reporting practices would, therefore, increase the likelihood of receiving a complaint by approximately 50% from average.

School and police referring practices also both significantly affect attendance and end-of-year achievement for students who receive a disciplinary infraction. Column 2 shows that a one standard deviation increase in police-to-court reporting increases average student absenteeism by 0.05 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 not become truant. 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 both school-to-police referring and police-to-court referring simultaneously, reading scores would decrease by 0.011 standard deviations and math scores would decrease by 0.009 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

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) | 0.0027** (0.000) | -0.0144 (0.021) | -0.0013 (0.002) | -0.0026+ (0.002) |
| Police-court referral (SDs) | 0.0012** (0.000) | 0.0480** (0.015) | -0.0060** (0.001) | -0.0040** (0.001) |
| School referral (SDs) x Police referral (SDs) | 0.0020** (0.000) | -0.0290 (0.021) | -0.0041* (0.002) | -0.0027+ (0.002) |
| Observations | 455,952 | 404,924 | 227,021 | 228,751 |

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

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 will 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 three-quarters of an additional day 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.

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, such as minor or subjective offenses such as disorderly conduct. They do so in a biased manner – making decisions that systematically discriminate against female students, Black, Native American, and multiracial students, and economically disadvantaged students. Two students with the same prior academic record, same prior 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.

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 particular 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).

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 even shows up in disciplinary referral data in the first place (e.g., Holt et al., 2022; Lindsay & Hart, 2017; Liu et al., 2022). 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, the classification of offense type during reporting is also imperfect. Some offense types are coarse (such as “disruptive behavior”), and therefore, there may be differences in offense severity that we cannot account for merely through the reported offense type dummy 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 explored 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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Appendix

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

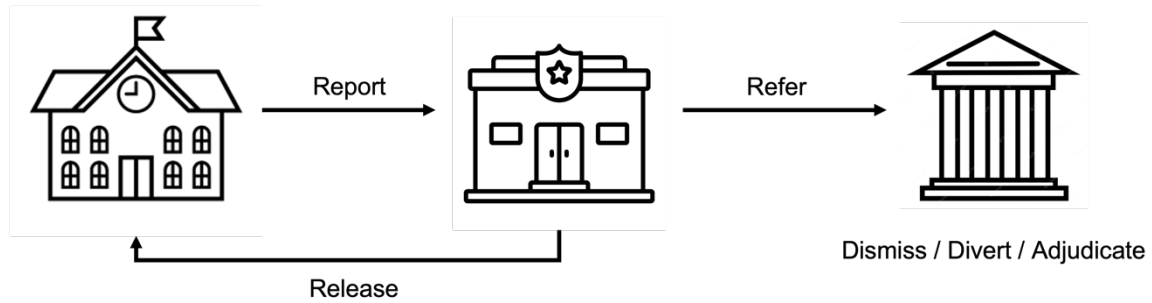
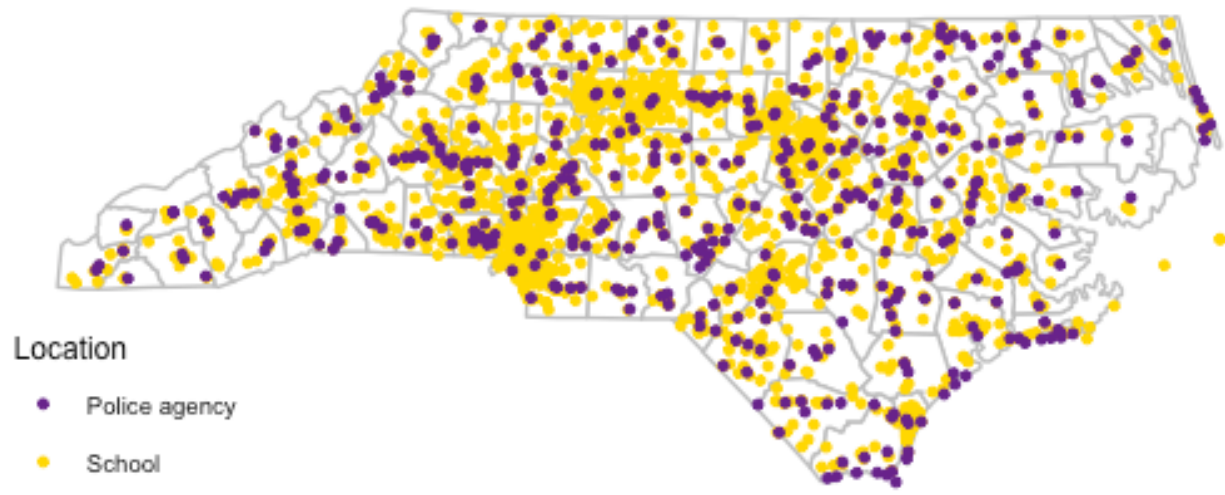


