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The effect of stand-your-ground laws on student achievement

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ABSTRACT

Objectives: To examine how "stand-your-ground" (SYG) laws affect children's academic performance.
Methods: We analyze 2008–2018 nationwide school district-level math and reading/language arts (RLA) test scores for 3rd-8th grade students combined with information on SYG laws by state and year. We implement two estimation approaches—two-way-fixed effects and group-time average treatment effects—and conduct analyses stratified by student race (Black, White) and area income level.
Results: We find negative effects of SYG on math achievement among all students using both estimation approaches (−0.0377 standard deviation decline, $p < 0.001$ and −0.0493, $p < 0.001$). We find adverse effects of SYG on math among White students (−0.0315, $p = 0.001$ and −0.0312, $p = 0.08$) and among students in low-income districts (−0.0616, $p < 0.001$ and −0.0903, $p < 0.001$). The precision of estimates for the effect on math scores among Black students varies across approaches (−0.0666, $p = 0.05$, −0.0444, $p = 0.48$). We estimate negative effects of SYG on RLA achievement in only a subset of models.
Conclusions: Our findings suggest SYG laws adversely affect math performance among 3rd-8th grade students.
Policy implications: These findings underscore the importance of additional work to understand and quantify the relationship between the nation's gun policies and children's academic performance.

1. Introduction

"Stand-your-ground" (SYG) laws lower the threshold for what is considered justifiable use of force in cases of self-defense by removing the duty to retreat outside the home, even if safe retreat is possible (Smart et al., 2023). This expansion of civilians' right to use deadly force is often construed as a deterrent to violent crime (i.e., by increasing the expected level of force that criminals may encounter), but empirical evidence supports the opposite—that such laws increase firearm homicides (Smart et al., 2023), likely by replacing de-escalation of volatile situations with firearm use (Crifasi et al., 2018). Such effects may directly affect children; for example, evidence from Florida, one of the first states to enact SYG, shows firearm homicides among adolescents increased following SYG adoption (Esposti et al., 2020).

SYG laws have raised concern not only because they escalate violent crime, but also because of disparate effects on racial minorities, particularly Black individuals (American Bar Association, 2015). Murphy (2018) finds racial bias in cases where SYG is used as a defense and Roman (2013) finds homicides in SYG states are more likely to be ruled justifiable in cases in which victims are Black, but not in cases when perpetrators are Black and victims are White (Murphy, 2018; Roman, 2013). At the same time, evidence from Florida shows that the increase in victimization from firearm homicides among adolescents following the implementation of SYG was more pronounced among Black compared to White children (Esposti et al., 2020).

Previous research about the effects of SYG laws on violent crime raises questions about potential broader implications on outcomes other than mortality. In this study, we focus on potential effects of these laws on children's academic performance. Because past work on SYG laws has revealed differential effects by race, we examine aggregate outcomes as well as separately for Black and White students. Research shows children are more likely to be exposed to gun violence and to be victims of gun violence in neighborhoods with concentrated poverty; thus, we also consider impacts by district median income (Kravitz-Wirtz et al., 2022; Barrett et al., 2022).

SYG laws may affect children by changing their exposure to gun violence or by affecting their fear and perceived risk of victimization. Previous research has established a relationship between exposure to gun violence and students' academic outcomes. Cabral et al (2020) find that high-school students who experienced a school shooting had

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increased absenteeism and grade repetition and lower high school graduation, college enrollment and completion (Cabral et al., 2020). Beland and Kim (2016) find reductions in math and English test scores in schools that experience a fatal shooting (Beland and Kim, 2016). Previous research also demonstrates an association between children's exposure to violent crime in the community and declines in their cognitive performance (Sharkey, 2010). Gershenson and Tekin (2018) find a negative effect of the 2002 "Beltway sniper" attacks on student achievement, specifically math proficiency among 3rd through 5th graders (Gershenson and Tekin, 2015). Exposure to gun violence may impact academic outcomes by affecting aggressive behavior and depression (Gorman-Smith and Tolan, 1998); academic engagement (Borofsky et al., 2013); sleep and disrupted cortisol (Heissel et al., 2018); and attention, impulse control and preacademic skills among preschoolers (Sharkey et al., 2012). Other research documents racial differences in effects on academic outcomes. Ang (2021) finds that effects on school performance following officer-involved shootings are concentrated among Hispanic and Black students (Ang, 2021), and Gershenson and Hayes (2018) report reductions in math and reading among students in predominantly Black schools throughout the Ferguson, Missouri metropolitan area following the 2014 police shooting of an unarmed Black teenager and the ensuing civil unrest (Gershenson and Hayes, 2018).

