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# Hardening Schools, Targeting Students:

# Minoritized Students, School Security, and the School-Prison Nexus

With schools spending over $3 billion on security every year (Singer, 2022), students are surveilled in ways that previously only existed in science fiction (Marlow et al., 2023). When entering their school, a student might not walk through a metal detector, but they might scan their RFID tag that they are required to wear at all times. School resource officers (SROs) walk the hallways when they are not monitoring the security cameras. Students glance at their phones that school administrators are tracking using the wi-fi's surveillance software, as the classroom doors automatically lock behind them. Students gaze outside with the bullet-resistant, tinted glass obscuring their view. Even so, students might spy a drone hovering over the courtyard (*A Comprehensive Report on School Safety Technology*, 2016). This typical array of security measures begs the question: in what ways are students affected by this surveillance?

*Target hardening* is a common term in law enforcement and the military that has recently gained popularity in reference to schools. Target hardening refers to a variety of methods for increasing security of particular areas or for specific people to deter crime and violence (James, 2022). Schools have increasingly implemented target hardening techniques over the last 50 years including security cameras, metal detectors, and law enforcement personnel (Wang et al., 2020). The federal government has funded much of this expansion with the U.S. Department of Justice's STOP School Violence and Community Oriented Policing programs allocating over $565 million to schools over the last five years (James, 2022; Office of Public Affairs, n.d.). At first, concerns about violence within schools led to these allocations, but fear of school shootings has, more recently, driven additional funding (Curran et al., 2020; Fisher et al., 2022; Marlow et al., 2023; Temkin et al., 2020). Because of the initial focus on school security to control and punish students, research from the 1990s and early 2000s explored the use of school security in city high schools primarily serving racially minoritized students as part of what previously was termed the school-to-prison pipeline (e.g., Devine, 1996; Hirschfield, 2010; Nolan, 2011) and has more recently been theorized as school-prison nexus (Turner & Beneke, 2020).

Several parallel trends necessitate the expansion of research on school security. First, target hardening has expanded its reach into schools outside of cities into suburban and rural areas that previously had little engagement with security approaches (*A Comprehensive Report on School Safety Technology*, 2016; Hirschfield, 2010). Second, suburban areas have become increasingly diverse through several demographic trends including the rise of the "melting pot suburbs" (Frey, 2018, p. 159), suburban areas with increasing socioeconomic and racial/ethnic diversity (Diamond et al., 2021). Third, increasingly sophisticated security technology is rapidly being integrated into schools, with technology entrepreneurs seeing schools as clients to expand the use of military and law enforcement technology into a new market (Heath & Yadav, 2023; Marlow et al., 2023; Singer, 2022). All the while, prior research indicates that school security strategies, like SROs, can have disproportionate negative impacts on racially minoritized students, particularly Black students (Javdani, 2019; Owens, 2017; Sorensen et al., 2023; Weisburst, 2019). Little to no research has examined how the expanding array of security measures affects students across identities including race, language, and socioeconomics.

This proposed study seeks to estimate the impact of SSM on minoritized students' experiences in school as well as their juvenile justice contact using quasi-experimental design through the following research questions (RQs):

1. To what extent does implementation of significant, additional SSM affect school-level crime and violence as well as school climate, attendance, and exclusionary discipline rates?
2. To what extent do increases in SSM affect minoritized students' attendance, test scores, course completion, arrest likelihood (at school or away from school), and probability of incarceration?

## Related Literature

### School Security Measures: Traditional Security Measures and New Technology

The literature exploring traditional security measures often define security as including metal detectors, cameras, and security officers (e.g., Tanner-Smith et al., 2018). However, schools have more recently adopted a much wider range of security technology. The National Institute of Justice recently commissioned a thorough examination of contemporary school security technology (*A Comprehensive*

*Report on School Safety Technology*, 2016). This report identified a large variety of security technologies in schools including technologies that controlled access to the building/classrooms, alarms/sensors, communication, lighting, software, surveillance, weapons detection, bullet-resistant shields, and privacy window film. This list includes things like software that can track students' social media, automatic door locks, and motion-activated sensors. Since the publication of this report, schools have continued to expand their use of security technology because of the confluence of the continued threat of school shootings (e.g., the shooting at Marjory Stoneman Douglas High School in February 2018) and ambitious technology entrepreneurs seeking to "disrupt" industries in the public and private sectors (Benjamin, 2019; Thakur et al., 2023). The literature on school security tends to focus on traditional security, with few studies observing a larger range of SSM (Reingle Gonzalez et al., 2016).