Figure A2. Locations of North Carolina Schools and Police Agencies in Sample



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 Reporting Propensity (Leave-Month-Out)

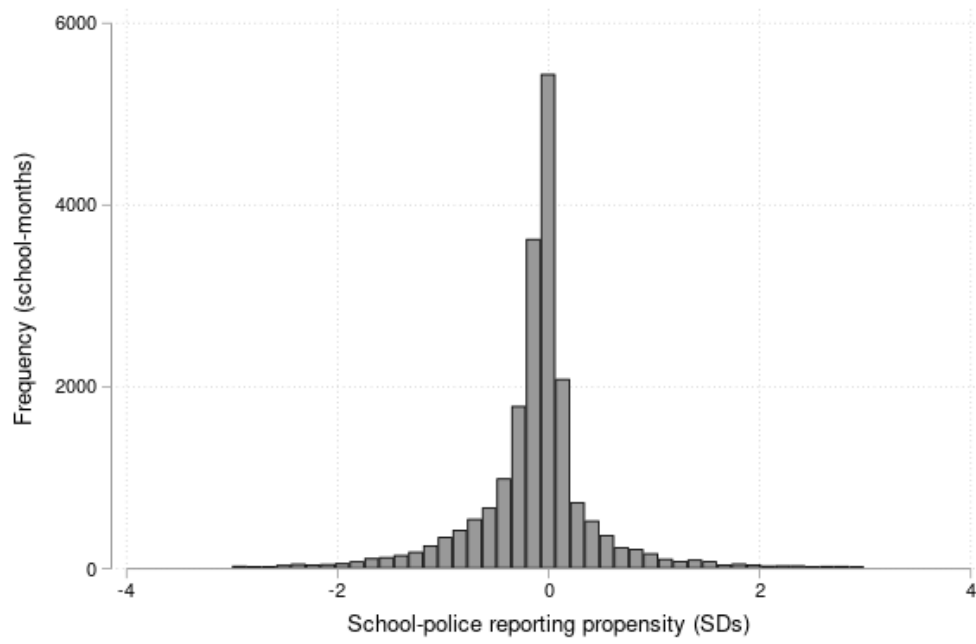


Figure A4. Histogram of Police-to-Juvenile-Court Referring Propensity (Leave-Month-Out)

