Evaluation of the School Counselor Corps Grant Program

Technical Report

REPORT HIGHLIGHTS:

- **On average, SCCGP funding had statistically significant, positive impacts on 6-year graduation and completion for students with a disability and English language learners.**
- **On average, SCCGP funding had a weakly statistically significant impact on 6-year completion and matriculation.** However, effect sizes are small.
- **Across the full group of students, on average, SCCGP funding had no statistically significant impacts on 4- and 6-year graduation or 4-year completion.**
- **For all students, on average, SCCGP funding had no statistically significant impacts on school dropout, dual enrollment, FAFSA completion, or READ plan/SRD rates.** Effects were seen for attendance, although these results should be interpreted with caution.

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Executive Summary

First enacted in 2008 by House Bill (H.B.) 08-1370 and updated in 2014 by Senate Bill (S.B.) 14-150 and again in 2017 by S.B. 17-068, 2019 by HB19-1187, and 2022 by S.B. 22-140, Colorado's School Counselor Corps Grant Program (SCCGP) aims to improve high school graduation rates and postsecondary and workforce readiness (PWR) and support work-based learning awareness, education, and opportunities by increasing the availability of effective school-based counseling services within K-12 schools. The program is administered by the Colorado Department of Education (CDE) and provides funding to eligible local education providers. SCCGP allocates funding for a 4-year grant cycle as appropriations are available from the Colorado General Assembly.

In State Fiscal Year (SFY) 2022, CDE contracted with the Colorado Evaluation and Action Lab (Colorado Lab) at the University of Denver to assess the impact of SCCGP on student engagement, educational attainment, and postsecondary readiness. This study was funded by a grant from the Governor's Office of State Planning and Budgeting. The quasi-experimental design (QED) aimed to estimate the causal impacts of participation in the SCCGP across Cohorts 7-10. Using a matching design, the QED compared SCCGP-funded to never-funded schools and the students within them. Overall, the grant program was shown to have statistically significant positive impacts on 6-year graduation and completion for students with disabilities and English language learners. For all students, SCCGP funding had weaker but suggestive positive impacts on 6-year graduation and postsecondary matriculation.

Evidence of impacts on dropout, Free Application for Federal Student Aid completion, and Reading to Ensure Academic Development plan/Significant Reading Deficiency rates were not detected. We do not see any evidence of detrimental effects of funding on any of the confirmatory or exploratory outcomes measured.

Findings from this report suggest that SCCGP funding is effective for groups of students who particularly stand to benefit from the development of a comprehensive school counseling program. However, if SCCGP funding is to move the needle at the school level, future trainings should focus on services and interventions that aim to reach a broader array of students. Consideration should be given to carefully weighing the tradeoff between more, but less personalized, services vs. fewer, but more personalized, services.

Putting the findings in context, it is important to note that the program has undergone numerous iterations, the COVID-19 pandemic, and significant turnover in staffing. Thus, more recent program improvements and efforts to codify proven implementation practices are not fully reflected in QED results. Furthermore, the evaluation team faced consequential data access barriers that limited the study.

Table of Contents

Acknowledgements

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Thank you to our partners who provided technical support, subject matter expertise, and guidance on this project: Jennicca Mabe, Brooke Morgan, and Michelle Romero at the CDE Office of Postsecondary and Workforce Readiness, and Kathryn Wright at CDE.

Data Sources

Student-level data for this study were provided by Information Management Services (IMS) at CDE, including:

- Colorado Measures of Academic Success
- Gender
- Eligibility for free or reduced-priced lunch(FRPL)
- Race/ethnicity
- English learner (ELL) status
- Disability status
- Homeless status
- Four- and 6-year graduation and completion status
- Matriculation status

Most school-level data for this study were drawn from a combination of CDE's publicly accessible data (supplemented by IMS when cell suppression was a barrier), including:

- School performance indicator ratings
- School-level rates of gender, FRPL eligibility, race/ethnicity, ELL, disability, homeless students
- School-level rates of dropout and attendance
- School level (i.e., elementary, middle, high)
- School size
- Whether a school was a charter or institute charter, or an Alternative Education Campus

- School locale

School-level data on dual enrollment and Free Application for Federal Student Aid completion were drawn from the Colorado Department of Higher Education's publicly available datasets.

Some school-level data were provided directly by IMS, including:

- Four- and 6-year graduation and completion rates
- Matriculation rates
- Reading to Ensure Academic Development plans/Significant Reading Deficiency rates

Lastly, school-level data on participation in other grant programs and indicators of program participation were provided by the Office of Postsecondary and Workforce Readiness at CDE.

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Note on Language and Terminology

The Colorado Evaluation and Action Lab affirms our commitment to the use of gender-inclusive language. We are committed to honoring the unique gender identity of each study participant. Throughout this report, we follow the guidance of the Associated Press Stylebook and the Chicago Manual of Style and use the gender-neutral, singular "they" when appropriate.

