Getting Down to FACTS

Learning from California's Prior Reading Reforms

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Executive Summary

Reading is a crucial skill for future life success, and yet many U.S. schools fail to prepare students adequately in this area. The last decade has seen a wave of new legislation at the state level to remedy this crisis. As part of those efforts, California has instituted two large-scale grant programs that aim to improve literacy outcomes through school-determined actions, rather than a prescribed blueprint. This technical report summarizes prior research showing the efficacy of the first grant (the Early Literacy Support Block Grant, ELSBG) and introduces new research on the efficacy of the second (the Literacy Coaches and Reading Specialists Grant, LCRSG).

Using quasi-experimental methods, this technical report estimates program effects of LCRSG on its nearly 400,000 students. Results indicate small but positive effects on achievement (0.04 SD) in the first year and larger positive effects (0.08 SD) in the second year. Qualitative evidence from school staff suggests that the small first-year impact reflects delayed spending as schools took time to identify their site-level needs. In year two, as schools completed their planning processes and implementation matured, most schools directed resources towards instructional coaches and professional development, likely fueling the observed gains.

The success of both grant programs strongly bolsters the evidence base for their similarities – professional development about evidence-based reading practices and additional funding for schools to support literacy development with some flexibility on spending. The differences in effectiveness between these programs, however, suggests that targeting, cost, and advance planning can meaningfully change the degree of literacy improvement achieved by state intervention.

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Introduction

Reading matters. Reading test scores in early elementary school strongly predict reading test scores in high school (Sparks et al., 2014) as well as high school graduation rates (Hernandez, 2011), which, in turn, predict college matriculation, college completion, and income. Beyond its link to employment, reading is a foundational prerequisite to many of life's daily tasks, including reading bank statements, transportation schedules, and street signage (Grajo & Gutman, 2019).

Despite the well-recognized importance of reading, national assessments suggest that California has not been adequately preparing vast swaths of its students with the reading skills they need to flourish. In 1998, the first year that accommodations were permitted for students with disabilities on the National Assessment of Educational Progress, the average student nationally in public school earned a 213 (*National Assessment of Educational Progress*, 1998). The average California student earned a 202 on the exam, suggesting the average California student was performing almost a full grade level below the national average.

The first two decades of the century saw moderate national growth in reading performance. As the federal government rolled out new reforms implementing evidence-based teaching practices in Title I schools with Reading First and a broad set of accountability reforms in No Child Left Behind, among other policies, the national average score increased to 219 by 2019 (*National Assessment of Educational Progress*, 2019). In addition, these two decades of reform saw a small but important reduction in the number of low-performing students. From 1998 to 2019, the percentage of students scoring above Basic (i.e., demonstrating at least partial mastery of grade-level content) increased from 58 to 65 percent.

During these two decades, California experienced even larger growth in its reading performance than the nation, though this growth was still insufficient for California to reach the national average. By 2019, California's average score had increased by 14 points since 1998 and had increased the percentage of students scoring above Basic from 48 percent to 63 percent. Despite these improvements, California was still ranked 40th compared to other states on grade-4 reading.

The COVID-19 pandemic, and the disruptions it wrought on school systems and families, erased these decades of growth at the federal level such that the average fourth grade student nationally in 2024 scored lower in reading than the average student in 1998 (*National Assessment of Educational Progress*, 2024). Test scores of California students fell too but not to its 1998 levels; California was ranked 39th compared to other states. Figure 1 shows California's performance on this exam relative to a nationally representative group of public school students.

As California heads into a new gubernatorial administration, this is a moment of opportunity for the state to take stock of its past reading reforms and to make new plans to dramatically improve reading performance. By examining the state's efforts of the last two decades, this piece aims to offer lessons about what worked and what did not to build towards the future.

The History of Past Reforms

National Reforms

The beginning of the 21st century brought with it two moments of substantial importance in national reading reform. First, in 2000, the National Reading Panel published a report summarizing the most effective ways to teach children to read as identified by the research literature. The report highlighted the importance of phonemic awareness, phonics, fluency, vocabulary, and comprehension, the five pillars of what would later be called the "science of reading" (National Reading Panel, 2000).

Second, in January 2002, President George W. Bush signed No Child Left Behind into law. This legislation increased the accountability requirements for schools, requiring students to take assessments every year in grades 3-8 and again once in high school, and added consequences for schools whose students did not make sufficient progress over time. The law also included funds for a new program called Reading First, which provided $900 million per year over six years to help states and school districts establish new reading programs "based on scientifically based reading research" (H.R.1 - No Child Left Behind Act, 2002). The law specifically named five "essential components of reading instruction" – the same five as were named in the National Reading Panel Report.

The official Institute of Education Sciences-report on Reading First concluded that, by April 2007, states had provided sub-grants to 5,880 schools but the program had no effect on reading comprehension of targeted students (Gamse et al., 2008). Evaluators of California's Reading First implementation, though, concluded the program had produced a positive effect on student achievement (Haager et al., 2009). This study may have come to different conclusions for a few reasons: first, Reading First delegated substantial policy design and implementation choices to states who then could select curricula and provide professional development, among other powers, to local schools. California's Reading First implementation may have been stronger than other states – either by selecting better curricula or by supporting greater fidelity of implementation – and thus California may have seen stronger results than the nation as a whole. However, the different methodological choices of these studies muddy that conclusion. In Haager et al. (2009), high-implementing Reading First schools are compared to low-implementing Reading First schools whereas, in Gamse et al. (2008), Reading First schools are compared to other schools just below the cutoff for selection into the program. The more rigorous, plausibly exogenous design in Gamse et al. (2008) provides a more reliable estimate of the program within its narrow sample of 248 schools in 13 states but may not generalize well beyond its sample.

Amidst controversy over tight relationships between regional directors of Reading First and certain curriculum publishers whose products were advanced by the program (Manzo, 2006), Congress cut funding for Reading First in 2008. As federal funding for literacy reform wound down, states across the country took different approaches.

Overview of State Approaches

The Foundation for Excellence in Education (ExcelinEd) has identified 18 early literacy policies that promote reading improvements. These 18 policies fall into four categories: 1) Supports for Teachers and Policy (e.g., literacy coaches), 2) Assessment and Parent Notification (e.g., testing all students for dyslexia), 3) Instruction and Intervention (e.g., adoption of high-quality instructional materials), 4) Retention and Intervention (i.e., a policy for keeping students in the previous grade level if they are performing severely below grade level).

Reflecting the energy that state legislators have focused on literacy reform in the past decade, all 50 states and the District of Columbia have at least one of these 18 policies in law (ExcelInEd, 2025a). The average state has 13 policies, with six states with all 18 and another 10 states with at least 16. Figure 2 shows the number of policies per state.

Mississippi has been recognized nationally for its reading progress (Kristof, 2023; Lurye, 2023) after it moved up the state rankings from second-to-last in 2013 for fourth grade reading to ninth in 2024 (*NAEP Reading*, 2024). Through legislation in 2013 and 2016, Mississippi has mandated science of reading trainings for all its teachers, aligned educator preparation programs to science of reading techniques, mandated a universal assessment of reading difficulties, rolled out evidence-based interventions for struggling students, and retained students severely below grade level in third grade.

Retention has been particularly controversial among early literacy policies for two reasons. First, the research base on the effects of grade retention is mixed. Some studies that use credible causal methods have found positive impacts on academic achievement while others using similar methods found null or negative effects, though positive effects do appear more uniformly when retention occurs at younger grades (see Hwang & Koedel (2025) for a good review). Effects on non-academic outcomes (e.g., attendance and discipline) are also mixed. Given its high cost_ grade retention is costly because it requires a public school system to support a student through an additional year of learning_the research base suggests that retention may be an effective way to improve student outcomes in some contexts but not in all.

Second, grade retention has typically been applied unequally. In Michigan, where grade retention was initially passed as part of the Read by Grade Three Law in 2016, researchers showed that, among students eligible for retention who had scored severely below grade level on the state assessment, economically disadvantaged students were 3.3 percentage points more likely to be retained (Westall et al., 2023). This difference remained even when controlling for test scores, school district, special education status, student mobility, and many other factors and is likely driven by the challenges economically disadvantaged families face in advocating for exemptions to the law's requirements. Michigan ultimately repealed its grade retention components of its comprehensive early literacy law (Rice & Whitmer, 2024).

Eight states, including Michigan, have passed at least 13 of ExcelInEd's early literacy policies and have not utilized retention based on third grade reading scores. For example, Colorado requires all K-3 teachers and administrators to participate in science of reading trainings and requires teacher candidates to pass a science of reading-specific exam for licensure; Colorado has also been deemed "above and beyond" by ExcelInEd for their adoption of a high-quality instructional materials mandate with strict monitoring of district compliance (ExcelInEd, 2025b).

California Policies

California has chosen to improve reading instruction through targeted policies, as well as improved state guidelines and recommendations. Specifically, California has passed 10 of the ExcelInEd-categorized early literacy policies into law, including a science-of-reading-specific exam for teacher candidates and a universal reading screener. Below, I chronicle these changes, and others, to early literacy policy within the state.

In California, new legislation in 2011 called for the revision of the English Language Arts/English Language Development Framework, non-binding documentation to support literacy instruction in school districts. After three years of consultation with educators, the State Board of Education approved the new framework in 2014. The framework, still in effect today, promotes phonemic awareness, phonics, fluency, vocabulary, and comprehension while also emphasizing the importance of oral language development and content knowledge, among other topics (*English Language Arts/English Language Development Framework*, 2014). In addition, the framework explicitly integrates the discussion both of the acquisition of literacy skills for students who already speak English and of the development of English for students who speak other languages at home, who make up about 30 percent of California's kindergarteners.

The next year, the California State Board of Education adopted a list of recommended programs that align with the Framework. This list is still in effect today and spotlights two programs for Basic ELA and five programs for Basic ELA/ELD for grades K-3 (*ELA/ELD Instructional Materials Adoption*, 2015). These programs are not required to be implemented though, and districts maintain local authority to select their own programs. The California Reading Curriculum Report concluded in 2022 that, despite this local authority, 81 percent of districts chose one of three reading programs, all three of which were

on the state recommended list (The California Reading Curriculum Report, 2022). Two of these three programs received almost perfect scores on EdReports' measures of the science of reading while the other scored well on all science of reading measures except comprehension (*Reports*, 2025). However, journalists have noted that these curricula "are jampacked with lessons and material in order to serve a wide range of schools," and critics contend this abundance of resources can lead to less-experienced teachers not necessarily implementing their science of reading components (Tadayon, 2022).

In 2016, California voters elected to allow bilingual education throughout the state with Proposition 58. Though this proposition need not have changed literacy instruction in every district, the proposition's encouragement to create dual language programs likely increased the prevalence of bilingual education statewide and changed the way many students in California acquired their reading skills. By 2018-19, 340 schools had added dual-language immersion programs, an increase of 84 percent, bringing the total to 747 schools with dual-language programs statewide (Stavely & Rosales, 2021). This is still a relatively small share of the state's 10,000 public schools.

In 2019, California also applied for and won a federal Comprehensive Literacy State Development Grant. This grant, along with its extension and additional funding awarded in 2024, has supported the state's efforts to create a State Literacy Plan that "aligns and integrates state literacy initiatives, content standards, and state guidance documents to support teachers of students, birth through grade twelve" and build local capacity for its implementation (*Comprehensive Literacy State Development Grant*, 2024).

The state legislature has also passed three significant literacy laws in the last five years. The first – SB 488 in 2021 – required that candidates for a teaching credential pass an assessment measuring with content on the "evidence-based methods of teaching foundational reading skills," including phonemic awareness and "direct, systematic, explicit phonics" (SB-488, 2021). The law also directed the Commission on Teacher Credentialing (CTC) and the Committee on Accreditation to certify that teacher preparation programs include instruction about "effective means of teaching literacy" in accordance with the ELA/ELD Framework and "tiered support for pupils with reading difficulties, English learners, and pupils with exceptional needs."

Implementation of the new requirements for teacher preparation programs has been contested. For example, in 2024, the CTC referred Mills College at Northeastern for accreditation despite testimony from dyslexia experts who stated that the school "paid lip service to foundational skills" and did not provide enough training for teachers about how to identify students to be screened for dyslexia (Fensterwald, 2024).

The state legislature also passed SB 114 in 2023. This law, the education omnibus budget trailer bill, included a key component with relevance to literacy instruction statewide: a requirement for the state to approve a list of screening instruments for identifying students at risk of having reading difficulties and then for all districts to assess students in kindergarten through second grade using one of those assessments annually beginning in fall 2025 (SB-114, 2023). The state has since announced its selection of four screeners (Thurmond, 2024), and analysis of a representative set of school board minutes shows that districts have selected their screeners and begun implementation during the 2025-26 school year (Sardillo & Ridley-Kerr, 2025).

In 2025, the state legislature passed AB-1454 to require the Commission on Teacher Credentialing further update credentialing requirements and to require the state Board of Education to adopt a new list of instructional materials to align with evidence-based reading practices. Furthermore, the law requires that school districts adopt materials from this new list by January 31, 2027 or provide documentation that their adopted materials similarly cover this content (AB-1454, 2025).

A timeline of these state actions is found in Figure 3. In addition to these actions that affect the whole state, California has created two targeted grant programs for particular schools to receive additional literacy support. Because these funds are more narrowly assigned only to eligible schools with clear criteria, the performance of eligible schools who received these funds can be compared to the performance of otherwise similar non-eligible schools in the state using rigorous, quasi-experimental methods. The takeaways from this research can help shed light on how the state as a whole can improve.