Even without direct exposure to gun violence, SYG laws could increase fear and perceived risk of victimization. For example, the American Bar Association (2015) describes heightened fear among Black males in SYG states (American Bar Association, 2015), and posits that high-profile cases related to SYG, such as the February 2012 shooting of Trayvon Martin (Alvarez and Buckley, 2013; Coates, 2013; Follman and Williams, 2024), are likely to have made the threat of victimization associated with such laws concrete. For children, the perceived risk associated with SYG can be transmitted–consciously or unconsciously–through adults. Armstrong and Carlson (2019), for example, document parents' approaches to talking with their children about the threat of gun violence and how to protect themselves following events such as the Trayvon Martin shooting (Armstrong and Carlson, 2019). Older children also likely form their perceptions of the threat of gun violence based on information they acquire from peers, social media, and other media.

The potency of anticipated victimization is emphasized by Cook (2020), who asserts it "engenders widespread anxiety, disinvestment in impacted communities, and costly efforts to avoid and mitigate attacks" (Cook, 2020). Armstrong and Carlson (2019) likewise contend that "gun violence induces trauma in its aftermath *and* in its anticipation" (Armstrong and Carlson, 2019), and Gershenson and Tekin (2018) explain, "…children do not have to be direct victims or witnesses of community traumatic events to be harmed: indirect exposure such as learning about a violent death or serious injury, the fear of death to self or a family member, an increased sense of vulnerability or helplessness, or repeatedly engaging with trauma-related stories via the media can also harm children's well-being" (Gershenson and Tekin, 2015).

Numerous studies have found that greater anticipated threats can negatively affect children. For example, active shooter drills, which can raise anxiety and fear alongside the perceived risk of gun violence victimization (Huskey and Connell, 2021), negatively affect students' emotional health, anxiety, stress and depression (Moore-Petinak et al., 2020; ElSherief et al., 2021), in addition to worsening academic performance (Estrera, 2023). Other research finds increased worry and post-traumatic stress symptomology among children following media exposure to traumatic events (Becker-Blease et al., 2008; Pfefferbaum et al., 2001).

We analyze the effects of SYG laws on students' academic performance using data from the Stanford Education Data Archive (SEDA) from school years 2008–09 to 2018–19 for 3rd through 8th graders, combined with information on states' adoption of stand your ground laws during this period. The timeframe of the available SEDA data means that our analysis is focused on the effects of SYG among states that adopted SYG between 2009 and 2017, for which we observe outcomes both before and after SYG adoption. We therefore are unable to identify the effects of SYG on academic outcomes in states that adopted SYG between 2005, when Florida implemented SYG, and 2008. Given previous research finds stronger effects of SYG on firearm homicide in earlier-adopting states (Esposti et al., 2022), our study is less likely to capture effects of SYG on child outcomes via exposure to SYG-induced gun violence and more likely to capture effects of SYG that operate through fear and perceived risk of victimization. Because of high-profile instances of gun violence in earlier-adopting SYG states, however, studying later-adopting states may capture what Armstrong and Carlson (2019) term "anticipatory trauma" from the law's enactment (Armstrong and Carlson, 2019). We examine the effects of SYG on academic achievement among all students as well as separately for Black and White students, and students in low-income and higher-income districts.

2. Methods

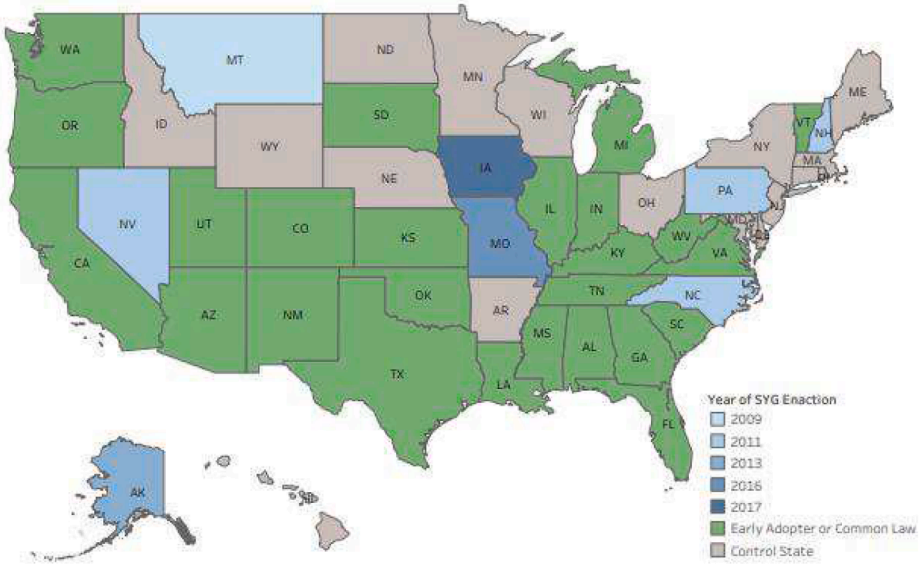
2.1. Data

We measure student achievement using 2008–2018 SEDA test score data (all years refer to the fall semester) (Fahle et al., 2019). These data contain district-grade-level average test scores for students in 3rd-8th grade for each school district for reading and language arts (RLA) and for math in the spring of each school year. The SEDA benchmarks district performance on state-specific achievement tests to the state-level achievement metrics in the National Assessment of Educational Progress to yield average achievement measures for students overall and by race that are comparable across states and over time. We focus on test score differences reported in standard deviation units, but also describe the grade-equivalent learning scale to ease interpretation. The SEDA data include information originally collected in the National Center for Education Statistics Common Core of Data and the American Community Survey on district characteristics, which we use for our control variables, in addition to information on per-student spending from the Census of Governments. As the SEDA is a publicly-available, anonymized dataset, this study is exempt from IRB approval.