Note that we use the term "students of color" to refer to students with a race/ethnicity designation other than White non-Hispanic, consistent with CDE.

Introduction

The School Counselor Corps Grant Program

First enacted in 2008 by House Bill (H.B.) 08-1370 and updated in 2014 by State Bill (S.B.) 14-150 and again in 2017 by S.B. 17-068, 2019 by HB19-1187, and 2022 by S.B. 22-140, Colorado's School Counselor Corps Grant Program (SCCGP) aims to improve high school graduation rates and postsecondary and workforce readiness (PWR) and support work-based learning awareness, education, and opportunities by increasing the availability of effective school-based counseling services within K-12 schools. The program is administered by the Colorado Department of Education (CDE) and provides funding to eligible local education providers. SCCGP allocates funding for a 4-year grant cycle as appropriations are available from the Colorado General Assembly.

> **SCCGP's goal is to increase the availability of effective school-based counseling to foster postsecondary preparation and work-based learning by increasing the number of qualified counselors within K-12 schools.**

The program's "North Star" outcomes are to increase the high school graduation rate and the percentage of students who successfully prepare for, apply to, and continue into postsecondary education, as well as to support work-based learning awareness, education, and opportunities across Colorado middle schools and high schools. To target these outcomes, the program leverages school counseling services, as guided by the American School Counselor Association (ASCA) national model.

Program Design

In the 2014-15 school year (Cohort 4), the program design shifted through a statutory change from SB14-150 to address program planning challenges. Since then, the grant provides 4 years of funding, with a lower funding amount in the first year for development and an increased amount of funding for the three remaining years.

The development year (Year 1) allows grantees time and support to complete an inventory of services, a comprehensive needs assessment, goal-setting activities, and other best practices recommended by ASCA to ensure subsequent grant funds will be used effectively. During the implementation years (Years 2, 3, and 4) grantees work toward implementation of a comprehensive school counseling program, including the hiring of licensed school counselors, the purchase or development of curricula or postsecondary planning programs, and facilitating college visits, among other activities. CDE staff offer structured trainings and a series of webinars each year to support grantees with a consistent model to use in designing their comprehensive school counseling programs.

Implications of COVID-19

The COVID-19 pandemic influenced the student outcomes across all four cohorts analyzed in the current study. Schools across Colorado experienced disruptions in educational delivery starting in the 2019-20 school year. This disruption lasted through the entirety of the 2020-21 academic year. Though most schools returned to in-person learning for the 2021-22 school year, the ripple effects of the pandemic continued to impact students, educators, school counselors, schools, and communities.

Previous Findings

SCCGP has shown promise since its implementation began over a decade ago, documented in prior legislative reports.[i] Earlier legislative reports consistently indicated that SCCGP had achieved or made progress toward stated goals. A formal outcome evaluation of program effectiveness last occurred in 2016 and was included in that year's legislative report. It showed strong results for schools receiving the grant funding compared to similar schools that had not received the grant.

Evaluation Objectives

The recent expansion of the program to include elementary schools has presented an opportunity and need to engage in another rigorous evaluation of the program. This study intended to establish causal links between engagement with SCCGP and key outcomes of the program.

In State Fiscal Year 2022, CDE contracted with the Colorado Evaluation and Action Lab (Colorado Lab) at the University of Denver to assess the impact of SCCGP on student engagement, educational attainment, and postsecondary readiness. A quasi-experimental design (QED) was crafted and executed to estimate the causal impacts of participation in the SCCGP across Cohorts 7-10 on a variety of postsecondary and workforce readiness outcomes.

The QED is a nearest neighbor matching design, without replacement, leveraging propensity scores. In matching designs, control units are selected from a pool of eligible units and compared with treated units. In this analysis, "treatment" referred to being awarded a grant, and comparison schools were drawn from a pool of contemporaneous never-funded schools according to their similarity to funded schools.

This evaluation presents findings and lessons learned to inform potential future program implementation, expansion, and evaluation.

[i] Previous years' reports are available by contacting CDE; more information can be found at cde.state.co.us/cdedepcom/requiredreports.

Description of the Study

The QED aims to estimate the causal effect of receiving SCCGP funding on a variety of student- and school-level outcomes. The QED is a nearest neighbor matching design, without replacement, leveraging propensity scores. In matching designs, control units are selected from a pool of eligible units and compared with treated units. The use of propensity scores in matching is a dominant matching paradigm and vetted method for aggregating information from multiple matching variables into a single value.[1, 2, 3]

The SCCGP Matching QED

In the present analysis, "treatment" refers to being awarded a grant, and comparison schools are drawn from a pool of contemporaneous never-funded schools according to their similarity to funded schools. Two schools are considered similar, and thus good matches, when they are similar along a set of observable characteristics, but one school in the pair received funding and the other did not.