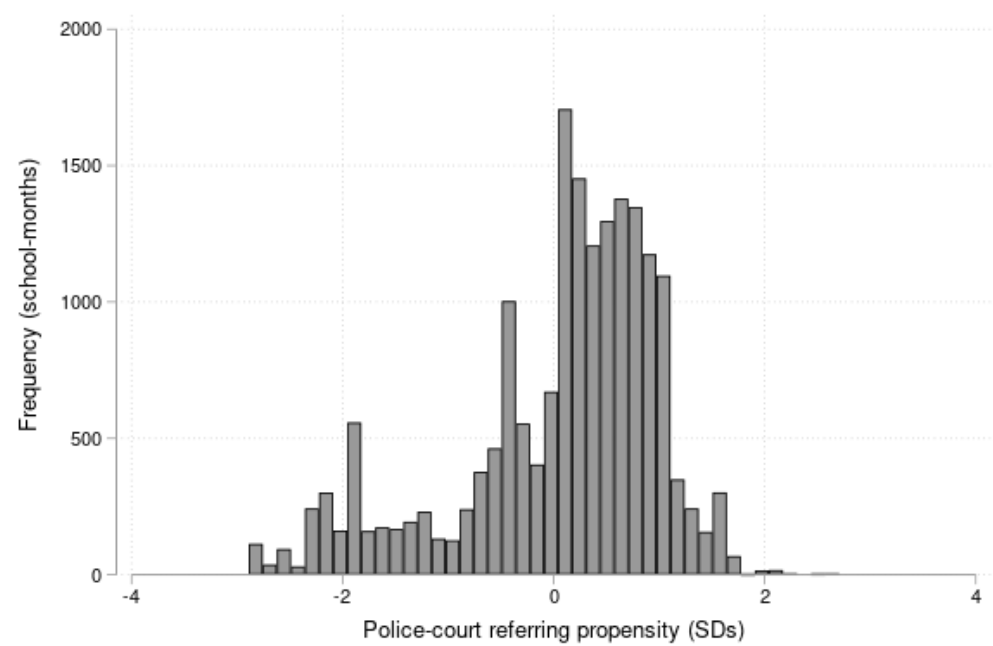


Figure A5. Disparities in Juvenile Complaints by Student Race-Gender Interactions

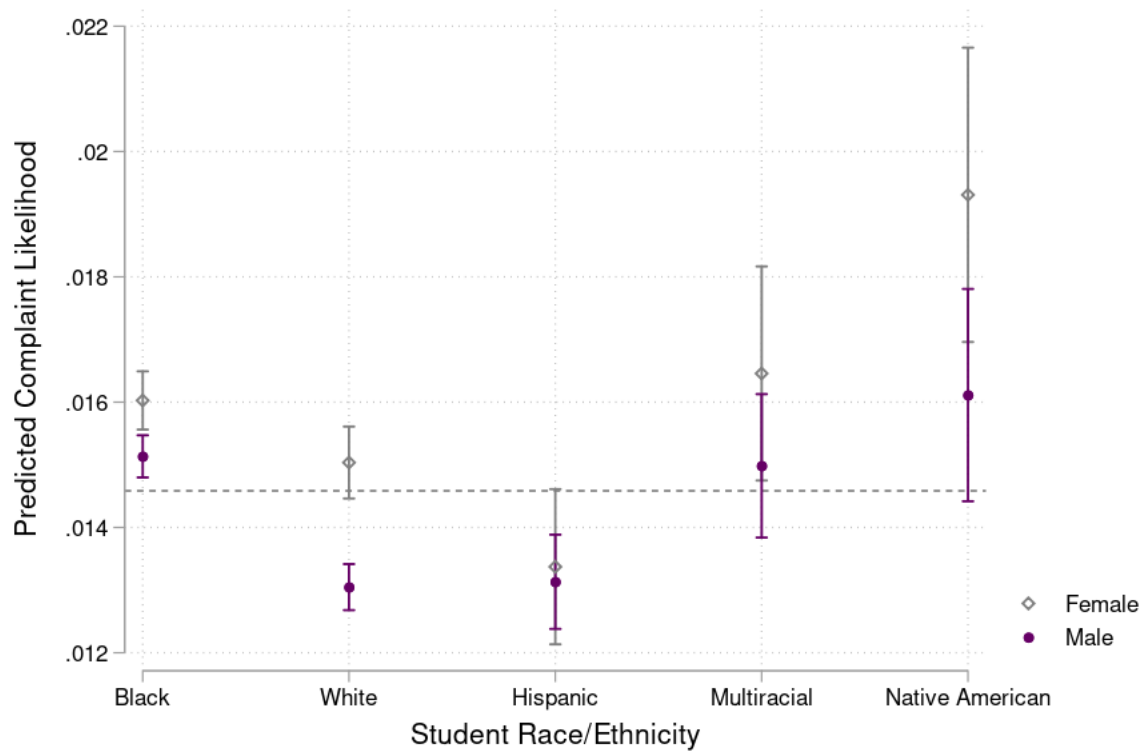


Figure A6. Disparities in Juvenile Complaints by Student Race-Economic-Disadvantage Interactions