A Tale of Two Grants:

The first targeted grant program emerged out of the settlement of a lawsuit called *Ella T v. State of California*, in which plaintiffs alleged that the state had violated their right to an education by failing to teach them to read (Public Counsel & Morrison & Foerster LLP, 2017). The case settled, and the state ultimately agreed to allocate $50 million to establish a new grant program known as the Early Literacy Support Block Grant (ELSBG). An additional $3 million was allocated later on. In 2020, the state identified the 75 lowest performing schools in the state on a measure of prior academic performance and offered them the opportunity to apply for the grant. Seventy-three of the 75 eligible sites did, and all applicant schools were accepted into the grant. The grant began in 2021-22 and concluded after three years.

ELSBG had four distinctive features, as described in prior work (Novicoff & Dee, 2025). First, ELSBG selected an outside agency – the Sacramento County Office of Education (SCOE) – to provide technical assistance on grant implementation, including assisting each school site in writing a plan describing how they intended to improve literacy instruction at their site. SCOE also provided optional professional development on evidence-based reading instruction (i.e., the science of reading) to staff at school sites. Second, ELSBG provided narrowly targeted funds, infusing an additional approximately $1000 per pupil per year in targeted schools to spend specifically on improving their K-3 literacy expenditures. Third, these funds could be spent flexibly on almost any literacy expenditure as long as those expenditures had been determined after consultation with school staff, parents, and community members and approved by SCOE as supporting their broader literacy plan. Finally, ELSBG required that schools use funds to supplement existing activities and submit quarterly reports showing expenditures consistent with the approved budget. Later-year funding was contingent on submission of those reports.

Prior research found that ELSBG improved grade-3 English Language Arts test scores by 0.14 standard deviations over the first two years of the grant (Novicoff & Dee, 2025). This is equivalent to an additional quarter of a year of learning. The grant also improved grade-3 mathematics scores by 0.11 standard deviations, perhaps by better equipping students to access word problems and instructions in

math assessment or by freeing up elementary teachers to spend more time planning for mathematics as the state provided additional support in literacy.

California rolled out a second targeted literacy grant program in 2022 called the Literacy Coaches and Reading Specialists Grant (LCRSG). Like ELSBG, LCRSG competitively selected the Sacramento County Office of Education (SCOE) to support programming and organize professional development; therefore, professional development offerings looked quite similar across both grants with providing optional science of reading trainings for teachers, literacy coaches, and school leaders. Though these trainings were not identical, both included similar slides about Scarborough's Reading Rope, or the importance of explicit instruction on both language comprehension and word recognition (*ELSBG Session 1*, 2021, p. 19; *LCRS Session 1*, 2024, p. 38).

But, LCRSG differed from ELSBG in its targeting, scale, cost, and oversight. First, LCRSG was targeted at the elementary schools in the state serving the highest percentage of low-income students, English Learners, or foster or homeless youth, whereas ELSBG selected schools based on academic performance. Second, LCRSG focused on more than 800 schools while ELSBG targeted only 75 schools. Third, LCRSG provided about $300 per student while ELSBG funneled more money to those schools at about $1000 per student. Finally, though both grants allowed funds to be spent on almost any literacy expenditure, LCRSG did not require schools to submit a plan for improvement or a budget of how funds would be spent. All grant funds were paid to schools upfront at the beginning of a five-year grant period, and schools were given full autonomy to spend the funds at any time in that period on any literacy expenditure they saw fit without state approval.

Additional Policy Details about LCRSG:

LCRSG Legislation and State-Level Implementation

As written into Governor Gavin Newsom's budget proposal and passed into law by the California State Legislature in June 2022, the Literacy Coaches and Reading Specialists Grant (LCRSG) allocated $225 million to "to develop school literacy programs, employ and train literacy coaches and reading and literacy specialists, and develop and implement interventions for pupils in need of targeted literacy

support" (AB-181, 2022). This legislative language encompassed a wide range of permissible activities: a school might hire literacy coaches to observe teachers, or hire reading specialists to work directly with students, or contract with a tutoring provider, or send teachers to receive professional development at a local university, or distribute free books to families, or purchase a new online reading platform, or administer new assessment programs, or purchase new textbooks or other instructional materials, or many other literacy-based expenditures. Schools did not need to receive approval from the state for the literacy spending they chose. In addition to autonomy about how to spend funds, schools also maintained autonomy to decide when to use these funds at any time over a five-year period.

Schools did not need to complete applications in order to receive these funds. Schools were automatically eligible to receive LCRSG if 97 percent or more of their students in grades kindergarten through third grade were unduplicated pupils_low-income, English learners, homeless, or foster youth, with students not allowed to be counted twice even if they are in multiple categories_in the school year prior to the grant's announcement (2021-22). Schools were notified of their eligibility to receive funds in September 2022 and given an opportunity to opt out of the program. Ten schools opted out, and 376 schools ultimately received five-year allocations in January 2023. These 376 schools are hereafter referred to as cohort one schools.

At the beginning of the 2023-24 school year, as cohort one schools continued to spend their five-year allocations, the state legislature allocated an additional $225 million in funds for the creation of a second cohort. Cohort two schools were eligible for LCRSG if more than 95 percent of their students in kindergarten through third grade were unduplicated pupils in the prior school year (2022-23). A school could not receive funds in cohort two if it had received funds in cohort one, even if it was eligible under these criteria too. These new criteria led to 455 additional schools deemed eligible and notified in September 2023, 13 schools then opted out, and 442 schools ultimately received five-year allocations of funds in January 2024.

In September 2023, in addition to notifying the second cohort, the state also announced its intention to award a $27 million grant to the Sacramento County Office of Education (SCOE) to provide support to the 818 schools in both cohorts. SCOE had demonstrated prior success executing a different

literacy grant program (Novicoff & Dee, 2025), but this agency would be stretched more thinly under LCRSG, supporting 818 schools at a cost of $33,007 per school compared to $40,000 per school in the previously successful initiative (20 percent less money per school to support).

In January 2024, SCOE began providing a Professional Learning Series focused on LCRSG consisting of seven hourlong sessions, with each offered three times to accommodate scheduling. Documentation provided by SCOE describes the content of the sessions: the first session introduced participants to the grant and its future offerings, and sessions two and three focused on the science of reading and how to measure reading's composite skills (e.g., fluency). Those sessions also emphasized the importance of oral language development for English learners. Sessions four through seven guided schools through a reflection of their school's current needs, an identification of roots causes, and the writing of a plan to improve their literacy achievement. Participants included district grant leads, school administrators, instructional coaches, reading specialists, and teachers, and participation rates were relatively high for optional programming but still encompassed less than half of eligible school sites. Session attendance ranged from 526 participants from 215 schools in Session 1 (LCRSG Orientation) to 1,168 participants from 311 schools at Session 5 (Root Cause Analysis) (Sullivan, 2024). SCOE solicited feedback from participants after each session and adjusted the provision of professional development to this feedback.

After the conclusion of that initial Professional Learning Series, SCOE instituted a Literacy Coach Training Series, a Coach Network for coaches to share ideas about what has worked at their site, a Family and Community Engagement series to discuss how to best integrate families into literacy improvement strategy, a Small School Collaborative and a Rural Schools Network to allow sites with those specific conditions to brainstorm approaches, and more opportunities for professional learning and collaboration. However, these efforts began in fall 2024 after the collection of the last academic achievement data used in this paper. Thus, this paper will not cover the effects of those initiatives. Legislators also recently authorized a third cohort of LCRSG, but, because this cohort was funded less than a year ago, this technical report will exclude the third cohort from analysis.

Once funds were received, LCRSG did not add any new consequences for schools that did not improve their student achievement. Local Education Agencies (LEAs; i.e., school districts or charter

management organizations) receiving LCRSG funds for any of their schools are required to submit annual reports each year that describe how funds are being used. In addition to these annual reports, LEAs are also required to submit a final report at the end of their allocation period (i.e., by June 2027 or 2028 depending on cohort). Notably though, schools received their LCRSG funds all at once at the beginning of their five-year allocation period before they had specified how they would like to spend it and before completing any reporting. LCRSG schools therefore face the same accountability regime as other schools in California from the state's Local Control Funding Formula, in which districts can become eligible for differentiated assistance or intensive support based on low performance on state indicators (*LEA Criteria for Differentiated Assistance*, 2024).

When California State Superintendent of Public Instruction Tony Thurmond described the reporting requirements to schools, he described what the state would do with these annual report submissions. He said, "If it's good news that's great, and we will help you to amplify that. If it's news that says that there are students in, say, the K-2 grade span, who are not on track to learn to read by third grade, then we hope you find that data helpful for yourselves as to be able to make interventions, and that it gives us a baseline of where our students are statewide and where we might be able to find more statewide resources to help you" (Howerter, 2023). Thurmond added that the program provided resources but not prescriptions, saying: "We're not here to tell you what you have to use… Every community is unique and has its own needs. But we think it's important that districts be given access to the best professional development and then the funding to make sure that school staff can get it" (Howerter, 2023). In another webinar, he emphasized the way in which the program was structured to support locally-identified needs – "We want to hear from you what you need" (Howerter, 2022).

In other words, LCRSG's theory of change envisioned the following process: the state would give additional funds to schools with high levels of need, and schools would spend the funds on the expenditures they thought would best improve their literacy instruction and achievement. These expenditures would differ by school site and context but be focused on addressing school-based needs. These new supports would ideally then improve literacy skills and academic achievement at the targeted high-need schools.

LCRSG Scale and Cost

LCRSG schools from the first two cohorts are located across the state geographically and in urban, suburban, and rural contexts. A map of these schools is shown in Figure A1. Though a plurality (42 percent) of grant-recipient schools across both cohorts are located in Los Angeles County, 46 of California's 58 counties have at least one LCRSG-recipient school in either cohort.

Descriptive statistics for the LCRSG-eligible schools from cohort one, compared to other elementary schools in the state, can be found in Table A1. This table shows that LCRSG-eligible schools from cohort one, on average, serve a higher percentage of Black and Hispanic pupils than the typical school in the state. LCRSG-eligible schools from cohort one also serve more students who receive free- or reduced-price lunch, English learners, and unduplicated pupils and have, on average, lower test scores.

In the first two cohorts, LCRSG delivered funds to 818 schools that served roughly 371,000 students each year. The median amount allocated per student per year at the school-level across both cohorts was $266.19.[1] Though this is a relatively small number of dollars at a per pupil level, the median school site received a total of $119,858 per year. This amount would have been sufficient to hire a full-time literacy coach to observe and give feedback to every teacher at a school biweekly, or purchase tutoring services for a full year for the lowest-performing third of students, or train all

[1] The authorizing legislation for LCRSG specified that "no local educational agency shall receive less than four hundred fifty thousand dollars ($450,000) per eligible schoolsite" over the grant's five-year time horizon (AB-181, 2022). Data shows that this requirement was adhered to. Remaining funds were divided among schools based on K-3 enrollment (Klein Briggs, 2022).

This requirement resulted in a few small schools receiving much larger sums per pupil than the median. For example, Happy Valley Community Day in northern California served seven students in 2021-22. All of their K-3 students were unduplicated pupils, giving them an unduplicated pupil percentage of 100 percent and making them eligible for LCRSG in the first cohort. Happy Valley therefore received an LCRS grant award of $450,000 (the legislatively-required minimum amount) in 2022-23 to be spent over five years. This amounted to $12,857 per student per year and, if fully spent, would represent an almost 75 percent increase in the per-pupil expenditures of the school.

The distribution of LCRSG dollars per student per year by school across both cohorts of recipients can be seen in Figure A2 Panel A and among schools in the balanced panel used for synthetic difference-in-differences in Panel B. Note that the distribution in Panel B no longer has a long righthand tail as in Panel A because the requirement of a balanced panel dropped small schools with fewer than 11 third graders in any given year; these small schools were also those that received substantially more dollars per pupil due to the legislative requirement of a minimum allocation of $450,000 regardless of school size.

teachers using science of reading-backed professional development, or many other choices. In addition to the funds allocated at the school level, $27 million was allocated to the Sacramento County Office of Education to administer the programming described above. When incorporated, these costs bring the total spending on LCRSG to $339 per pupil per year.

Data and Methods

Research Questions

This technical report aims to answer the following research questions:

1. What causal effect did LCRSG have on the academic achievement of targeted schools over its first two years?
2. How did school and school district leaders spend the largely unregulated literacy funds from LCRSG during the first two years?
3. How did school and school district leaders describe the successes and challenges of grant implementation during the first two years?

Quantitative Data & Methods

Of the 10,600 schools listed as open in the California School Directory on July 1, 2021 (i.e., the beginning of the school year in which eligibility was determined), 6,427 were eligible for the program because they: 1) administered by elementary or unified school districts, county offices of education, or charter schools; 2) served students in at least one grade between kindergarten and third grade during the eligibility-determining year; and, 3) reported an unduplicated pupil count (i.e., the assignment variable) for those grades in the eligibility-determining year. Of the 6,427 schools, 5,760 reported also reported a test score on California Assessment of Student Performance and Progress (CAASPP) for grade-3 ELA in SY 2022-2023 and SY 2023-24 (i.e., the outcome variables) and thus are in the analytic sample. This can be computed as an attrition rate of 10.4 percent, primarily driven by the dropping of

small schools due to a data privacy requirement that test scores not be reported for any grade with 11 or fewer students.