The set of characteristics used to match schools aimed to cover a variety of student- and school-level factors predictive of SCCGP funding and was based on the criteria in the grant application. Differences in outcomes are calculated for each pair and then aggregated to produce an average difference.

Research Questions

The QED focused on two sets of questions, defined as confirmatory and exploratory questions. The confirmatory questions assessed five student-level outcomes at the end of the 4-year grant cycle for schools in Cohorts 7-10. Confirmatory outcomes were only examined for high school students.

> **Confirmatory Question 1. What was the impact of receiving SCCGP funding on educational attainment as measured by students' likelihood to graduate or complete high school, within 4 and 6 years?**
>
> **Confirmatory Question 2. What was the impact of receiving SCCGP funding on postsecondary readiness and success among students who have graduated high school, as measured by students' likelihood of matriculating in postsecondary education or training?**

Three exploratory questions were assessed during Years 2, 3, and 4 of the grant cycle. The analysis was at the school level and included elementary, middle, and high schools from Cohorts 7-10.

> **Exploratory Question 1. What was the impact of receiving SCCGP funding on attendance and school engagement as measured by attendance rates for elementary school, middle school, and high school programs, and dropout rates for middle school and high school programs?**

Exploratory Question 2. What was the impact of the SCCGP funding on postsecondary readiness and success as measured by dual enrollment rates and Free Application for Federal Student Aid (FAFSA) completion rates for high school programs?

Exploratory Question 3. What was the impact of receiving SCCGP funding on academic achievement as measured by elementary and middle school Reading to Ensure Academic Development (READ) plans and Significant Reading Deficiency (SRD) rates?

Steps to Building Evidence

Familiarity with the Colorado Steps to Building Evidence model is essential to understanding how the present evaluation will inform decision makers. The Colorado Lab meets stakeholders where they are to iteratively move programs along the five-step evidence continuum, regardless of where they start. SCCGP has the advantage of being built upon existing standardized program elements (Step 1) and being supported by ongoing fidelity analyses (Step 2) and past studies (Step 3). The present evaluation focuses on advancing SCCGP along the evidence continuum by conducting a rigorous QED (Step 4).

Step to Building Evidence 4: QED

The fourth step in building evidence establishes causal evidence of a program's impact by comparing the outcomes of those who received the program with the outcomes of a control group. Quasi-experimental methods using statistical approaches can often be accomplished using administrative data, taking a program to Step 4.

The QED aims to estimate the causal effect of receiving SCCGP funding on a variety of student- and school-level outcomes. The QED is a matching design using propensity scores. Similar SCCGP-funded and never-funded comparison schools are paired based on a variety of observable characteristics. Outcomes are then compared for each pair and the differences aggregated.

Key Findings

Using the matching design, we compared SCCGP-funded to never-funded schools and the students within them resulting in three key findings from the confirmatory analysis and one key finding from the exploratory analysis.

Confirmatory Analysis

Key Finding 1

> **On average, SCCGP funding had statistically significant, positive impacts on 6-year graduation and completion for students with a disability and English language learners (ELLs).**

For high school students with a disability, attending a school with SCCGP funding increased their probability of *graduation* by 10 percentage points ($p<0.01$) and of *completion* by 10 percentage points ($p<0.01$), relative to students with a disability at never-funded schools.

For ELLs, attending a high school with SCCGP funding increased their probability of *graduation* by 8 percentage points ($p<0.05$) and *completion* by 6 percentage points ($p<0.05$), relative to ELLs at never-funded schools.

Together, these findings suggest that the students who stand to benefit the most from SCCGP, and who may have more contact with a school counselor than peers, are seeing the greatest benefit.

Key Finding 2

> **On average, SCCGP funding had a weakly statistically significant impact on 6-year completion and matriculation ($p<0.10$), relative to never-funded schools. However, effect sizes are small.**

SCCGP-funded schools experienced a 1.9 percentage point increase in the probability of 6-year completion relative to never-funded schools ($p<0.10$). SCCGP-funded schools experienced a 4.7 percentage point increase in matriculation relative to never-funded schools ($p<0.10$). However, when standardizing the effect sizes, the impacts are classified as “very small” and “small,” respectively. Both effects were also only significant at the $p<0.10$ level, which is a reasonable threshold in education research but is higher than the typical threshold of $p<0.05$. While these findings are promising, they do not provide strong evidence of the impact of SCCGP for the broader group of high school students.