**The Effects of School Security Measures on Students**

Two recent literature reviews have examined the relationship between SSM and school safety. The first systematic review identified 32 studies with high-quality designs that could detect the causal effect of SSM (Reingle Gonzalez et al., 2016). The review found introducing more SSM often led students to feel less safe in school while visible security sometimes resulted in lower victimization rates. The second review, a meta-analysis, examined the predictors of school violence, including all peer-reviewed research published through 2018, finding no evidence visible security is associated with school violence (Turanovic et al., 2022). These reviews present equivocal evidence on SSM and student safety.

A smaller literature examines whether SSM is associated with students' academic/ social outcomes using nationally representative data. Most research examines one SSM (e.g., metal detectors) with most finding no significant relationship between these SSM and educational attainment (Peguero & Bracy, 2015; Servoss & Finn, 2014; Tanner-Smith & Fisher, 2016). Studies examining the number of SSM have found more SSM are associated with reduced participation in extra-curricular activities, academic performance, and attendance (Mowen & Manierre, 2017; Tanner-Smith & Fisher, 2016).

Arguably, the research base on SROs is more developed than research on other SSM, and it is the one area that has consistently interrogated the differential use of SSM in schools serving racially

minoritized students as well as resulting disparities in outcomes for Black students. Ethnographic research offers compelling evidence that racially minoritized students feel surveilled, over-policed, and sometimes harassed by SROs (Kupchik, 2010; Mukherjee, 2007; Nolan, 2011; Shedd, 2015). Quantitative studies confirm SRO placement is associated with higher arrest and suspension rates of Black students (Owens, 2017; Sorensen et al., 2023; Weisburst, 2019). My previous research found SROs engage in many routine security tasks leading students to often feel positively about SROs while increasing students' fear (Curran et al., 2021; Viano et al., 2021). Overall, we have little understanding of how a wider range of SSM affects students by their racial identity, language, and socioeconomic status.

## Conceptual Framework

As schools become sites of target hardening, they are enveloped in an increasingly pervasive surveillance apparatus previously associated with settings like prisons or banks (Browne, 2015). It is for this reason that more recent scholarship has moved away from the "school-to-prison pipeline" metaphor, in which experiences in school precede incarceration, to the concept of the "school-prison nexus." The school-prison nexus recognizes that SSM and other features of schools (e.g., student discipline policy) are informed by the prison-industrial complex and carceral state logics (Turner & Beneke, 2020). Correspondingly, the conceptual framework for the proposed study conceives of SSM as having a differential effect on students' experiences in school based on their marginalized identities including their racial identity, English fluency, or income/wealth. Identity is proposed to moderate the effect of SSM on students because of the ways SSM implementation could be racialized (Browne, 2015; Woulfin & Sadler, 2021) leading to students being differentially targeted by SSM because of their minoritized identity in ways that affect their experiences and outcomes (Benjamin, 2019; Kupchik, 2010; Shedd, 2015).

### How School Demographics Inform School Security Measure Implementation

While all schools have some arrangement SSM, the history of traditional security placement shows how SSM decisions are racialized as part of the school-prison nexus (Turner & Beneke, 2020; Woulfin & Sadler, 2021). One oversight of the school security literature has been the tendency to focus on traditional security without attending to the ways in which schools are increasingly integrating

technology into their security infrastructure (*A Comprehensive Report on School Safety Technology*, 2016; Marlow et al., 2023). Surveillance studies offers powerful frameworks to understand the construction of sites of surveillance and the racialization of surveillance (Benjamin, 2019; Browne, 2015). As surveillance seeks to track and control its subjects, racialized surveillance uses technology to "reify boundaries, borders, and bodies along racial lines, and where the outcome is often discriminatory treatment of those who are negatively racialized by such surveillance" (Browne, 2015, p. 16) with this racialization "[operating] in an interlocking manner with class, gender, sexuality, and other markers of identity and their various intersections" (p. 17). SSM technology are adopted in schools in ways that might be racialized, but, even if these technologies are universally adopted, their effects on students are likely racialized (Benjamin, 2019; Browne, 2015; Shedd, 2015).

**How School Security Measures Could Affect Minoritized Student Experiences and Outcomes**

The most prevalent theory undergirding the widespread use of SSM is based on a rational actor model in which SSM deters violence (Piliavin et al., 1986). Alternatively, SSM may have negative expectancy effects where the SSM signal the school is dangerous, leading violence to increase (Devine, 1996; Kupchik, 2016). These theories do not necessarily clarify the mechanisms through which SSM disproportionately affect students by their racial identity, language, and income. In race critical code studies, racialized computer coding (i.e., racial codes) is embedded in surveillance in ways that result in discriminatory technology (Benjamin, 2019). Racial codes are not necessarily intentionally malicious; they result from a combination of efficiency and ignorance that reinforces societal hierarchies, replicating past attempts "to shroud racist systems under the cloak of objectivity" (Benjamin, 2019, p. 8). Youth are aware of these surveillance technologies, and they internalize how SSM are differentially targeted at students with marginalized identities and backgrounds (Vakil & McKinney de Royston, 2022). SSM, as a set of school safety technologies, can have racialized effects on students because surveillance technology is coded in ways that are discriminatory, altering minoritized students' outcomes in and out of school (Benjamin, 2019; Browne, 2015). This framework clarifies why the effects of SSM might differ for students of different racial identities, home languages, and socioeconomic status.