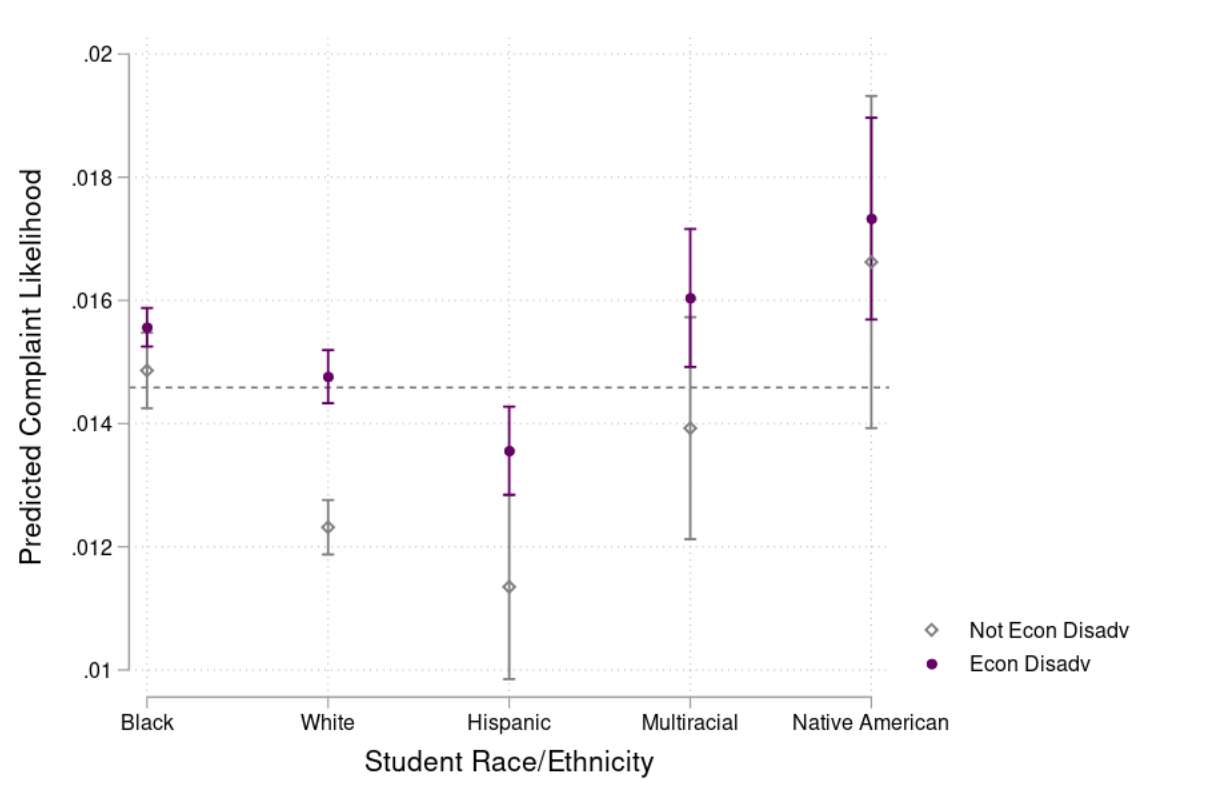


Table A1. Number of School-Based Offenses by Charge Reported by Juvenile Justice

| 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 parape | 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 | 2.4477** (0.148) 456,421 | -0.0484** (0.010) 254,633 | -0.0556** (0.009) 256,616 | 0.2134** (0.039) 513,334 | 0.3548** (0.020) 513,334 | 0.7901** (0.009) 513,334 |
| (2) School FE | 2.3935** (0.147) 458,185 | -0.0409** (0.010) 255,633 | -0.0489** (0.009) 257,610 | 0.2514** (0.037) 515,355 | 0.3493** (0.019) 515,355 | 0.7859** (0.009) 515,355 |
| (3) Student FE | 1.4334** (0.197) 277,036 | -0.0329* (0.013) 149,490 | -0.0263* (0.013) 150,857 | 0.0304 (0.059) 295,516 | 0.1947** (0.028) 295,516 | 0.8621** (0.012) 295,516 |
| (4) Incident FE | 1.3504* (0.529) 76,839 | -0.0814+ (0.046) 46,651 | -0.0769+ (0.040) 47,153 | 0.2642* (0.124) 91,597 | 0.3078** (0.062) 91,597 | 0.7381** (0.024) 91,597 |

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 | -0.0015** (0.000) | | | |
| White | | (Omitted) | | |
| Black | | 0.0018** (0.000) | | |
| Hispanic | | -0.0004 (0.000) | | |
| Asian | | -0.0004 (0.001) | | |
| American Indian | | 0.0041** (0.001) | | |