We use the publicly available RAND State Law Firearm Database to identify states that have a state SYG law (defined as an expansion of the castle doctrine to any location) and the year of implementation (Cherney et al., 2022). The coding of SYG laws we use is consistent with that used in other studies (Esposti et al., 2022; Yakubovich et al., 2021). Case laws may have different effects than stand-your-ground statutes because of media attention and how SYG is applied as a defense in civil versus criminal cases (Smart et al., 2023). We follow the literature in excluding case law states from the analysis. Fig. 1 shows the treatment timing among the eight states that implemented SYG laws between 2009 and 2017 for which we observe both pre- and post-period data; states that are excluded from the analysis because they were either case-law states or had implemented SYG laws before 2009; and "control" group states that had not implemented a SYG law by 2017. We use the differential timing of SYG adoption to identify the effect of these laws on academic outcomes, where school years are coded as treated in the year following SYG implementation to account for the timing of implementation versus spring-time testing.

2.2. Estimation

We estimate a two-way-fixed effect (TWFE) model that has been traditionally used in analyses of the effect of SYG (Cheng and Hoekstra, 2013; Siegel et al., 2019; McClellan and Tekin, 2017; Doucette et al., 2019). These analyses include district, cohort and year fixed effects and a set of time-varying covariates. In addition, we estimate a group-time average treatment effect estimator (ATT-GT) (Callaway and



Notes: Map shows the year of SYG implementation among the eight states that adopted laws between 2009 and 2017. States that implemented SYG prior to 2009, as well as those with case laws are excluded from the analysis.

Fig. 1. Year of SYG implementation, treatment and control states. Notes: Map shows the year of SYG implementation among the eight states that adopted laws between 2009 and 2017. States that implemented SYG prior to 2009, as well as those with case laws are excluded from the analysis.

Sant'Anna, 2021). In both models, a key identifying assumption is that average performance in districts in states that adopted SYG and performance in districts without SYG would have followed parallel trends in the absence of SYG adoption. We present event study analyses to illustrate the plausibility of this assumption.

Our analyses control for the percentage of students in the district who participate in the Supplemental Nutrition Assistance Program, the percentage of students in the district by race (White, Hispanic, Black), median family income, and the unemployment rate in the district. These are time-varying characteristics of the school district that are correlated with the adoption of SYG and plausibly correlated with student achievement (Butz et al., 2015). All regressions are weighted by group-specific grade-level enrollment in the district, and robust standard errors are clustered at the state level.

We analyze results for all students, and conduct stratified analyses for districts with household median income below the national median ("low-income" districts) versus those above the national median ("high-income"), as well as White versus Black students. Sample sizes of districts reporting test results for students of other races or ethnicities are insufficient for analysis. We also conduct event-study analyses which allow us to examine the similarity of trends prior to SYG implementation between SYG and non-SYG districts. In addition, these analyses allow for the effect of the SYG to vary with the number of years since implementation, although the cell sizes for identifying the effect of each post-implementation year are smaller than for estimating an average post-implementation effect which reduces our statistical power.

2.3. Sensitivity analyses

As described, SYG laws may affect academic performance by affecting gun violence, and/or by increasing fear and perceived risk of victimization. Our main analyses exclude the firearm homicide rate in order to estimate the overall effect of SYG on our outcomes. However, we also conduct a sensitivity analysis in which we control for the age-adjusted firearm homicide rate in the state to isolate the effect of SYG that is likely due to the anticipated threat of victimization.

We also estimate analyses without controls for time-varying covariates and without weights (Supplemental Appendix). A threat to identification of the causal effect of SYG on academic outcomes is the potential existence of other factors correlated with both the adoption of SYG and academic outcomes. To mitigate against this threat, we test the robustness of our results to the inclusion of controls for the level of gun ownership in the state, per pupil school spending, and the political ideology of the state's congressional delegation, as measured by the NOMINATE score (Lewis et al., 2024). Political ideology is designed to serve as a proxy for potential unmeasured changes in education or criminal justice policies that could be correlated with the adoption of SYG and academic outcomes.

3. Results

Table 1 presents descriptive statistics for districts with and without SYG laws. Districts in SYG states have higher shares of White students, higher unemployment rates, lower median household income, lower per-student spending, and lower math and RLA test scores for both Black and White students. The SYG states also tend to include more rural areas and fewer urban areas.