The primary outcome for Research Question 1 is the average score on the state standardized exam (i.e., California Assessment of Student Performance and Progress; CAASPP) for grade-3 English Language Arts because LCRSG funds were designed to be spent on literacy expenditures and because third grade was the only state-tested grade for which schools also had to report outcomes in their annual reports. That being said, LCRSG funds could be spent at any grade level so exploratory outcomes also include CAASPP scores for fourth and fifth grade. In addition, because elementary teachers who receive professional development through LCRSG teach both English and math, math test scores are added as an exploratory outcome.

To measure the effect of LCRSG on academic achievement, the preferred specification uses a synthetic difference-in-differences analysis. Synthetic difference-in-differences compares the treated group of schools to all non-treated schools both before and after the treatment began. SDID also incorporates elements of synthetic control though, purposefully selecting comparison schools from this wider pool of non-treated schools who are most similar in trend and level of the outcome variable (i.e., mean standardized grade-3 ELA score) to the treated schools in the pre-treatment period. The formula for the resulting calculation of the effect of interest (i.e., $\hat{\tau}^{sdid}$) can be found below:

$$\left(\hat{\tau}^{sdid}, \hat{\mu}, \hat{\alpha}, \hat{\beta}\right) = \left\{ \sum_{s=1}^{N} \sum_{t=1}^{T} \left(Y_{st} - \mu - \alpha_s - \beta_t - D_{st}\tau\right)^2 * \hat{\omega}_s^{sdid} * \hat{\lambda}_t^{sdid} \right\}$$

The procedure first calculates the squared value of the difference between the outcome of interest (Y_{st}) and the intercept (μ), unit-specific fixed effect (α_s), time-specific fixed effect (β_t), and the binary treatment indicator (D_{st}; equal to 1 if school n was eligible for LCRSG and year t is in the post-period) over all schools N in all time periods T. The procedure then multiplies that squared difference by unit- and time-specific weights and aims to minimize the resulting estimate (Arkhangelsky et al., 2021). The unit-specific weights, $\hat{\omega}_s^{sdid}$, optimally align pre-treatment trends across treated and

comparison units, and time-specific weights, $\hat{\lambda}_t^{sdid}$, place more emphasis on pre-treatment periods that are similar to the post-treatment period.

The causal validity of a synthetic difference-in-difference design relies on the assumption that, absent LCRSG, the average scores of eligible and non-eligible schools would have followed the same trend over time (i.e., parallel trends). Though we cannot test this directly, we can determine if eligible and non-eligible schools have historically followed similar trends. Figure 5 shows that, in the years before treatment, the SDID procedure was mostly successful at identifying comparison schools whose academic achievement was trending in the same way as eligible schools, thus upholding the validity of the design.

I further explore the robustness of SDID results in four ways. First, I present SDID results with covariate adjustments for school demographics (i.e., percent White and percent receiving free- or reduced-price lunch) and the natural log of school enrollment. The presence of these covariates slightly alters the SDID procedure: rather than identifying comparison schools based solely on their prior achievement as in a canonical SDID, SDID with covariates incorporates data beyond achievement into the selection of comparison schools and thus selects a different set of comparison schools from which to construct an estimate of the treatment effect. Second, I present results that restrict the dataset from which the SDID algorithm can select comparison schools to schools within increasingly constricted bandwidths of the cutoff value for assignment into LCRSG. This procedure again changes the set of comparison schools from which to construct an estimate of the treatment effect. In addition, all SDID procedures require the use of a balanced panel (i.e., all schools in the treatment or comparison group must have reported test scores in all eight years of the dataset). If LCRSG had induced schools to become missing from the dataset, either by closing or falling below the minimum number of test-takers for reporting, this would introduce selection bias into our calculations. I perform a regression in Table A2 to test this and determine that presence in the balanced panel is unrelated to LCRSG eligibility at narrow bandwidths. I perform a similar regression to determine if the number of test-takers is related to LCRSG eligibility (Table A3) and conclude it is not.

I also present SDID results without schools who received the Early Literacy Support Block Grant in pre-LCRSG years. The Early Literacy Support Block Grant provided professional development on the science of reading, about $1000 per pupil, and support from the state to low-performing elementary schools. This program has been shown to have raised academic achievement (Novicoff & Dee, 2025), and thus possibly raised the capacity of these sites and their staff. Of the 376 LCRSG schools in cohort one, 16 are prior ELSBG recipients. I therefore perform a robustness check in which I drop ELSBG recipient-schools from both the treatment and the comparison group to test if any effect observed from LCRSG is not driven by the lingering effects of the ELSBG program.

This technical report focuses on academic outcomes for the first cohort who had two years to implement the program. In the preferred specification, along with all other elementary schools in the state that reported both an outcome and an assignment variable, cohort two schools are considered to be possible comparison schools, because they had received funds about four months before assessments were given and thus did not have time to make meaningful changes to the learning environment for their students; if cohort two schools were able to improve during this period, then the effect of LCRSG reflected in this technical report represents a lower bound of the effect of the program. However, I also present alternate specifications that exclude cohort two schools from analysis altogether.

In the Appendix, this technical report also presents results from two-way fixed effects and regression discontinuity designs as alternate specifications. These alternate specifications have trade-offs for internal and external validity. In this case, because of an imbalance in prior test scores at the cutoff explored in more depth in the Appendix, a method that is less reliant on the cutoff is preferred. In addition, because LCRSG schools range widely in their prior academic achievement and because prior achievement is extremely predictive of later achievement, a methodological approach that uses prior achievement (i.e., the outcome variable in the pre-treatment period) rather than school demographics (i.e., the assignment variable) to identify the comparison group is preferred.

Qualitative Data & Methods

Quantitative research can tell us whether, and to what degree, LCRSG affected academic achievement. To understand how this program operated, how the funds were spent, and why an effect

might or might not be observed, I use a large and unusual body of text – annual grant reports – as a data source.

I queried annual report documents for both years from the California Department of Education through California Public Records Act requests. These documents provide narrative reflections from school or school district staff about how they spent the funds, why they made those spending choices, and the successes and challenges they encountered along the way. Furthermore, these documents were not created for research purposes, nor do they have accountability consequences (i.e., regardless of the experiences described in the report, LCRSG schools could not have additional funding granted or have any funding removed) so they likely reflect an honest perspective of the individual writing the report. The designated grant lead at an LEA was to complete the annual reports. The designated grant lead varied by district from Superintendent to Principal to Director of Early Literacy, and more.

These annual reports follow a standard template and ask LEAs to list how many LCRSG dollars were spent in the prior school year and what the funds were spent on. The template also asks LEAs to submit a few open-ended responses to questions, such as, "If zero funds were spent in any fiscal year, provide narrative details (max 2,000 characters) as to why, and when funds will be spent," "Provide a brief executive summary (max 2,000 characters) of this fiscal year's activities," "Details about selected successes", and "Details about selected challenges."

Though annual report completion is required, LEAs received their full five-year allocations at the beginning of the grant and thus are not incentivized financially to submit reports. However, staff at the California Department of Education communicated with LEA staff about the annual report deadline and completion rates were relatively high. Ninety percent of LEAs in the first year submitted annual reports while 75 percent did so in the second.

I used NVivo qualitative software to perform document analysis on this corpus of 313 documents composed of 2,880 pages. Before reading, I developed a list of deductive codes based on prior work in early literacy and program evaluation as well as allowable spending categories. As I read documents, I tagged text with those codes and noted any new themes that were emerging (e.g., engagement with a County Office of Education). I then conducted a second read, using the newly created list of inductive codes to code documents again. This hybrid deductive and inductive coding

method is both "iterative and reflexive" and introduces additional rigor to the process of thematic analysis (Fereday & Muir-Cochrane, 2006). The codebook used for this analysis can be found in Appendix C.

New Research: Findings

RQ1: How did LCRSG change the academic achievement of targeted schools over two years?

Grade-3 ELA

I find that LCRSG improved the grade-3 ELA test scores of targeted schools by 0.06 SDs. In Table 1, using the preferred synthetic difference-in-differences specification, I find that LCRSG improved the grade-3 ELA test scores of targeted schools by 0.06 SDs (statistically significant with $p < 0.01$). Model 2 of that same table shows that these effects are robust to the inclusion of covariates, while Table 2 shows these effects hold as we restrict the comparison set for the SDID algorithm to draw upon to create alternative counterfactual estimates. This effect persists when schools who had previously received literacy support under a different state program (i.e., the Early Literacy Support Block Grant) are removed from the sample (see Table A4) and when schools from the second cohort of LCRSG are removed from the sample (see Table A5).

LCRSG effectiveness improved substantially in year two relative to year one. Table 1 shows that LCRSG improved the grade-3 ELA achievement of targeted schools by 0.04 SDs in year one and 0.08 SDs in year two. This improvement is visualized in Figure 4. Reasons for this improvement will be explored in qualitative findings.

LCRSG targeted schools based on student need, proxied for with demographics, but these high-need schools varied substantially in their prior academic performance with the highest-performing LCRSG school scoring 0.49 SD above the mean in the year before the intervention and the lowest-performing LCRSG school scoring 1.30 SD below the mean in the year before the intervention. When LCRSG effects are calculated using sub-samples of terciles of prior academic performance

(calculated as the average of performance between 2019 and 2022 to address concerns about mean reversion), Table 3 shows that middle-performing and lowest-performing LCRSG schools saw the largest gains from the program while previously higher-performing schools saw relatively smaller gains from the program. This may reflect the role that LCRSG-funded professional development played in improving the instructional and curricular quality of low-performing schools, while higher-scoring schools may have already been using high-quality curricular and instructional approaches.

LCRSG also included schools in different areas, from rural communities to urban cores. Table 4 shows LCRSG results when the treatment schools are sub-set to schools in urban, suburban, and town or rural areas. This table shows that the positive effect of LCRSG is driven primarily by positive effects in urban areas; rural schools have not shown statistically significant gains under the program. Reasons for this will be explored in qualitative findings.

Other Grades and Subjects

Perhaps surprisingly, we observe a similarly-sized positive effect of LCRSG on math achievement: LCRSG increased the math achievement of grade-3 students in targeted schools by 0.06 SDs as shown by SDID models in Table 2. The positive effect on math achievement may reflect the role of instructional coaches, whose hiring was a common source of LCRSG expenditures in the first two years of the program. Though instructional coaches were hired to improve literacy instruction and should have observed teachers during their literacy blocks, in most schools, the same teachers instruct both English and math for the same group of elementary students. Instructional coaches may have provided general strategies for classroom management and student achievement rather than specific strategies for phonemic awareness or comprehension, and then teachers improved their general teaching practice in ways that improved English and math scores to an equal degree. Even in a world where instructional coaches provided exclusively literacy support and English instruction is the only kind of instruction that improved, improved reading skills could translate into improved student ability to access and complete math problems.

I also find that the effect of LCRSG is less present on earlier grades, who were less targeted by the program's explicit goals but could have had dollars spent on their education. Table 2 shows a positive effect of 0.05 SDs on grade-4 ELA but only an effect of 0.02 SDs on grade-5 ELA.

RQ2: How did school and school district leaders spend the largely unregulated literacy funds from LCRSG?

LCRSG allocated $500 million to two cohorts of schools to spend over overlapping five-year windows. In 2022-23 (i.e., year one), annual reports show that only 22 percent of LEAs in the program reported spending any LCRSG funds. This lack of spending may explain the small effect size for the program on academic achievement seen in the first year. Among LEAs who spent funds in the first year, 50 percent hired literacy coaches, 25 percent hired reading specialists, and 45 percent added professional learning opportunities for staff.

In 2023-24 (i.e., year two for cohort one and year one for cohort two), reports submitted by school and school district leaders show that $23.8 million of LCRSG funds were spent. This marks a sharp increase from the prior year in which only $3.2 million of LCRSG funds were spent. However, this entirely reflects a shift in the behavior of cohort one as they increased their spending from $3.2 million in the first year to $20 million in the second year; cohort two spent a similar quantity in its first year as cohort one had in its first year.

Sixty-five percent of Local Education Agencies (school districts, charter management organizations, or county offices of education; LEAs) spent some of their funds in 2023-24. Of LEAs who spent funds, 58 percent hired literacy coaches, 25 percent hired reading specialists, and 57 percent added professional learning opportunities for their staff. Note that these sum to greater than 100 percent because some LEAs used multiple strategies. This distribution of funds is similar to the prior year.

RQ3: How did school and school district leaders describe the successes and challenges of grant implementation?

Qualitative analyses of grant implementation surfaced four themes: a need for planning, hiring challenges, staff buy-in, and a focus on professional development and interventions using the science of reading.

Theme 1: A need for planning

Almost two-thirds of LEAs in the first year cited a need for planning time, with this theme identified in 62 of the 95 annual reports that contained more than a sentence of open-ended response. In one Central Valley school district, an Associate Superintendent reported that the district spent no LCRSG dollars in year 1 and narrated their planning process in which they spent the fall developing an implementation plan with LCRSG schools, submitted the plan to the school board in December 2022 for approval, developed a job description for a Literacy Coach/Reading Specialist in the early spring, submitted it to the board for approval in March 2023, and then eventually hired four Literacy Coaches/Reading Specialists in May 2023 to begin in August (i.e., in the next fiscal year). Other districts reported a similar need to plan their expenses. In a rural Southern California district, one Superintendent wrote that the district used the first year to "meet, collaborate, research, seek input then design our literacy programs." In a suburban Southern California district, the Superintendent wrote: the district is "currently in the needs assessment phase to determine how to operationalize literacy coaches."