| Multiracial | | 0.0015** (0.001) | | |
| Not Economically Disadvantaged | | | (Omitted) | |
| Economically Disadvantaged | | | 0.0019** (0.000) | |
| Not Exceptional Child | | | | (Omitted) |
| Exceptional Child | | | | 0.0004+ (0.000) |
| Reference group mean | 0.0134 | 0.0153 | 0.0134 | 0.0140 |
| Observations | 1,570,003 | 1,570,003 | 1,570,003 | 1,570,003 |
| R-squared | 0.134 | 0.134 | 0.134 | 0.134 |

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, year, and grade 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 | -0.0007** (0.000) | | | |
| White | | (Omitted) | | |
| Black | | 0.0007** (0.000) | | |
| Hispanic | | -0.0002 (0.000) | | |
| Asian | | 0.0005 (0.001) | | |
| American Indian | | 0.0010** (0.000) | | |
| Multiracial | | 0.0006** (0.000) | | |
| Not Economically Disadvantaged | | | (Omitted) | |
| Economically Disadvantaged | | | 0.0004** (0.000) | |
| Not Exceptional Child | | | | (Omitted) |
| Exceptional Child | | | | 0.0003** (0.000) |
| Reference group mean | 0.0024 | 0.0018 | 0.0017 | 0.0019 |
| Observations | 1,570,003 | 1,570,003 | 1,570,003 | 1,570,003 |
| R-squared | 0.016 | 0.016 | 0.016 | 0.016 |

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, year, and grade fixed effects.