Table 2 presents the average post-implementation effect of SYG on math and RLA test scores using both estimation approaches (TWFE and ATT-GT). We report results for all students, by high- and low-district income, and separately for Black and White students (in districts of all income levels). Reported coefficients represent the standard deviation change in average test scores after SYG implementation.

Column 1 presents results using the ATT-GT approach. Among all students, we find a negative effect of SYG on math achievement (−0.0377, CI −0.0590 to −0.0164, $p < 0.001$) and RLA achievement (−0.0222, CI −0.0427 to −0.0017, $p = 0.03$). This effect is about 0.08–0.09 grade levels in each subject. In analyses stratified by race, we find adverse effects of SYG on math (−0.0315, CI −0.0508 to −0.0122, $p = 0.001$) and RLA achievement (−0.0260, CI −0.0484 to −0.0035, $p = 0.02$) among White students. The effects of SYG on math among Black students (−0.0444, CI −0.1666 to 0.0778, $p = 0.48$) and RLA (−0.0091, CI −0.0245 to 0.0063, $p = 0.25$) are imprecisely estimated, which may be due to smaller sample sizes and lower statistical power ($n = 35{,}932$ district-cohort-year observations for Black student test scores vs. $n = 214{,}426$ for White student test scores). We also observe significant

Table 1
Descriptive statistics, districts in SYG and non-SYG states, 2008–09 to 2018–19 school years.

	Non-adopting states Mean (SD)	SYG-adopting states Mean (SD)
Percentage of households receiving SNAP	0.076 (0.057)	0.098 (0.058)
Percentage of students who are White	0.578 (0.233)	0.644 (0.221)
Percentage of students who are Hispanic	0.134 (0.147)	0.078 (0.100)
Percentage of students who are Black	0.230 (0.183)	0.245 (0.200)
Median household income	64675.7 (22130.1)	53916.3 (18219.5)
Unemployment rate	0.069 (0.023)	0.071 (0.021)
Real current expenditures per student	8165.1 (2304.6)	6307.1 (1320.9)
Total students (grade)	833.5 (3037.8)	934.5 (2016.4)
Average math score (Black students)	−0.359 (0.301)	−0.392 (0.261)
Average math score (White students)	0.263 (0.340)	0.226 (0.313)
Average RLA score (Black students)	−0.327 (0.314)	−0.399 (0.282)
Average RLA score (White students)	0.226 (0.313)	0.183 (0.297)
Percent urban	0.212 (0.385)	0.179 (0.335)
Percent rural	0.120 (0.233)	0.261 (0.323)
NOMINATE score	−0.103 (0.213)	0.128 (0.090)
Violent crime rate per 10,000	379.6 (106.5)	434.2 (75.59)
Number of district-grade-subject observations (math scores, all students)	20,252	9,732

Notes: Non-adopting states are those that never adopted SYG or adopted SYG after 2017. Adopting states are those that adopted SYG between 2009 and 2017. NOMINATE scores capture ideological information about members of congress in each state. RLA is reading/language arts. SNAP is the Supplemental Nutrition Assistance Program. Cells report the mean of each variable (standard deviation in parentheses).

Table 2
Average Effect of SYG on District Math and RLA Achievement, by Student Race and District Median Income, ATT-GT and TWFE Analysis, 2008–09 to 2018–19 School Years.

	ATT-GT	TWFE
Math		
All students	−0.0377	−0.0493
	CI −0.0590 to −0.0164	CI −0.0754 to −0.0232
	$p < 0.001$	$p < 0.001$
Black students	−0.0444	−0.0666
	CI −0.1666 to 0.0778	CI −0.1323 to −0.0008
	$p = 0.48$	$p = 0.05$
White students	−0.0315	−0.0312
	CI −0.0508 to −0.0122	CI −0.0663 to 0.0039
	$p = 0.001$	$p = 0.08$
Low-income districts	−0.0616	−0.0903
	CI −0.0900 to −0.0332	CI −0.1351 to −0.0454
	$p < 0.001$	$p < 0.001$
Higher-income districts	−0.0158	−0.0188
	CI −0.0407 to 0.0092	CI −0.0497 to 0.0121
	$p = 0.22$	$p = 0.23$
RLA		
All students	−0.0222	−0.0078
	CI −0.0427 to −0.0017	CI −0.0332 to 0.0175
	$p = 0.03$	$p = 0.53$
Black students	−0.0091	0.0096
	CI −0.0245 to 0.0063	CI −0.0674 to 0.0866
	$p = 0.25$	$p = 0.80$
White students	−0.026	−0.0093
	CI −0.0484 to −0.0035	CI −0.0276 to 0.0090
	$p = 0.02$	$p = 0.31$
Low-income districts	−0.0454	−0.0234
	CI −0.0714 to −0.0194	CI −0.0689 to 0.0220
	$p = 0.08$	$p = 0.30$
Higher-income districts	−0.0071	0.0027
	CI −0.0339 to 0.0197	CI −0.0209 to 0.0263
	$p = 0.60$	$p = 0.82$