The need for planning occurred more frequently in the narratives of charter LEAs, suggesting that traditional school districts may have been more easily able to draw on existing infrastructure for program implementation while charters needed additional planning time to build the structure for program implementation of this high-autonomy grant. For example, staff at a Southern California charter network reported that, "Capacity is one of the greatest barriers with being able to plan for more headcount or acquiring of resources in a way that is thoughtful and effective. While we did not spend towards the grant in 22-23, we were able to more clearly identify opportunities to improve literacy." Data on spending also shows that charter schools faced a greater delay in spending funds. Charter LEAs were 10 percentage points (or, 40 percent) less likely to spend LCRSG dollars in the first year compared to non-charter LEAs. But, among LEAs who did spend LCRSG dollars in the first year, charter LEAs and non-charter LEAs made similar spending choices across allowable categories.

The need for planning time reflects a fundamental trade-off of high-autonomy policy. High-autonomy policy allows communities to customize implementation to their priorities and needs but therefore requires communities to spend time gathering information about their priorities and

needs before implementation. In this way, the slow start of spending of LCRSG flows logically from its autonomy-centered policy design and is neither necessarily a success nor a challenge.

Theme 2: Hiring challenges

Another common theme was hiring challenges. Of the 95 annual reports that contained more than a sentence of open-ended response in year one, 40 (or 42 percent) cited a challenge in hiring staff to implement the program. These challenges did not disappear in year two, though they did lessen; in that year, 63 of the 204 districts who submitted a report (31 percent) described a challenge in hiring staff with high rates of reporting even among districts in their second year.

An urban Northern California district reported in year one, “We have had a very hard time this fall in [District] with hiring and filling vacancies across different classifications (literacy tutors, teachers, and literacy coaches).” Even when qualified staff could be identified, many of them were working in classrooms as teachers so hiring them mid-year to be coaches presented a challenge to schools who would then have to fill newly open teacher position(s). In a northern California district near Sacramento, a principal described in their annual report that “we currently have empty classrooms” and that this had led to a challenge in elevating coaches from teaching ranks because their hires would have further emptied classrooms. Even when Literacy Coaches or Reading Specialists were hired, a challenging teacher labor market affected implementation. For example, a suburban Southern California district reported that their hired Literacy Coach was pulled from her role after a few months to “cover a teaching position at the school site.”

These hiring challenges were particularly acute in rural environments where research shows teacher shortages and vacancies are more prevalent (Ingersoll & Tran, 2023). At one district rural Northern California district, a principal for three small schools wrote: “We have advertised and recruited for positions in the literacy program. In the 2022-23 year we did not receive any qualified applicants.” In a rural district inland from the Central Coast, the Superintendent, Principal, and Chief Business Officer wrote: “The district has been advertising for a Literacy Coach/Reading Specialist for over a year without any applicants.” These narratives align with the data on spending: Though LEAs in rural counties were 22 percentage more likely to spend LCRSG dollars in the first year compared to non-rural LEAs, they were less likely to spend their dollars on hiring literacy coaches or reading

specialists and more likely to spend dollars on professional development for existing staff. These differences in spending may explain the lack of an effect seen in rural communities (shown in Table 4 and discussed previously).

These labor constraints reflect the scale of the policy's design in which hundreds of schools were trying to hire individuals with a rare credential at the same time. The state encouraged LEAs in LCRSG's 376 schools to hire individuals that possess the Reading and Literacy Added Authorization or the Reading and Literacy Leadership Specialist Credential or to support individuals in obtaining these licenses (*LCRS*, 2023). According to the California Commission on Teacher Credentialing, in 2021-22, the last school year before the grant began, only 19 institutions statewide issued this authorization or credential (*Commission-Approved Institutions Offering California Preparation Programs*, 2023). These institutions are heavily concentrated in urban areas and located in only 11 of California's 58 counties. Author calculations show that 102 of the 376 LCRSG schools (27 percent) are in counties without an authorizing institution of higher education for those licenses, though some of those institutions offer online programs that may broaden their reach. LEAs in counties without an authorizing institution for those licenses were 19 percentage points less likely to spend LCRSG dollars in the first year, possibly because they were unable to find qualified candidates.

California has begun plans to increase the number of practitioners with these licenses in the coming years. Specifically, beginning in 2022-23, the state has partially funded the acquisition of those licenses through the provision of $2,500 per participating teacher with its Reading and Literacy Supplemental Authorization Incentive Grant Program; districts were then required to match that $2,500 and could do so using LCRSG funds (*Reading and Literacy Supplementary Authorization Incentive Grant Program*, 2024). But, after the first year of the program, this grant had enrolled only 22 participants in licenses with the Commission on Teacher Credentialing reporting that the $5,000 funds were insufficient to cover the full program costs (Report to the Legislature, 2024).

Some schools adapted to the shortage of trained staff by recruiting from within their own ranks and compensating staff for additional training to obtain the licenses recommended by the state to provide literacy intervention services to students. A rural school district in Northern California described this process, "We struggle to find teachers and are unable to find Reading Specialists with

the correct authorization… We have hired 2 staff members with multiple subjects teaching credentials to work as our Literacy Specialists as we work toward getting them correct authorizations." Other schools struggled with hiring staff for support roles that enabled the broader activities for the grant. For example, an Educational Programs Administrator at a rural school district in Central California reflected that "a recurring challenge is the shortage of substitute teachers to cover certificated staff during PD sessions." In other words, even when the school hired an instructional coach to provide professional development to a targeted group of teachers about evidence-based literacy practices, whether that PD could actually be delivered depends on the availability of substitutes to cover classrooms.

Theme 3: Staff buy-in

Only 38 of the 204 districts (19 percent) reported resistance to LCRSG. This frequency may reflect the high-autonomy nature of the grant in which the very school staff who may have resisted implementation instead were asked to craft their school's plans for improvement. This mindset shift, from resistance to acceptance to active engagement, was embodied in the reflection of an administrator from a suburban Southern California district. The administrator said:

> "The implementation… faced resistance from some staff, primarily due to the time investment required for change. Many teachers felt overwhelmed by the shift in instructional practices, expressing concerns about the additional planning, assessments, and structured routines. The transition challenged long-standing teaching habits, leading to frustration and reluctance. However, through ongoing professional development, collaborative PLCs, and administrative support, many educators gradually embraced the program. While some still struggle with the time demands, continued coaching and evidence of student success have helped shift mindsets, reinforcing the value of structured literacy instruction."

This quote surfaces the role that autonomy can play in empowering educators to work with school leaders to design programs rather than top-down implementation that can leave school staff feeling de-professionalized or burnt out. Autonomy does not magically fix those feelings though, as a different suburban Southern California administrator reflected after they chose a new curriculum and promoted

an experienced teacher to be a literacy coach: "There remains a pocket of resistance among some veteran educators… [they] might view these initiatives as implicit criticism of their current practices, leading to defensive postures."

More commonly though, school leaders reported high levels of teacher buy-in and anecdotal evidence of student achievement gains from the programming that accords with quantitative evidence presented above. A Southern California school district administrator described higher levels of student achievement and increasing scores on formative assessments, then said, "These successes reflect the collective effort of our educators, leadership team, and literacy coach to create sustainable improvements in literacy outcomes for all students. We are proud of the progress made and remain committed to continuing this important work."

Theme 4: A focus on professional development and interventions using the science of reading

District leaders or instructional coaches provided professional development to schools and teachers in 57 percent of LEAs in year two. Of the 70 LEAs that described the content of professional development in their year two reflections, 53 (76 percent) described professional development where themes of the science of reading (e.g., phonological awareness, fluency) were emphasized. Seventeen LEAs specifically highlighted their use of Language Essentials for Teachers of Reading and Spelling (LETRS), an in-depth literacy professional development series that can take up to 160 hours and emphasizes how to build phonemic awareness and comprehension skills in students; the program has been contracted by 23 states to provide statewide training for educators as part of a broader legislative "science of reading" push (Schwartz, 2022b).

In addition to or instead of professional development, 62 LEAs (30 percent) in year two described the provision of literacy intervention services directly to struggling students in one-on-one or small group settings, often by a trained reading specialist or a paraprofessional. The superintendent of a rural Northern California school district, like many other district leaders statewide, tied the provision of these services to data analysis, saying, "The literacy consultant supported literacy staff to implement assessments, analyze the assessment data, create schedules of small groups based on student needs

and best practices, and meet regularly to keep teacher training and student progress moving forward." The effectiveness of these interventions depends partially on the quality of the data used to inform them, which varied tremendously by district. The 204 LEAs who completed these reflections reported using 31 different assessments to monitor progress for K-2 students whose achievement is not tested at the state level on standardized tests. Only 38 LEAs (19 percent) reported using a test on the statewide list of approved screeners for reading difficulties.

Lessons Learned

Both ELSBG and LCRSG led to tangible increases in the academic achievement of targeted, high-need students. Given the well-documented link between reading skills and high school graduation (Hernandez, 2011), which in turn affects college matriculation, college completion, and income, both programs likely improved the life outcomes of California students in meaningful ways.

The success of both programs strongly bolsters the evidence base for their similarities. First, both programs relied strongly on professional development about evidence-based reading practices (i.e., the science of reading), offered by a competitively-selected agency with past expertise leading a portfolio of differentiated programming for teachers and administrators. Second, both programs offered school sites funding with some flexibility to support school-level programming that would accompany this professional development. In other words, rather than training teachers and sending them back to otherwise unchanged schools, both programs granted schools additional funding to hire instructional coaches or paraprofessionals, purchase new assessment systems, use data to target students for additional interventions, or other changes designed to support broader changes to literacy instruction. Third, both programs included substantial planning of how expenditures will support growth. This planning was mandated through ELSBG and optional in LCRSG, but qualitative research showed that two-thirds of LEAs in LCRSG still initiated some kind of planning process to determine expenditures.

Both programs did not achieve the same sized effect though. Over the same length of time (i.e., two years), measured on the same test (i.e., California's state standardized test; the California

Assessment of Student Performance and Progress), and using the same quasi-experimental method (i.e., synthetic difference-in-differences), ELSBG improved test scores by 0.14 standard deviations while LCRSG improved academic achievement by 0.06 standard deviations. Furthermore, ELSBG's effects were seen quickly (i.e., within a year) whereas LCRSG's effects took two years to materialize. Additional research is needed into later years of LCRSG to determine if LCRSG's effect size continues to grow as slower investments (like curriculum) pay larger dividends or shrinks as enthusiasm for instructional changes wanes.

This difference in effect sizes across the programs suggests that ELSBG's oversight and accountability processes may have been beneficial. ELSBG required schools to submit plans and get them approved before beginning to spend, and later-year allocations were contingent on the submission of annual reports and quarterly budget documentation. These requirements may have encouraged ELSBG sites to conduct a more detailed planning process than LCRG sites did and to consult the state-appointed expert agency more regularly throughout the grant's life cycle.

ELSBG also differed from LCRSG in its expenditures though. LCRSG was a less costly program, both because it gave less funds to schools directly and because it provided less monitoring and technical assistance. LCRSG has a hypothetical effect size of 0.18 standard deviations per $1000 in spending, more than ELSBG's 0.13 standard deviations per $1000 in spending. This calculation assumes that a program like LCRSG could scale up and maintain its efficacy, which may not hold true; school and school district leaders may have well-allocated a relatively small sum of money for an area of high need in their sites, and larger sums may not have been allocated as effectively. In fact, evidence from the nearly $200 billion infusion of funds into schools after the COVID-19 pandemic suggests that the allocation of significant funds without strong monitoring or technical assistance did not lead to substantial improvement in student achievement (Dewey et al., 2024; Goldhaber & Falken, 2025).

As California seeks to improve the reading performance of its students, these two grant programs offer a path forward through the provision of professional development about evidence-based reading practices and additional funding for schools to implement complementary supports (e.g., instructional coaching, student interventions, assessments). The success of these programs in schools whose populations were 40-45 percent English learner is of particular note amidst

criticism that the needs of multilingual learners have been insufficiently addressed by the science of reading movement (Bramble, 2024; Schwartz, 2022a).

These two grant programs also suggest that planning out how literacy will improve at the site-level – whether mandated as in ELSBG or initiated by school leaders as qualitative research on LCRSG shows occurred – is crucial to ensure success. Finally, these programs suggest that accountability and cost are important elements of program design for policymakers to consider; this research suggests that even programs with otherwise similar goals and structures will produce different results if they differ in those components.