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

Table A7. 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** (0.426) 90,557 | -0.0537 (0.039) 62,262 | -0.0595 (0.041) 63,153 | -0.2370** (0.089) 97,374 | 0.0183 (0.055) 97,374 | 0.0304* (0.014) 97,374 |
| Middle | 2.8116** (0.256) 204,379 | -0.0563** (0.014) 187,006 | -0.0546** (0.013) 188,099 | -0.2596** (0.046) 221,742 | 0.0526+ (0.027) 221,742 | 0.1019** (0.011) 221,742 |
| High | 1.7395** (0.311) 149,242 | N/A | N/A | -0.2460** (0.051) 178,629 | 0.0089 (0.030) 178,629 | 0.0669** (0.009) 178,629 |
| Other | 5.2156** (1.393) 11,931 | 0.0440 (0.069) 4,745 | -0.0699 (0.067) 4,736 | -0.7282** (0.131) 15,200 | -0.2751** (0.099) 15,200 | 0.1920** (0.043) 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 A8. 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 A9. 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** (0.539) 451,254 | -0.0831* (0.039) 252,057 | -0.0575+ (0.035) 254,020 | -0.4581** (0.086) 507,293 | -0.0209 (0.057) 507,293 | 0.1341** (0.022) 507,293 |
| (2) School FE | 3.7375** (0.525) 453,000 | -0.0661+ (0.039) 253,047 | -0.0471 (0.034) 255,005 | -0.4469** (0.085) 509,291 | -0.0181 (0.056) 509,291 | 0.1120** (0.022) 509,291 |
| (3) Student FE | 2.7063** (0.763) 271,663 | -0.0387 (0.052) 147,195 | -0.0588 (0.048) 148,543 | -0.8396** (0.154) 289,496 | -0.2798** (0.088) 289,496 | 0.0692* (0.032) 289,496 |
| (4) Incident FE | 6.2233+ (3.593) 66,816 | -0.0796 (0.205) 40,195 | 0.0973 (0.151) 40,676 | 0.0201 (0.363) 78,805 | 0.2159 (0.208) 78,805 | 0.2509** (0.096) 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 A10. 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 (0.334) 6,587 | -0.0417 (0.026) 3,185 | -0.0448+ (0.025) 3,215 | -0.1013* (0.046) 8,078 | 0.0044 (0.029) 8,078 | 0.0677** (0.011) 8,078 |
| (2) School FE | 0.1270 (0.401) 6,179 | -0.0477 (0.033) 2,860 | -0.0576+ (0.032) 2,887 | -0.1063* (0.054) 7,691 | 0.0086 (0.033) 7,691 | 0.0613** (0.012) 7,691 |
| (3) Student FE | -0.7513 (2.938) 157 | 0.4360* (0.203) 55 | 1.3160** (0.072) 55 | -1.0068 (0.699) 185 | -0.4262 (0.263) 185 | 0.1706* (0.080) 185 |
| (4) Incident FE | -0.6194 (1.738) 977 | 0.1073 (0.173) 514 | 0.1330 (0.135) 517 | -0.2636 (0.174) 1,222 | -0.0430 (0.090) 1,222 | 0.0659+ (0.035) 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 A11. 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+ (0.534) 35,482 | 0.0036 (0.049) 16,458 | -0.0602 (0.044) 16,593 |
| (2) School FE | 0.7591 (0.538) 35,237 | 0.0202 (0.052) 16,228 | -0.0470 (0.045) 16,365 |
| (3) Student FE | 0.0049 (0.225) 258,523 | 0.0122 (0.020) 127,641 | -0.0160 (0.018) 128,799 |
| (4) Incident FE | 0.0000 (0.000) 68,019 | -0.0000** (0.000) 40,977 | 0.0000 (0.000) 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 A12. Effects of a Juvenile Complaint on Student Outcomes by Month of First Offense

| Model | (1) Absences | (2) Reading (SDs) | (3) Math (SDs) | (4) Later Offenses | (5) Later Removals | (6) Later Complaints |
|-----------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|-------------------------------|--------------------------------|
| Aug - Sep | 3.5025** (0.528) 86,917 | -0.0639* (0.031) 42,441 | -0.0719* (0.031) 42,815 | -0.3667** (0.103) 100,725 | 0.0525 (0.060) 100,725 | 0.1677** (0.020) 100,725 |
| Oct - Dec | 2.7029** (0.311) 178,756 | -0.0642** (0.022) 97,953 | -0.0559** (0.021) 98,697 | -0.2577** (0.045) 200,781 | 0.0173 (0.030) 200,781 | 0.0985** (0.011) 200,781 |
| Jan - Mar | 2.1325** (0.290) 121,678 | -0.0321 (0.022) 73,443 | -0.0332 (0.022) 74,034 | -0.1385** (0.028) 135,641 | -0.0139 (0.019) 135,641 | 0.0610** (0.010) 135,641 |
| Apr - Jun | 1.7734** (0.338) 68,461 | -0.0654* (0.030) 40,416 | -0.0904** (0.029) 40,682 | -0.0784** (0.013) 75,483 | -0.0232* (0.011) 75,483 | 0.0068 (0.005) 75,483 |

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