Notes: Reported coefficients represent the standard deviation change in test scores after SYG implementation. Specifications include year, age cohort, and district fixed effects and controls for the district SNAP participation rate, log median income, unemployment rate, and the share of students in a grade that are White, Black, or Hispanic. 95% confidence intervals and robust standard errors clustered by state are shown. RLA is reading/language arts. ATT-GT is average treatment effect for the treated, group-time and TWFE is two-way fixed effects.

adverse effects on math performance in low-income districts (−0.0616, CI −0. 0900 to −0.0332, $p < 0.001$) but not in higher-income districts (−0.0158, CI −0.0407 to 0.0092, $p = 0.22$).

Column 2 provides results using the TWFE approach. We find consistent results regarding the effects of SYG on math achievement among all students (−0.0493 standard deviation decline, CI −0.0754 to −0.0232, $p < 0.001$), those in low-income districts (−0.0903, CI −0.1351 to −0.0454, $p < 0.001$), White students (−0.0312, −0.0663 to 0.0039, $p = 0.08$), and Black students (−0.0666, CI −0.1323 to −0.0008, $p = 0.05$). The effect of SYG on math performance among Black students is more precisely estimated using TWFE ($p = 0.05$) compared to the ATT-GT estimator ($p = 0.48$). For all groups, the confidence intervals of the TWFE and ATT-GT estimates of the effect of SYG on math scores substantially overlap.

The point estimate of the effect of SYG on math scores among Black students is larger than that among White students in both the TWFE and ATT-GT, as is the difference between low- and high-income areas, although only the difference between low- and high-income districts is statistically significant. We find no statistically significant effects of SYG on RLA for any group using the TWFE approach.

The math and RLA achievement results in Table 1 using the TWFE approach are qualitatively robust in sensitivity analyses that are unweighted or in which the covariate mix is adjusted (Supplemental Appendix). In sensitivity analyses using the ATT-GT approach, the precision of the estimated effects of SYG on math and RLA scores exhibits sensitivity to the specification of covariates and to weighting, although the magnitude and direction of coefficient point estimates are qualitatively similar to those in Table 2.

3.1. Event study analyses

Fig. 2 provides results from event study analyses of the effect of SYG on math and RLA scores using the TWFE estimator. Fig. 3 provides analogous results using ATT-GT. Visual inspection shows similar pre-implementation trends between SYG and non-SYG states for both math and RLA scores, supporting the plausibility of the parallel trends identifying assumption. The yearly post-period coefficients show declining math scores among students following SYG implementation. The test of joint significance of all post-period coefficients for math and RLA shows strongly significant results ($p < 0.001$). The effects for specific post-implementation years are precisely estimated for some years and imprecisely for others, as indicated by the confidence intervals shown in each Figure.

Fig. 4 presents event study analysis under both approaches for low- and high-income areas. Similar patterns emerge to the full sample: there are no significant pre-implementation trends for any group or subject. After SYG implementation, both math and reading performance decline over time, so that the adverse effects accumulate over time.