Tables and Figures

Table 1: Effect of LCRSG on Grade-3 ELA using SDID

	Over the first two years		Year 1 only		Year 2 only	
	(1)	(2)	(3)	(4)	(5)	(6)
Grade-3 ELA	0.06***	0.06***	0.04***	0.04***	0.08***	0.08***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	42288	42136	37002	36869	37002	36869
Covariates?		X		X		X

Note: Standard errors are noted in parentheses below the point estimate and are clustered at the school level. When included, covariates are percent White, percent receiving free- or reduced-price lunch, the natural log of enrollment, and urbanicity. This table, like all SDID analyses, runs only on the balanced panel of schools that reported test scores for all eight analysis years (2015, 2016, 2017, 2018, 2019, 2022, 2023, and 2024). *p<0.10, **p<0.05, ***p<0.01

Table 2: SDID Effect of LCRSG by Bandwidths

Sample Construction	Grade 3 ELA	Grade 3 Math	Grade 4 ELA	Grade 4 Math	Grade 5 ELA	Grade 5 Math
Full Sample	0.06***	0.06***	0.05***	0.04***	0.02*	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	42288	42328	42016	42016	42016	42000
+/- 2.0 SDs	0.06***	0.06***	0.05***	0.04***	0.03*	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	31560	31592	31112	31112	30744	30736
+/- 1.0 SDs	0.06***	0.05***	0.05***	0.04***	0.03*	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	22512	22512	22160	22168	21928	21928
+/- 0.5 SDs	0.05***	0.05***	0.04***	0.03***	0.02*	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	15680	15688	15472	15472	15288	15296
+/- 0.25 SDs	0.05***	0.04***	0.03***	0.02**	0.02	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	9928	9928	9768	9768	9672	9672
Calonico et al. (2014) Bandwidth	0.05***	0.04**	0.03**	0.02	0.02	0.01
	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)
N	5232	6168	6208	6576	6056	6152

Note: Standard errors are noted in parentheses below the point estimate and are clustered at the school level. This table runs only on the balanced panel of schools that reported test scores for eight tested years (2015, 2016, 2017, 2018, 2019, 2022, 2023, and 2024). *p<.1. **p < .05. ***p < .01

Table 3: Effect of LCRSG on Grade-3 ELA Using SDID, by Terciles of Prior Performance

	Highest-Performing Tercile	Middle Tercile	Lowest-Performing Tercile
	(1)	(2)	(3)
Grade-3 ELA	0.04***	0.08***	0.07***
	(0.02)	(0.02)	(0.02)
N	40656	40664	40648

Note: Standard errors are noted in parentheses below the point estimate and are clustered at the school level. Terciles are calculated among LCRSG-eligible schools using average grade-3 ELA test scores in 2019 and 2022, the two years with test score data prior to LCRSG implementation. This table runs only on the balanced panel of schools that reported test scores for eight tested years (2015, 2016, 2017, 2018, 2019, 2022, 2023, and 2024). *p<.1. **p < .05. ***p < .01

Table 4: Effect of LCRSG on Grade-3 ELA Using SDID, by Urbanicity

	Urban Schools	Suburban Schools	Town or Rural Schools
	(1)	(2)	(3)
Grade-3 ELA	0.08***	0.06**	0.02
	(0.02)	(0.02)	(0.02)
N	14528	17584	10176

Note: Standard errors are noted in parentheses below the point estimate and are clustered at the school level. This table runs only on the balanced panel of schools that reported test scores for eight tested years (2015, 2016, 2017, 2018, 2019, 2022, 2023, and 2024). *p<.1. **p < .05. ***p < .01

Figure 1: California's Performance on the National Assessment of Educational Progress

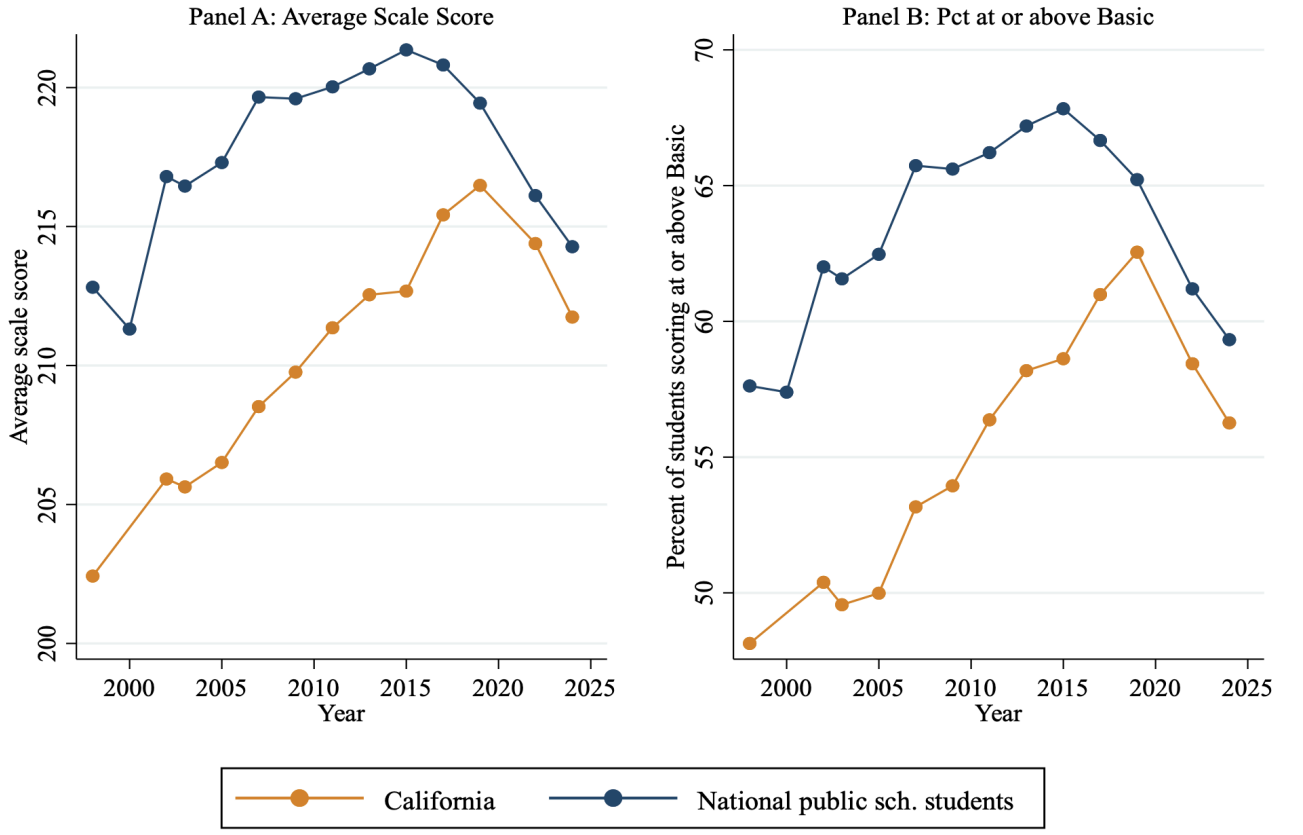


Figure 2: Number of Early Literacy Policies per State

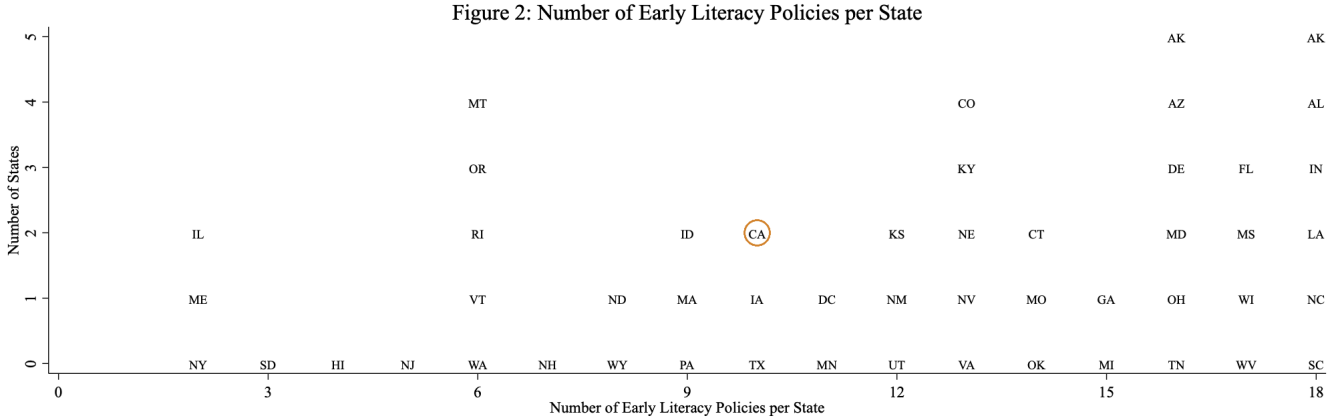
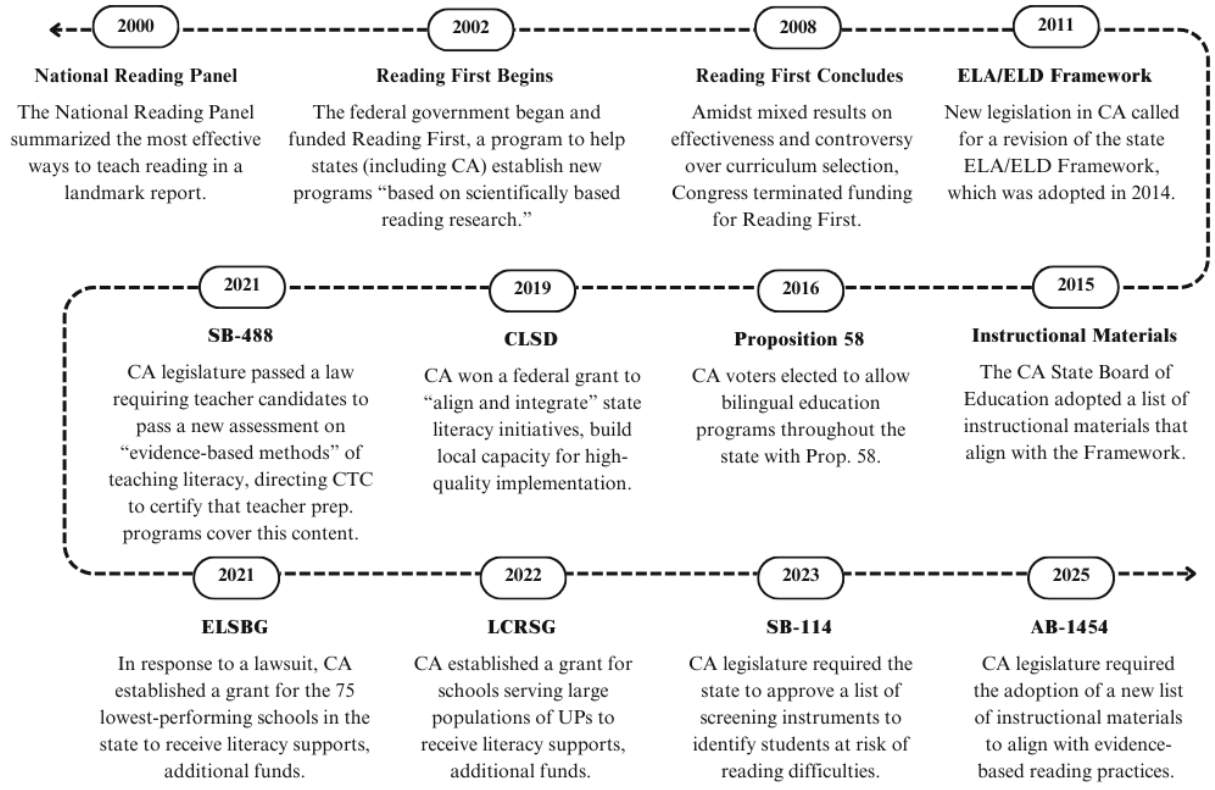
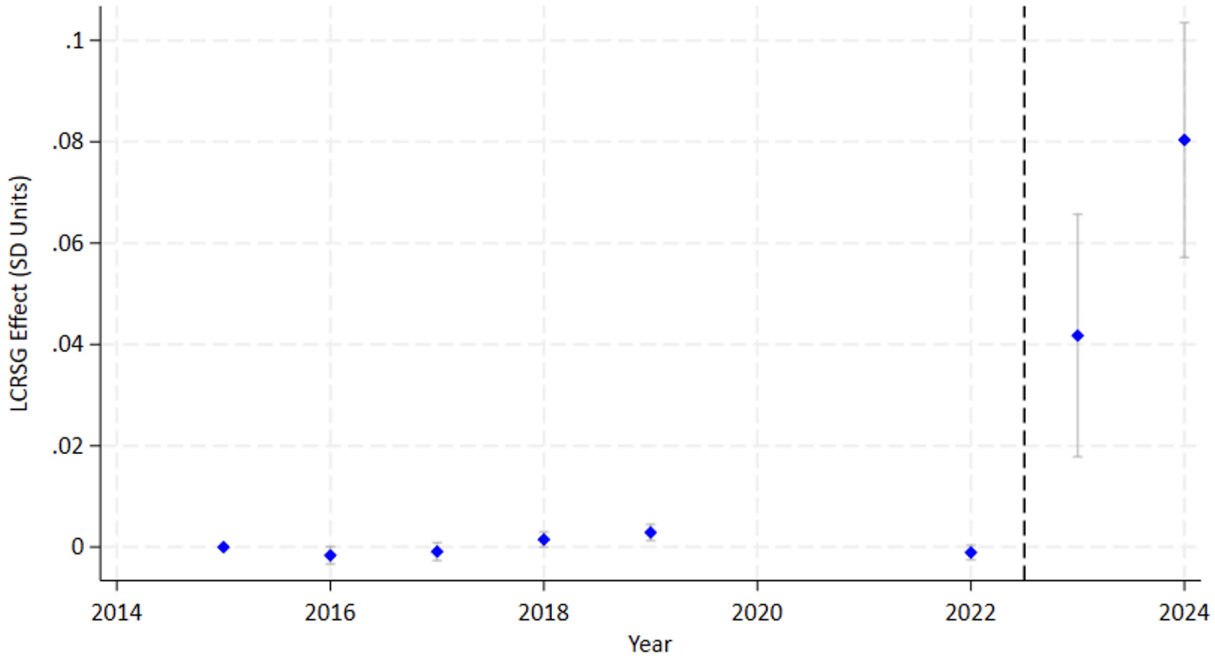


Figure 3: Selected Timeline of California Literacy Reforms



CA = California; ELA = English Language Arts; ELD = English Language Development; CLSD = Comprehensive State Literacy Development; SB = Senate Bill; CTC = Commission on Teacher Credentialing; ELSBG = Early Literacy Support Block Grant; LCRSG = Literacy Coaches and Reading Specialists Grant