## Methods

SSM placement does not occur randomly; implementing new SSM is a purposeful decision made by individual schools, school districts, and states. To the extent that new SSM adoption is correlated with factors like school quality or violence, any descriptive evidence on whether students' outcomes differ at schools with different configurations of SSM would be biased. In other words, a major challenge of identifying the effects of SSM is disentangling the effect of the SSM itself versus why schools selected into that configuration of SSM. Since randomizing SSM across schools is not a viable option for this project, the goal is to identify plausibly exogenous variation in SSM placement to allow for isolating the effect of new SSM on students. In this study, I leverage a competitive, annual grant program that distributes funding to individual schools to support the purchase and installation of new SSM.

Since [redacted], the [redacted] program distributes awards to schools to support a variety of SSM [redacted]. [redacted] The grant program distributes funding based on a numerical score assigned to each application. The scoring criteria are published, but the cutoff is unknown, as [redacted] awards these grants to the top scoring applicants until funding is exhausted. [redacted] the funding rate has ranged from 40% to 88% of applicants receiving funding with an average of 69%. Below, I detail available data sources that align with the two RQs and then describe a variety of ways I will exploit this funding mechanism to identify the causal effect of new SSM on students in schools receiving these grants using quasi-experimental designs.

### Data

The RQs focus on the effects of SSM on school-level (RQ1) and student-level (RQ2) outcomes. I will collect quantitative data from publicly available, school-level datasets from state (e.g., [redacted]) and national (e.g., Civil Rights Data Collection) sources. These data will include measures of student achievement, attendance, school violence, discipline, and school climate (all schools participate in an annual school climate survey). While [redacted] is a large state with [redacted] K-12 schools and [redacted] awards about [redacted] grants a year, the school-level analysis will have less

fine-grained data on students' minoritized status (note that school climate, exclusionary discipline, and school violence data are only available at the school-level). To address this limitation, I will also have student-level data to use for this proposed project.

For student-level data, I will analyze data from the [redacted] The [redacted] integrates data from multiple state agencies with common identifiers to track across agencies. I will access data from [redacted] and the [redacted] including data on arrests and incarceration for all of the state's juveniles. From [redacted], I will identify variables from standardized tests, attendance, juvenile arrest (at school or off-campus) and incarceration for various offense types (e.g., property, violent), and student racial identity, language, and economic disadvantage. Student-level data will facilitate identifying the minoritized status of students in schools that received grants for new SSM as well as adding power to detect a range of effect sizes of new SSM in the models.

I have experience analyzing data from [redacted] and other state longitudinal data systems, often using quasi-experimental designs to identify the effects of specific policies (e.g., Viano & Bowser, 2020; Viano & Henry, 2023). I have a research partnership with [redacted] with whom I will collaborate in order to secure data on the [redacted] program applicant scores from the last 10 years for those who did and did not receive a grant. The list of schools receiving these grants along with the dollar amount of each grant is publicly available.

**Empirical Framework**

The application criteria of the [redacted] program allow for potentially implementing three quasi-experimental designs: regression discontinuity (RD), instrumental variables (IV), and comparative interrupted time series (CITS). All three quasi-experimental designs allow for moderation analyses to identify if treatment effects vary by students' racial identity, language, and economic disadvantage status. While each design would define treatment as receipt of the SSM grant, I will also explore other ways of identifying treatment based on the grant award amount and what SSM was purchased and deployed (e.g., the visibility/intrusiveness of the SSM).

***Regression Discontinuity Design***

My RD design would look very similar to a recent student on SROs that examined a federal grant program that had a similar scoring approach to decide on receipt of funding (Sorensen et al., 2023). Just as in Sorensen et al. (2023), I will identify schools close to the funding threshold for that grant year. The treatment schools, i.e., those that received funding for new SSM, would be those just above this funding threshold, and the comparison schools would be those just below the threshold. In an RD design, schools scoring just above or below the funding cutoff are hypothesized to be so similar that the receipt of the SSM grant is plausibly random. Consequently, examining the subsequent outcomes of schools close the cutoff would identify the causal impact of the new SSM on the outcomes.