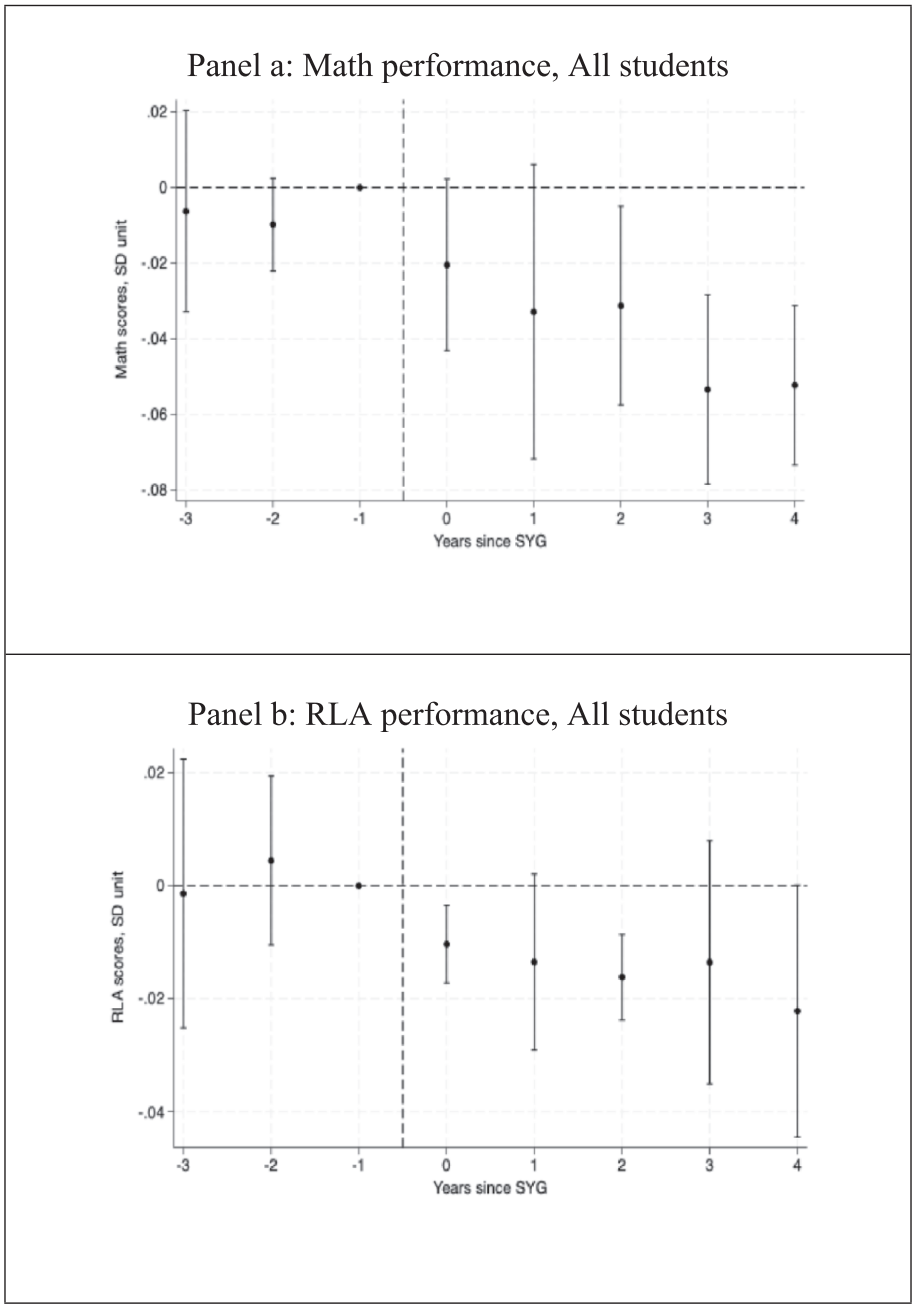


Fig. 2. Effect of SYG on district average academic achievement (all students), event study analysis (TWFE), 2008–09 to 2018–19 School Years *Notes:* Figure shows change in math performance, in standard deviation units before and after passage of a SYG law. The year prior to SYG implementation is normalized to equal 1. Specifications include year, age cohort, and district fixed effects and controls for the district SNAP participation rate, log median income, unemployment rate, and the share of students in a grade that are White, Black, or Hispanic. Vertical lines denote 95% confidence intervals with robust standard errors clustered by state.

4. Discussion

We find declines in math performance among children in 3rd through 8th grades after SYG implementation in states that adopted SYG between 2009 and 2017. There are two pathways through which these laws may affect academic outcomes: One is by increasing exposure to gun violence and associated trauma, and the second is by more generally increasing fear and the perceived risk of gun violence victimization. We attribute the effects of SYG implementation on learning and academic achievement we observe primarily to the latter for two reasons. First, previous state-by-state analyses show limited effects of SYG on homicides in our study states (Esposti et al., 2022). Second, the effects of SYG on academic performance that we observe are robust to including a control for the firearm homicide rate in the state.

Although we find some evidence using the ATT-GT estimator of a decline in RLA performance following SYG adoption, we find no effect on RLA using the TWFE approach and the estimated effect on RLA using the ATT-GT estimator is sensitive to covariate mix. It is not unusual in the education literature to identify stronger impacts of educational interventions and other shocks on math achievement than RLA (Monteiro and Rocha, 2017; Kuhfeld et al., 2022).

We find that SYG is associated with statistically significant reductions of 0.038 to 0.049 of a standard deviation in math. We characterize these impacts as modest, but credible and meaningful given the range of treatment effects on student achievement. For example, schoolwide free meals are associated with a 0.05 standard deviation