Figure 4: SDID Estimate of LCRSG on Grade-3 ELA



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Appendix A: Additional Tables and Figures

Table A1: Descriptive Statistics of LCRSG-Eligible Schools in 2021-22

		Sample Restrictions on Non-LCRSG Schools					
	LCRSG-Eligible Schools	Full Sample	+/- 2.0 SDs	+/- 1.0 SDs	+/- 0.5 SDs	+/- 0.25 SDs	Calonico et al (2014) Bandwidth
Percent Black	8.65	5.35	6.42	7.08	7.23	7.11	7.10
	(11.91)	(8.56)	(9.68)	(10.59)	(10.85)	(10.32)	(9.94)
Percent Hispanic	83.76	52.43	63.34	71.95	77.43	80.70	83.04
	(18.79)	(28.34)	(24.65)	(22.09)	(20.10)	(18.55)	(16.98)
Percent White	4.52	24.05	16.47	10.27	6.89	5.40	4.12
	(11.79)	(22.50)	(18.59)	(14.36)	(11.00)	(9.41)	(7.01)
Percent FRPL	94.21	57.05	70.24	79.60	84.64	88.00	90.42
	(6.83)	(26.52)	(17.02)	(10.78)	(8.65)	(8.32)	(6.94)
Percent English Learners	45.30	22.55	27.74	33.25	37.84	40.57	42.60
	(19.75)	(17.16)	(17.09)	(16.77)	(16.08)	(16.01)	(15.38)
Percent Unduplicated Pupils, K-5	96.65	63.01	76.43	85.85	90.69	93.50	95.06
	(6.24)	(26.13)	(15.63)	(7.90)	(4.24)	(2.68)	(1.72)
Enrollment	462.96	491.50	486.23	487.83	491.12	501.12	483.08
	(262.48)	(382.96)	(387.28)	(379.95)	(225.37)	(239.16)	(175.06)
Std. Grade-3 ELA Test Score	-0.53	0.01	-0.19	-0.32	-0.38	-0.42	-0.43
	(0.26)	(0.49)	(0.37)	(0.32)	(0.30)	(0.28)	(0.29)
Pct. Proficient Grade-3 ELA	20.24	42.51	33.81	28.43	26.04	24.60	24.30
	(10.03)	(21.27)	(16.07)	(13.32)	(12.21)	(11.52)	(11.38)

Note: Cells indicate the mean value for 2021-22 with the standard deviation in parentheses. Demographic data come from the National Center on Education Statistics Common Core of Data, with the exception of English Learner and unduplicated pupil data reported by the California Department of Education in School-Level CALPADS UPC Data files. Test score performance data come from the California Assessment of Student Performance and Progress.

Table A2: Effect of LCRSG on Missingness from Balanced Panel for SDID Analysis

Sample Restriction	Grade 3 ELA
Full Sample	0.03***
	(0.01)
N	50072
+/- 2.0 SDs	0.03***
	(0.01)
N	37112
+/- 1.0 SDs	0.02**
	(0.01)
N	25768
+/- 0.5 SDs	0.02**
	(0.01)
N	17536
+/- 0.25 SDs	0.02*
	(0.01)
N	11040
Calonico et al. (2014) Bandwidth	0.02
	(0.02)
N	2984

Note: This includes missingness in any year of test data (2015-2024, excluding 2020 and 2021) for any reason (school closed, school opened, or school too small for data reporting) among the risk set (i.e., schools that reported a K-3 UPC count in 2022). Robust standard errors are noted in parentheses below the point estimate and are clustered at the school level. All models include school and year fixed effects. *p<.1. **p < .05. ***p < .01

Table A3: Effect of LCRSG on Number of Test Takers

Sample Restriction	Grade 3 ELA
Full Sample	-0.09***
	(0.01)
N	46387
+/- 2.0 SDs	-0.07***
	(0.01)
N	34358
+/- 1.0 SDs	-0.05***
	(0.01)
N	24139
+/- 0.5 SDs	-0.03**
	(0.01)
N	16589
+/- 0.25 SDs	-0.01
	(0.01)
N	10427
Calonico et al. (2014) Bandwidth	0.00
	(0.02)
N	2878

Note: This includes missingness in any year of test data (2015-2024, excluding 2020 and 2021) for any reason (school closed, school opened, or school too small for data reporting) among the risk set (i.e., schools that reported a K-3 UPC count in 2022). Robust standard errors are noted in parentheses below the point estimate and are clustered at the school level. All models include school and year fixed effects. *p<.1. **p < .05. ***p < .01

Table A4: SDID Effect of LCRSG by Bandwidths without ELSBG Schools

Sample Construction	Grade 3 ELA	Grade 3 Math	Grade 4 ELA	Grade 4 Math	Grade 5 ELA	Grade 5 Math
Full Sample	0.06***	0.06***	0.05***	0.05***	0.03*	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	41768	41800	41512	41512	41520	41512
+/- 2.0 SDs	0.06***	0.06***	0.05***	0.05***	0.03*	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	31040	31064	30608	30608	30240	30248
+/- 1.0 SDs	0.06***	0.05***	0.05***	0.04***	0.03*	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	22000	22008	21672	21672	21440	21456
+/- 0.5 SDs	0.06***	0.05***	0.04***	0.03***	0.02*	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	15216	15224	15024	15024	14840	14856
+/- 0.25 SDs	0.05***	0.04***	0.03***	0.02**	0.02	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	9544	9544	9392	9392	9296	9304
Calonico et al. (2014) Bandwidth	0.05***	0.04**	0.03**	0.02	0.02	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	5280	6184	5264	6320	5768	5864

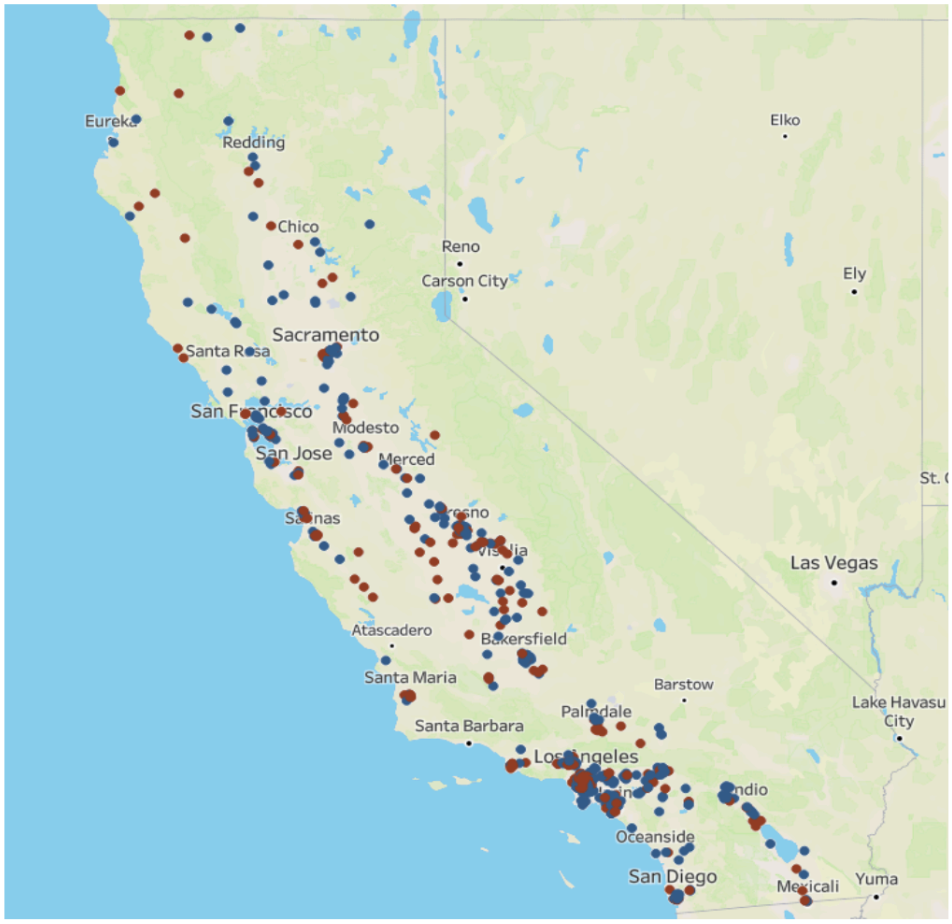
Note: Standard errors are noted in parentheses below the point estimate and are clustered at the school level. This table runs only on the balanced panel of schools that reported test scores for eight tested years (2015, 2016, 2017, 2018, 2019, 2022, 2023, and 2024). *p<.1. **p < .05. ***p < .01

Table A5: SDID Effect of LCRSG by Bandwidths without LCRSG Cohort 2 Schools

Sample Construction	Grade 3 ELA	Grade 3 Math	Grade 4 ELA	Grade 4 Math	Grade 5 ELA	Grade 5 Math
Full Sample	0.06***	0.06***	0.05***	0.05***	0.02*	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	39208	39248	38992	38992	39024	39016
+/- 2.0 SDs	0.06***	0.06***	0.05***	0.05***	0.03*	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	28288	28320	27912	27912	27568	27568
+/- 1.0 SDs	0.06***	0.05***	0.05***	0.04***	0.03*	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	19288	19288	19016	19024	18800	18816
+/- 0.5 SDs	0.05***	0.05***	0.04***	0.03**	0.02*	0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	12560	12568	12416	12408	12264	12280
+/- 0.25 SDs	0.05***	0.04***	0.03***	0.02**	0.01	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	7064	7064	6952	6952	6904	6912
Calonico et al. (2014) Bandwidth	0.07***	0.05***	0.03	0.02	0.01	0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
N	2976	3264	3216	3672	2984	3040

Note: Standard errors are noted in parentheses below the point estimate and are clustered at the school level. This table runs only on the balanced panel of schools that reported test scores for eight tested years (2015, 2016, 2017, 2018, 2019, 2022, 2023, and 2024). *p<.1. **p < .05. ***p < .01

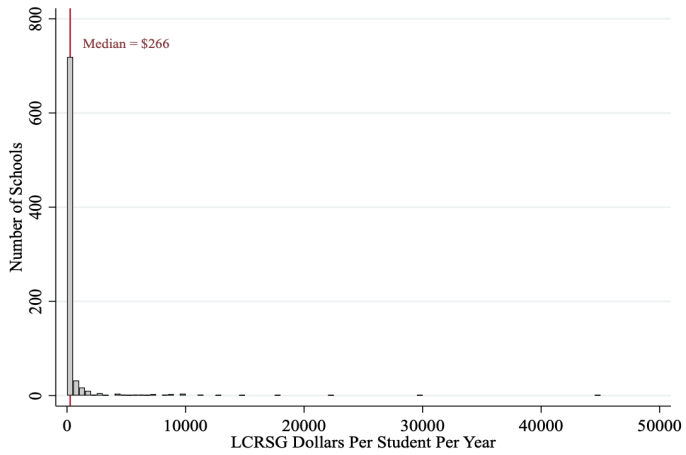
Figure A1: Map of LCRSG Recipient Schools Across Cohorts



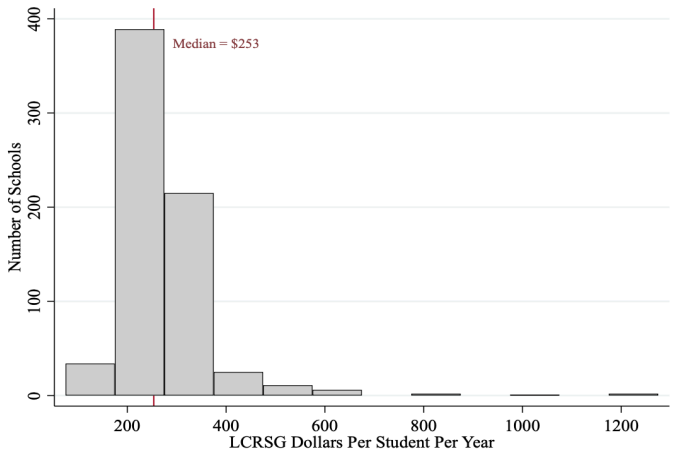
Note: Cohort 1 schools are denoted in red while Cohort 2 schools are in blue.

Figure A2: Distribution of LCRSG Allocations per Student per Year by School

Panel A: Among All LCRSG Recipient Schools, Both Cohorts



Panel B: Among LCRSG Recipient Schools in SDID Sample, Both Cohorts



Note: Schools are excluded from the SDID sample if the school did not report test scores in all eight of the years of analysis for this study. This primarily drops smaller schools who did not have more than 10 third graders in a given year and thus whose test scores are censored for data privacy.

Appendix B: Alternate Specifications

For alternate specifications of program efficacy, I leverage the fact that eligibility for LCRSG in the first cohort was determined based on a well-defined assignment variable. Specifically, schools were eligible if more than 97 percent of their students in kindergarten through third grade were unduplicated pupils_either low-income, English learners, or homeless or foster youth, with students not allowed to be counted twice even if they are in multiple categories_in the school year prior to the grant (2021-22). This cutoff is unique and not used to assign schools to other programs. I requested data from the California Department of Education on the percent of students in grades kindergarten through third grade at each school who were unduplicated pupils in 2021-22 to observe this eligibility criteria. I find that this variable was complied with in program assignment, as documented in Figure B1 wherein non-eligible schools overwhelmingly did not receive LCRSG funds and eligible schools almost all received the funds.