The validity of an RD design relies on an extensive set of assumptions and specification checks that I will perform, and these analyses will be aligned with the What Works Clearinghouse (WWC) criteria for RD designs (2022). To be eligible for WWC review, RD studies must be based on a numerical forcing variable with a least four unique values, in our case the score on the application for funding. RD studies must satisfy four standards to meet WWC standards without reservations. First, a study must demonstrate integrity of the forcing variable. In this study, although the cutoff of the application scores was unknown to the applicants of [redacted] beforehand, I would test for manipulation in the grant score (i.e., the forcing variable) around the cutoff. Second, a study must have "acceptable levels" of attrition or establish that treatment and control groups were equivalent pre-treatment. Attrition would occur if schools awarded grants did not accept the award. Other kinds of attrition are unlikely in this analysis since school closure is a rare event in [redacted] but I will examine baseline equivalence using available covariates and pre-treatment versions of the outcomes using the WWC guidelines for this criterion (2022, p. 71). Third, I will implement tests on the relationship between the forcing variable and the outcomes including examining evidence for discontinuities at values of the forcing variable other than the funding cutoff. Fourth, I will follow the WWC requirements related to functional form and bandwidth which includes satisfying five to six criteria including controlling for the forcing variable in RD models, specifying the correct functional form (linear, quadratic, or nonparametric), justifying an appropriate bandwidth, robustness checks for

modeling choices related to functional form and bandwidth, displaying the graphical relationship between the outcomes and forcing variable, and allowing the relationship between the forcing variable and the outcome to differ on both sides of the cutoff.

***Alternative Quasi-Experimental Designs***

It is possible these specification checks could reveal the RD findings to be biased (e.g., manipulation of the running variable around the cutoff). If that is the case, I have two alternative identification strategies. First, the criteria for this grant program for each year are published and include several criteria that would be plausible instruments for an IV quasi-experimental design. Several of the criteria for this grant program predict higher scores for the applicant school on their application, thereby increasing their chances of receiving the grant, and, as a core argument for the IV approach, the only path through which these criteria impact the specified outcomes is through the SSM grant receipt (i.e., the exclusion restriction). This grant application awards scores based on some criteria that are likely correlated with the outcomes like the number of violent offenses at the school or the school's poverty rate. These criteria would not make for valid instruments since they could affect the outcomes in ways uncorrelated with SSM grant receipt. Other criteria are more likely to be uncorrelated with outcomes pre-grant receipt including "whether the school was built before or after 1990" and "whether the school has an Uninterrupted Power Supply." I would use these types of criteria as instruments, identifying the variation in treatment predicted by these plausibly exogenous grant criteria as a way to approximate random assignment. After implementing a variety of tests of the exclusion restriction (Huntington-Klein, 2021), the IV approach is fit using a two-stage least squares (2SLS) regression in which the endogenous treatment assignment (X) predicts the instrument (Z) in the first stage, and the predicted values from the first stage (Z') are then an independent variable predicting the outcome (Y) in the second stage.

CITS is the second alternative identification strategy. CITS is designed to address several sources of bias that can manifest when simply comparing post-treatment differences between the treatment and comparison groups. The basic assumption of the CITS model is that both treatment and control schools' would continue their pre-trends into the post-treatment period in absence of receipt of the security grants

in the treatment schools, conditional on covariates. CITS controls for trends in the outcome for the comparison group as well as pre-treatment trends for the treatment group. Then, CITS estimates the treatment effect by isolating deviations from the trend in the outcome for the treatment group. Similar to the other identification strategies, I will perform several validity checks in order to assess if key assumptions of the CITS model are met and the treatment effects can reasonably be interpreted as causal.

## Contribution

Schools are increasingly using target hardening strategies in response to fears of violence and the expanding security technology sector, but little research evaluates the effects of new SSM on students. To help partially address this gap, I am co-PI on a study funded by the Institute of Education Sciences (IES) at the U.S. Department of Education titled "More than Just Safety: School Security Measures and Academic, Behavioral, and Social Outcomes" (Award R305A220359). This IES grant began in September 2022 with correlational analyses of secondary datasets, and we are collecting primary data in a midwestern school district and a large, suburban district in Virginia during the 2023-24 school year. In this project, we are generating hypotheses for how SSM might affect the schooling environment through interviews with teachers and students (purposefully selected to represent the diversity of the school) in approximately 16 high schools. This proposed project for the National Academy of Education/Spencer Postdoctoral Fellowship would facilitate testing the hypotheses generated from our secondary data analysis and case studies to assess the effect of SSM on school and student-level outcomes.

With the devastating persistence of school violence, schools will likely continue their trajectories of increasing their use of SSM, particularly new technologies. The framework of the proposal suggests potential ways in which school surveillance has differential effects on students based on their minoritized identity, raising critical questions about the ways in which new SSM might strengthen (instead of dismantle) the school-prison nexus (Benjamin, 2019; Browne, 2015). In a time of great urgency to address mass incarceration and inequality, this study seeks to provide key information to inform educational policy to encourage SSM use that balances safety with the civil rights of minoritized students.

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