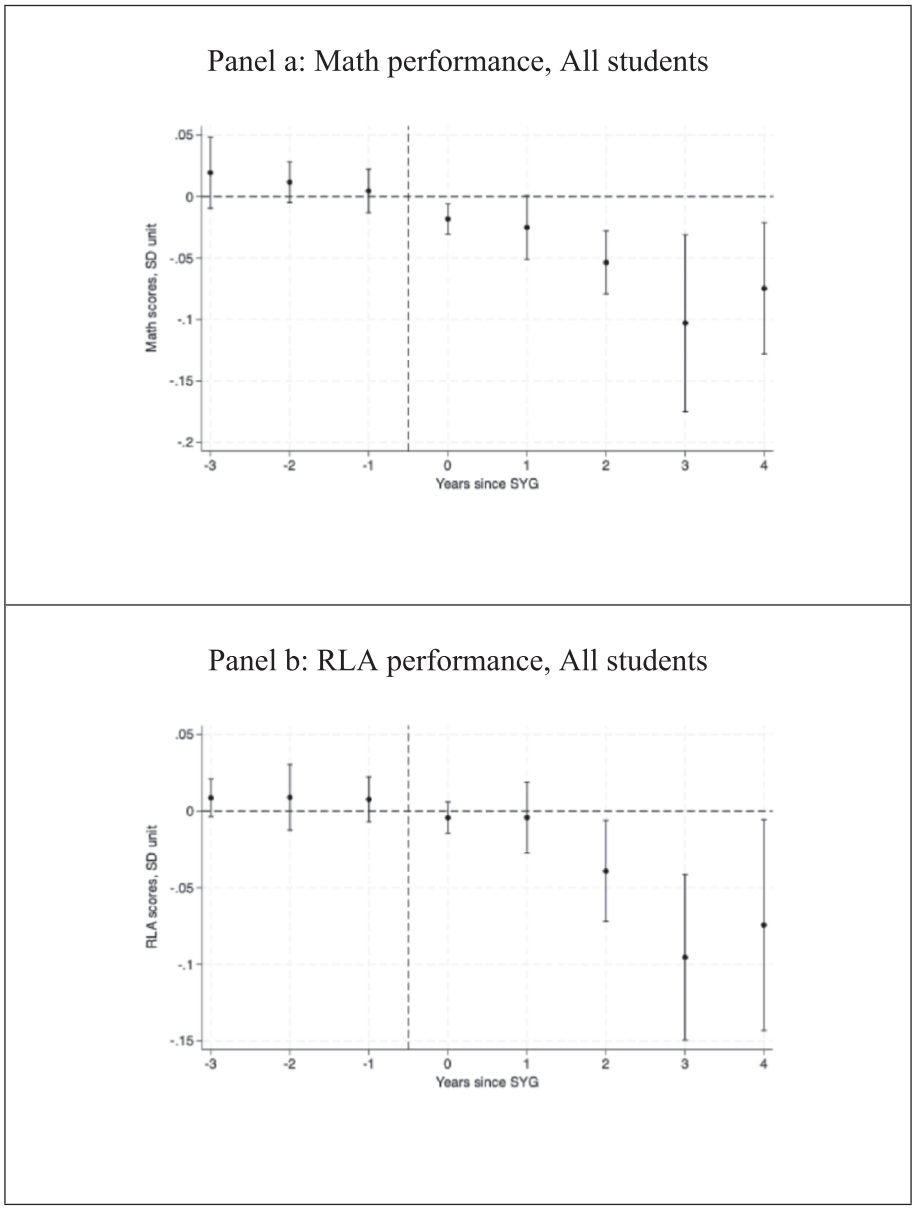


Fig. 3. Effect of SYG on district average academic achievement (all students), event study analysis (ATT-GT), 2008–09 to 2018–19 school years. *Notes:* Figure shows change in math performance, in standard deviation units before and after passage of a SYG law under the ATT-GT approach. Specifications include year, age cohort, and district fixed effects and controls for the district SNAP participation rate, log median income, unemployment rate, and the share of students in a grade that are White, Black, or Hispanic. Vertical lines denote 95% confidence intervals with robust standard errors clustered by state.

increase in math scores in the districts most impacted by expansion in provision (Ruffini, 2022). Meanwhile, expensive, intensive tutoring programs in schools–a treatment consistently identified in the literature as having a strong impact on achievement–increase achievement by 0.36 standard deviation (Nickow et al., 2020; Dietrichson et al., 2017).

We explored potential differences in the effect of SYG laws by race and income level. The effect of SYG on math performance is significantly larger in low-income districts than in higher-income districts. In addition, although the point estimate among Black students is larger than that among White students, the confidence intervals for Black and White students overlap. Thus, we cannot reject the null hypothesis that Black students experience the same effect on math performance as White students.

4.1. Limitations

Policy adoption is not randomly assigned and it is possible that other, time-varying factors are correlated with both the adoption of SYG and student performance. We mitigate against this threat by including time-varying covariates shown to be correlated with the adoption of SYG and testing the sensitivity of our results to a range of conceptually plausible factors. Our TWFE results are robust to covariate mix (Supplemental Appendix), but the precision of our estimates using the ATT-GT estimator is more variable.