Regression discontinuity designs compare schools on either side of the eligibility cutoff after treatment to determine if there is a discontinuity in the outcome of interest. The causal warrant of a regression discontinuity design relies on the assumption that schools on one side of the cutoff provide a valid counterfactual for schools on the other side of the cutoff. In other words, I assume that a school where 96 percent of its students are low-income, English Learners, or homeless or foster youth is very similar to a school where 98 percent of its students are low-income, English Learners, or homeless or foster youth except for the presence of LCRSG grant dollars. Therefore, if these two schools exhibit statistically significant differences in their test scores, then we can say that the LCRSG program had an effect.

Though this identifying assumption can never be directly proven, three key pieces of evidence can be deployed to support that claim. First, I document that schools could not and did not manipulate their presence around the cutoff to obtain treatment eligibility. Though the assignment variable was reported by schools directly, this information was input by schools in December 2021, and the program was not passed into law with a defined cutoff until June 2022. I additionally visualize the density of the assignment variable and note there is no spike in the assignment variable to the right of the cutoff.

Using the Cattaneo et al. (2018) manipulation test, I also fail to reject the null hypothesis that the assignment variable is continuous at the cutoff (see Figure B2).

Second, I examine whether schools who were eligible for LCRSG stayed closed or dipped below the minimum number of grade-3 students to report test scores at higher rates than schools who were not eligible for the program. I find that attrition is differential at wide bandwidths but not when using the bandwidth selection procedure of Calonico et al. (2014) (see Table B1). This indicates that the most reliable estimates of program effect occur closer to the eligibility threshold.

Third, I examine whether schools on either side of the cutoff exhibit statistically significant differences in observable characteristics, such as percent of students who are White, percent of students receiving free- or reduced-price lunch, the natural log of enrollment, and standardized test scores in three pre-treatment years. I find (as shown in Table B2) that schools eligible for LCRSG serve statistically significantly different populations than non-eligible schools at wide bandwidths. When using the more narrow bandwidth selection procedure of Calonico et al. (2014), I find that differences in student characteristics are no longer statistically significant but a statistically significant difference in the average standardized test score in grade-3 English Language Arts in 2022 (i.e., the last pre-treatment year) remains. I visualize this covariate difference in Figure B3.

This evidence raises concern about the validity of a regression discontinuity design to produce a causal estimate of the program effect. Specifically, regression discontinuity designs compare the post-treatment outcomes on both sides of the cutoff and rest on the assumption that the groups on either side of the cutoff were otherwise similar before the treatment; if this is not the case, then estimates from a regression discontinuity design are less valid. For transparency though, the estimate from the regression discontinuity design is provided in Table B3 at linear and quadratic specifications, using a variety of bandwidths, and controlling directly for the imbalanced covariate (as well as other observable characteristics of schools).

In addition to regression discontinuity, I employ a two-way fixed effects model at increasingly narrow bandwidths of the assignment variable around the cutoff:

$$Y_{st} = \beta X_{st} + \alpha_s + \gamma_t + \varepsilon_{st}$$

where Y_{st} represents the outcome of interest for school s in time t, X_{st} represents a dummy variable if the observation is for a school that is eligible for LCRSG and in the post-period, α_s is a school-specific fixed effect, and γ_t is a time-specific fixed effect. Robust standard errors are also used. The presence of fixed effects in this model absorbs baseline differences in test scores between schools and therefore no longer relies on an assumption that LCRSG schools are comparable to non-LCRSG schools in the years prior to treatment.

Two-way fixed effects models rely on a different set of assumptions. Specifically, like synthetic difference-in-differences, two-way fixed effects models rely on the parallel trends assumption. Though we cannot test this directly, we can determine if eligible and non-eligible schools have historically followed similar trends. I visualize prior trends in Figure 4, Panel A, wherein we find that eligible and non-eligible schools were not trending similarly prior to the introduction of LCRSG. However, in Panels C and D, I leverage the presence of the cutoff for eligibility to restrict the set of comparison schools to those around the eligibility cutoff. This figure shows that, at those bandwidths, I have successfully identified a set of comparison, ineligible schools who appear to exhibit parallel trends with eligible schools.

In Table B4, I show results of a two-way fixed effects model on the full sample for transparency but encourage readers to focus on estimates calculated at more narrow bandwidths for causal interpretability.

Table B1: Effect of LCRSG on Missingness in Outcome Year 2

Sample Construction	Grade 3 ELA	Grade 3 Math	Grade 4 ELA	Grade 4 Math	Grade 5 ELA	Grade 5 Math
Full Sample	-0.20***	-0.20***	-0.20***	-0.20***	-0.21***	-0.21***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
N	6259	6259	6205	6205	6143	6143
+/- 2.0 SDs	-0.17***	-0.17***	-0.18***	-0.18***	-0.18***	-0.18***
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)
N	4639	4639	4600	4600	4552	4552
+/- 1.0 SDs	-0.15***	-0.15***	-0.15***	-0.15***	-0.16***	-0.16***
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
N	3221	3221	3186	3186	3156	3156
+/- 0.5 SDs	-0.16***	-0.16***	-0.16***	-0.16***	-0.17***	-0.17***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
N	2192	2192	2174	2174	2151	2151
+/- 0.25 SDs	-0.15***	-0.15***	-0.15***	-0.15***	-0.15***	-0.15***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
N	1380	1380	1365	1365	1348	1348
Kernel Weighted	-0.15***	-0.15***	-0.15***	-0.15***	-0.16***	-0.16***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
N	3221	3221	3186	3186	3156	3156
Calonico et al. (2014) Bandwidth	0.02	0.02	0.03	0.03	0.03	0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
N	658	658	625	625	619	619

Note: Robust standard errors are noted in parentheses below the point estimate. *p<.1. **p < .05. ***p < .01

Table B2: Auxiliary RD estimates of Baseline Covariate Balance

Panel A: Covariates Tested Independently

Sample Construction	Full Sample	+/- 2.0 SDs	+/- 1.0 SDs	+/- 0.5 SDs	+/- 0.25 SDs	Calonico et al. (2014) Bandwidth
Percent White 2022	-0.05***	-0.04***	-0.03***	-0.04***	-0.03***	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	6193	4586	3188	2168	1359	683
Percent FRPL 2022	0.05***	0.05***	0.04***	0.03***	0.02***	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	6183	4582	3185	2165	1356	692
Ln(Enrollment 2022)	0.48***	0.44***	0.40***	0.40***	0.43***	0.04
	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)	(0.07)
	6193	4586	3188	2168	1359	635
Change in Percent White 2018-22	0.01	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	5843	4330	3036	2081	1313	943
Change in Enrollment 2018-22	0.03***	0.03***	0.02***	0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	5841	4331	3037	2082	1311	809
Change in Percent FRPL 2018-22	-54.23***	-44.23***	-21.49*	-26.93**	-11.73	-11.62
	(10.98)	(10.87)	(11.27)	(10.64)	(11.36)	(12.10)
	5850	4337	3041	2085	1314	827
School Urbanicity	-0.21**	-0.16*	-0.13	-0.15*	-0.05	-0.03
	(0.08)	(0.08)	(0.08)	(0.09)	(0.10)	(0.11)
	6202	4592	3192	2170	1360	836
Standardized Grade-3 ELA Test Score 2022	-0.03	-0.04	-0.05*	-0.05*	-0.06*	-0.09**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
	5864	4328	3044	2090	1305	848
Standardized Grade-3 ELA Test Score 2019	0.01	-0.00	0.00	0.02	0.01	0.01
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
	5642	4170	2955	2042	1280	805
Standardized Grade-3 ELA Test Score 2018	-0.02	-0.02	-0.00	0.00	-0.01	-0.00
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
	5558	4111	2915	2024	1275	787

Panel B: Covariates Tested Jointly

Sample Construction	Full Sample	+/- 2.0 SDs	+/- 1.0 SDs	+/- 0.5 SDs	+/- 0.25 SDs	Calonico et al. (2014) Bandwidth
Covariates Tested Jointly	-0.02**	-0.01	-0.00	-0.00	0.00	-0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
	5594	4136	2932	2026	1277	795

Note: All models include linear splines of the assignment variable and robust standard errors in parentheses below the point estimate. Covariates tested jointly include percent White, percent FRPL, ln(enrollment) and standardized test score in 2022 but not test scores in other years to avoid multicollinearity.
*p<.1. **p < .05. ***p < .01

Table B3: Regression Discontinuity Estimate of LCRSG Eligibility on 3rd Grade ELA Test Scores

Sample Construction	(1)	(2)	(3)	(4)
Full Sample	0.02	-0.00	0.04*	0.03
	(0.03)	(0.04)	(0.02)	(0.03)
N	5786	5786	5725	5725
+/- 2.0 SDs	0.00	0.00	0.03	0.03
	(0.03)	(0.04)	(0.02)	(0.03)
N	4273	4273	4227	4227
+/- 1.0 SDs	-0.00	-0.01	0.03	0.03
	(0.03)	(0.04)	(0.02)	(0.03)
N	3012	3012	2985	2985
+/- 0.5 SDs	-0.00	-0.01	0.04	0.04
	(0.03)	(0.05)	(0.02)	(0.03)
N	2080	2080	2060	2060
+/- 0.25 SDs	-0.01	-0.04	0.04	0.02
	(0.04)	(0.05)	(0.03)	(0.04)
N	1299	1299	1285	1285
Kernel Weighted	-0.00	-0.00	0.03	0.04
	(0.03)	(0.04)	(0.02)	(0.03)
N	3012	3012	2985	2985
Calonico et al. (2014) Bandwidth	-0.03	-0.02	0.03	0.03
	(0.04)	(0.06)	(0.03)	(0.04)
N	807	940	797	929
Quadratic		X		X
Covariates			X	X

Note: All models include linear splines of the assignment variable and robust standard errors in parentheses below the point estimate. Weighting refers to the addition of a triangular kernel. Covariates include percent White, percent receiving free- or reduced-price lunch, the natural log of enrollment, urbanicity, and the mean standardized test score in grade-3 ELA, all for 2022 (the year prior to implementation). *p<.1. **p < .05. ***p < .01

Table B4: Effect of LCRSG Using TWFE

Sample Construction	Grade 3 ELA	Grade 3 Math	Grade 4 ELA	Grade 4 Math	Grade 5 ELA	Grade 5 Math
Full Sample	0.06***	0.05***	0.05***	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	45214	45218	45156	45165	45229	45224
+/- 2.0 SDs	0.07***	0.06***	0.06***	0.05***	0.04***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	33423	33427	33075	33086	32759	32756
+/- 1.0 SDs	0.06***	0.06***	0.06***	0.05***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	23647	23648	23355	23366	23131	23136
+/- 0.5 SDs	0.06***	0.06***	0.05***	0.04***	0.03***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	16325	16333	16172	16180	16002	16006
+/- 0.25 SDs	0.05***	0.05***	0.04***	0.03**	0.02*	0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	10253	10256	10125	10131	10016	10021
Calonico et al. (2014) Bandwidth	0.05***	0.04***	0.04***	0.03**	0.02	0.02
	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)
N	5588	6296	6545	6591	6067	6533

Note: Standard errors are noted in parentheses below the point estimate and are clustered at the school level. *p<.1. **p < .05. ***p < .01

Figure B1: LCRSG Eligibility and Probability of Receiving LCRSG (Cohort One)

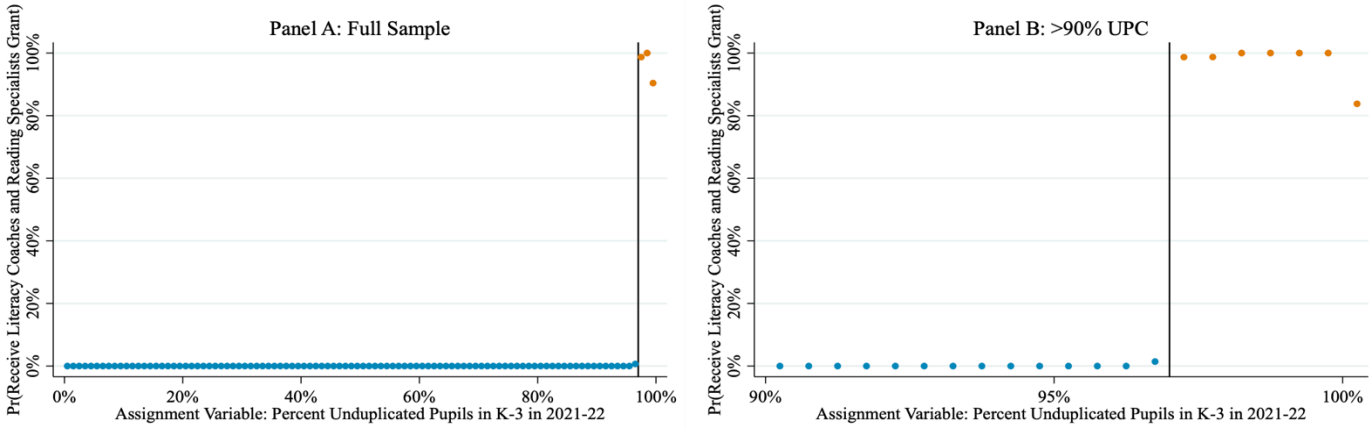
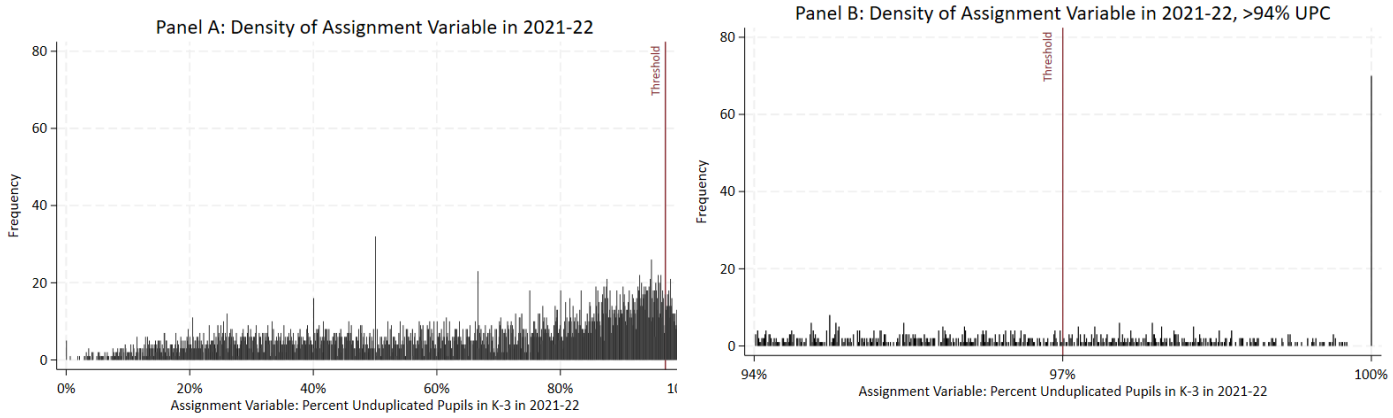


Figure B2: Tests of Manipulation around the Cutoff



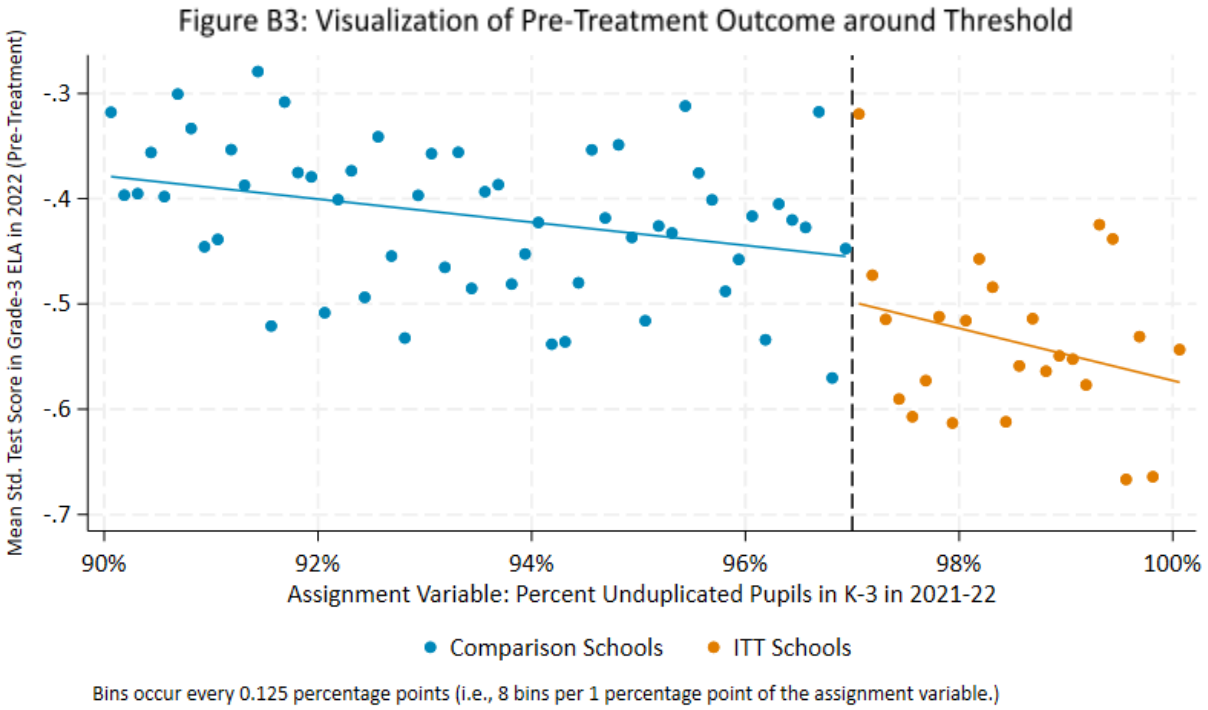
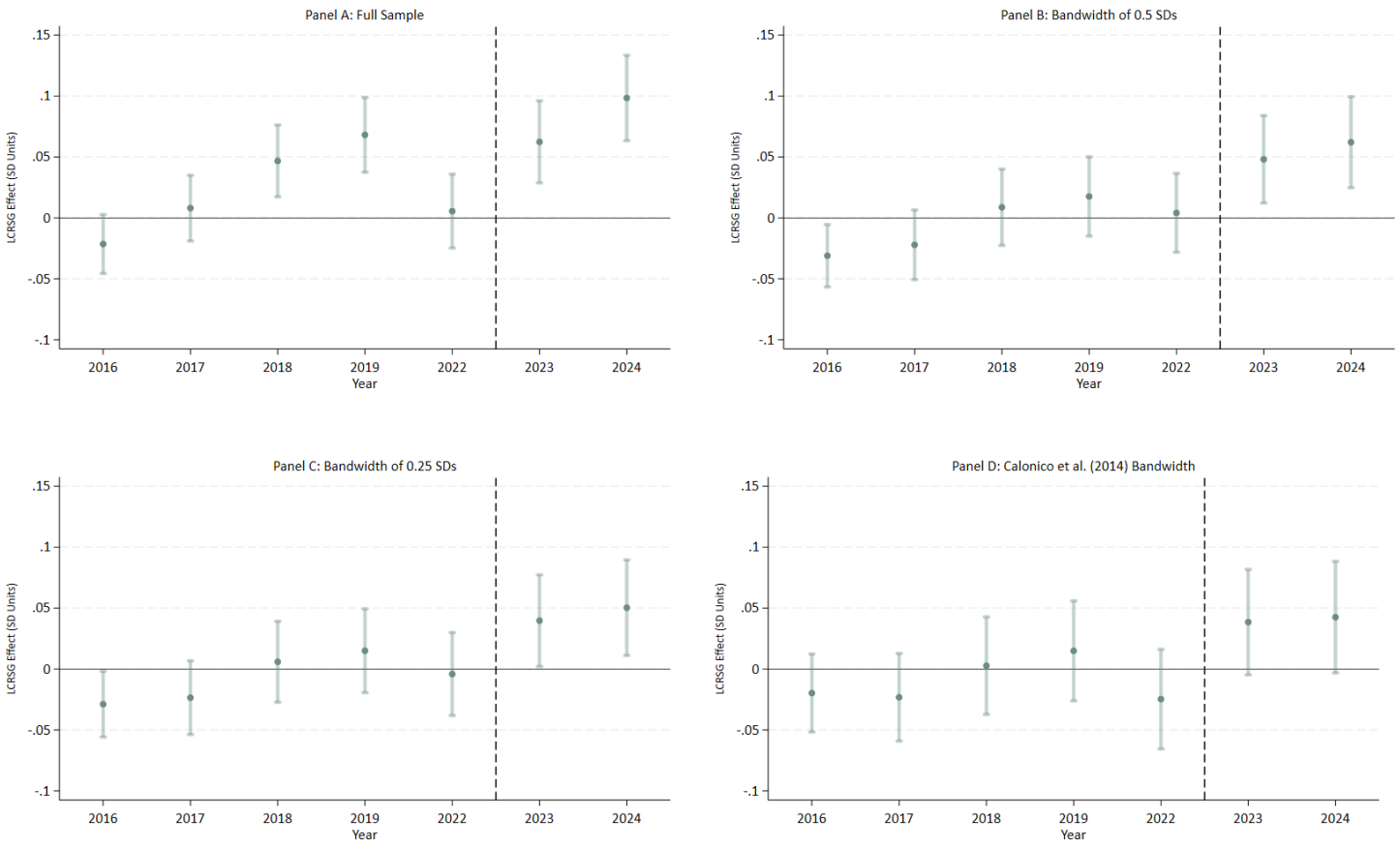


Figure B4: Effect of LCRSG using TWFE at Cohort One Bandwidths, Grade-3 ELA



Appendix C: Codebook for Qualitative Analysis

Statements of future intentions are not to be coded because these do not reflect actions taken in the reporting year. (E.g., "Data analysis of iReady data will begin in 2024-25" should not be coded as Data Analysis).

Code Name (Code Type: parent, child, grandchild)	Code Description	Code Count (Child Sum)	Example
County Office	Mentions interacting with either their County Office of Education or another County Office of Education.	28	"These teams participated in professional development sessions provided by the Los Angeles County Office of Education and the Sacramento County Office of Education."
Need for Planning	Describes a need to determine future actions or having taken steps to determine future actions.	95	"A job description needed to be drafted and approved prior to recruitment of site literacy coaches"
Staggering Funding	Describes the use of other (non-LCRSG) funds to cover relevant literacy expenses.	14	"Funds with nearer deadlines were prioritized, and focus is now shifting to those with later spend-by dates. LCRS expenditure plans are accelerating, aiming to use all funding by 2026-27."
No Details	No funds were expended, and reflections do not explain why. (Note: even if a reflection includes a description of future activities, if no explanation is given for why funds have not been spent thus far, then this is categorized as No Details).	19	"We did not use any of the funds this fiscal year."
Challenges (parent)	Identifies internal and external factors that might be obstructing LCRSG implementation or success.	217	"Staff were hesitant to start a new position that may be eliminated in three years due to lack off ongoing funding."

Code Name (Code Type: parent, child, grandchild)	Code Description	Code Count (Child Sum)	Example
Hiring challenges (child)	Describes challenges in hiring or retaining staff to implement components of LCRSG. This includes teachers, literacy coaches, reading specialists, paraprofessionals, or substitutes.	77	"Were unable to hire a reading specialist until December 2023. No applicants."
Credential-specific (grandchild)	Describes challenges that are specific to hiring or retaining staff with an advanced credential (like Reading Specialist Authorization).	21	"It was difficult to get a qualified pool of candidates after the first posting. The job description was modified so that a reading specialist certificate can be gained while on the job. This will help open up the candidate pool."
Urbanicity (grandchild)	Describes challenges that are specific to hiring or retaining staff based on the school's location and urbanicity.	14	"Due to the remote location of our school, recruiting and hiring staff can be a challenge."
Insufficient time (child)	Refers to situations where time is a limiting constraint for implementation success.	57	"It has been difficult to find a time when all team members can meet within their contracted hours."
Lack of resources (child)	Refers to situations where resources (including but not limited to financial resources) are a limiting constraint for implementation success.	20	"We have ideas and have implemented what we could afford with our limited grant funds."
School size (child)	Describes situations where school size affects implementation negatively.	11	"The unique one-room schoolhouse model, with one teacher serving multi-age groups, requires highly specialized instructional approaches that are difficult to find in available resources."

Code Name (Code Type: parent, child, grandchild)	Code Description	Code Count (Child Sum)	Example
Staff resistance (child)	Identifies situations where staff do not willingly and fully engage in LCRSG programming.	46	"Resistance from certificated staff poses a substantial challenge. This resistance may stem from fear of change, uncertainty, inexperience, and a lack of prior knowledge and training among our teachers. It is possibly compounded by a lack of confidence in the new program's effectiveness."
Successes (parent)	Identifies positive change taking place at school sites.	336	"We were able to hire 9 literacy coaches and provide ongoing training for them."
Classroom observations (child)	Describes moments where an instructional leader observes a classroom and gives that teacher feedback for improvement.	34	"These coaches implement professional development, conduct regular observation and feedback guided by aligned walkthrough indicators."
Community or family partnerships (child)	Identifies situations where school staff engage with families, caregivers, or local communities (e.g., libraries or museums) to improve literacy.	37	"Families, literacy team members, and caregivers are actively involved in attending planned literacy events. These include virtual parent kick-off orientations, mid-program family education sessions, and celebrations that are either virtual or in-person at the school."
Data Analysis (child)	Describes moments when school staff analyze data on student performance. This data is sometimes used to make adjustments to actions based on this analysis but need not to be classified this way.	59	"Assigned staff is responsible for assessing students at the beginning of the year (August), middle of the year (January) and end of the year (May) using Acadience/DIBELS assessments."
Student intervention (child)	Describes occasions where school staff provide direct intervention services to	89	"The funds were used to employ a literacy support teacher who works directly with students on skill gaps,"

Code Name (Code Type: parent, child, grandchild)	Code Description	Code Count (Child Sum)	Example
	students in one-on-one or small group settings to improve their literacy skills.		
PD delivered (child)	Refers to professional development delivered to school staff (including but not limited to teachers and coaches).	83	"Funds have been used at the K-8 site to provide professional development in student engagement in literacy for all grade levels particularly targeting our English learners,"
Science of reading PD (grandchild)	Refers to professional development delivered to school staff where themes of the science of reading (e.g., phonological awareness, fluency) were emphasized.	73	"[Through this training], staff will increase their knowledge of the English language, including phonemes, graphemes, blends and clusters, syllables, spelling and affixes and the ability to recognize comprehension deficiencies in their students."
Improved student achievement (child)	Comments in which the reflection's author believes academic achievement has improved. This can include references to specific statistics showing improvement but need not.	51	"Students literacy growth in word-reading and oral reading fluency improved"