Because of the time frame for which the SEDA data are available, we use states that adopted SYG from 2009 to 2017 for identifying the effect of the law on student achievement. Thus, our results should be interpreted as indicating the effect of SYG in states that adopted SYG in relatively recent years, in a period with high-profile shooting cases involving SYG gaining national media attention. Accordingly, the anticipated threats from these laws might be more pronounced than in an earlier period. Additionally, while event study analyses suggest dynamic treatment effects, we lack sufficient power to estimate implementation effects by year. Lastly, our sample sizes for Black students are

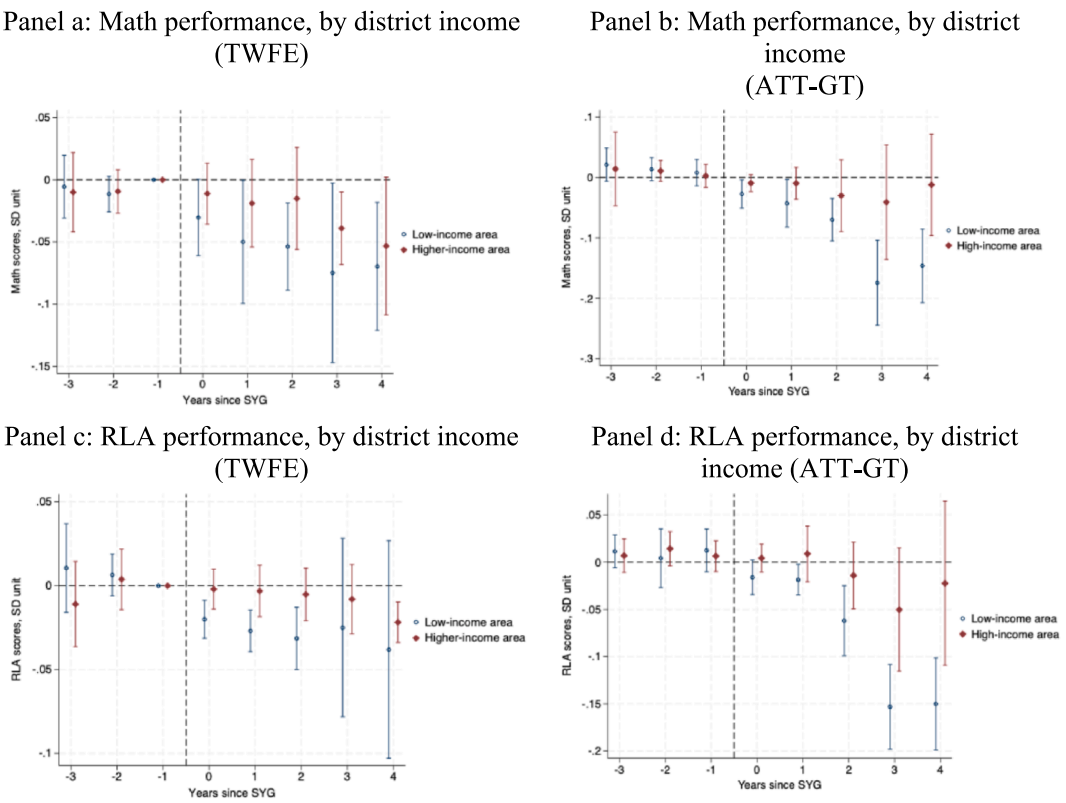


Fig. 4. Effect of SYG on district average academic achievement by district median income, event study analysis, 2008–09 to 2018–19 school years. *Notes:* Figure shows change in math performance, in standard deviation units before and after passage of a SYG law using the TWFE and the ATT-GT event time estimator. "Low-income" districts are those with a median household income (averaged across all years) below $48,720. "Higher-income" districts are those with a median household income above $48,720. Specifications include year, age cohort, and district fixed effects and controls for the district SNAP participation rate, log median income, unemployment rate, and the share of students in a grade that are White, Black, or Hispanic. Vertical lines denote 95% confidence intervals with robust standard errors clustered by state.

much smaller than for White students, which limits our ability to estimate effects precisely for these students.

5. Conclusion

This study makes several important contributions. First, we add to the incipient literature on the ways in which psychological harms from the perceived threat of gun violence may manifest in children's outcomes. Recent research finds a relationship between stress from the threat of gun violence and low birthweight, for example (Currie et al., 2023). Second, we widen the scope of research examining the effect of gun policies on children by investigating a more generalized, albeit less severe, outcome (academic performance) than firearm homicides or suicides. Third, compared to studies examining the effect of a single, acute gun-related event (such as a school shooting) or set of events spanning weeks (such as the Washington sniper attacks), we focus on estimating the effects of ongoing, longer-term gun-related stressors that may play out over multiple years.

Our findings suggest that movement among states over the last decade to decrease the threshold for justifiable use of force through the implementation of SYG laws adversely affected math performance among 3rd-8th grade students. For the states in our study, the effect of SYG laws on learning and academic achievement is likely to operate primarily by affecting fear and perceived risk of victimization that children experience. The patterns we observe underscore the importance of additional work to understand and quantify the relationship between the nation's gun policies and children's academic performance. More research with a longer panel is needed to better identify possible differences in the effect of SYG on students by race, income, and age, and to more precisely capture dynamic treatment effects and identify whether these effects have changed over time.

6. Funding credits and disclosure of potential

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CRediT authorship contribution statement

Krista Ruffini: Writing – review & editing, Methodology, Formal analysis. **Carole Roan Gresenz:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Nora Gordon:** Writing – review & editing, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2024.102817.

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