Key Finding 3

> **When looking at outcomes for all students, on average, SCCGP funding had no statistically significant impacts on 4- and 6-year graduation or 4-year completion.**

Exploratory Analysis

Key Finding 4

> **When looking at outcomes for all students, on average, SCCGP funding had no statistically significant impacts on school dropout, dual enrollment, FAFSA completion, or READ plan/SRD rates. Effects were seen for attendance, although these results should be interpreted with caution.**

In general, the impact of SCCGP on exploratory outcomes was null. The one potential exception is attendance. In Year 2, SCCGP-funded schools had a mean attendance rate that was 0.46 percentage points lower than non-funded schools. By the final year of funding, this gap was reduced to an average of 0.05 percentage points.

It should be noted, however, that the matching design and empirical post-estimation approach were not able to compensate for the data limitations present in the exploratory analysis. For example, due to data availability, the reference year used for the exploratory analysis was not a true "pre" for those cohorts. This means that potential positive effects may have been muted.

Overall, the results provide limited evidence of a positive impact of receiving grant funding on educational attainment and postsecondary continuation. We do not see any evidence of detrimental effects of funding on any confirmatory or exploratory outcomes.

Implications

Interpreting the Findings

The primary outcomes show limited evidence of a positive impact of receiving funding on educational attainment and postsecondary continuation. Overall, we found suggestive evidence that funding increased the odds of 6-year completion and slightly stronger evidence of postsecondary matriculation for high school students. Considering the expansion of the grant program to elementary and middle schools, it is possible a more precise measurement would have been possible if the cohorts had contained more high schools. That said, the estimated standardized effect sizes point to relatively small differences between funded and never-funded schools, and these are unlikely to change significantly with a larger sample size.

Considering the intent-to-treat nature of the analysis, the evidence presented points in the direction of possible larger impacts. Within schools, the impacts of funding are dispersed amongst a diverse population of students who are anticipated to receive varying degrees of exposure to grant-funded services. A non-trivial percentage of students will either not have any exposure or very limited exposure to grant-funded activities; therefore we should not necessarily expect to see improvements in outcomes for these students. When aggregated with students who are impacted, the average impact is attenuated.

This hypothesis is consistent with what we see when we compare the impact for all students against the impact for specific subpopulations. The impact on students with disabilities and ELLs could reflect counselor efforts to target these students, in accordance with program objectives. It could also reflect the fact that these students may already be better positioned to take advantage of expanded resources via already established relationships with school counselors and administrators.

Recommendations

The key findings from this report inform the following recommendations:

- **SCCGP funding is effective for groups of students who particularly stand to benefit from the development of a comprehensive school counseling program.** Students with disabilities and ELLs at SCCGP-funded schools had a greater likelihood of graduating/completing high school within 6 years. These students gained the most from additional school counselors and may also be groups of students that SCCGP counselors are intentionally targeting for support.
    - If SCCGP funding is to move the needle at the school level, future trainings should focus on services and interventions that aim to reach a broader array of students. Consideration should be given to carefully weighing the tradeoff between more, but less personalized, services vs. fewer, but more personalized, services.
    - It may be valuable to more closely examine how counselors are approaching service provision to inform future direction and professional development. SCCGP program staff could consider adding questions to the End of Year survey to better understand intensity and spread of programming (e.g., "In this school year, approximately how many students did you have small-group or individual contact with for [less than 1 hour/1-3 hours/4-10 hours/more than 10 hours?"). This could be supplemented with more systematic collection of data from the Fidelity of Implementation rubric. Knowing to what extent students engaged in SCCGP-funded services would provide greater detail regarding what types of impacts are expected to be measurable in aggregate school-level data.
- **Program outcomes may not be observable in the time available during funding.** Longer-term outcomes are slow-moving, so disruptions in implementation can derail the progress made. Staff turnover poses a major challenge to sustaining and building on the gains initially established during SCCGP funding. In some cases, grantees note that even hiring a qualified counselor in the first place can be challenging.
    - Stable funding and staffing need to be a priority to ensure programming is being executed to fidelity.
    - We acknowledge that all four cohorts were affected by the COVID-19 pandemic. It means that counselors' work was likely done partially virtually, and because a counselor's role is relational, this intervention may have been less effective for these cohorts than if activities had been conducted in person.

- **Data availability and access posed substantial barriers to painting a comprehensive picture of what SCCGP funded.** Extenuating challenges at the Colorado Department of Higher Education (CDHE) prevented comprehensive data sharing and limited the Colorado Lab's ability to look at postsecondary outcomes.
    - Future examination of program outcomes will require that data partners establish clear roles and responsibilities for data sharing within and between agencies. Ideally, data would be coordinated through a key, central representative with big picture knowledge. This will help determine what data can be shared and with whom in timely ways that facilitate program learning and improvement.
- **Expansion of the program to include elementary and middle schools could have reduced the statistical power needed to uncover impacts for high schools.** Funding was required to be spread across elementary, middle, and high schools, potentially diluting our ability to statistically uncover impacts at the school level.
    - Future analysis that evaluates an expanded number of eligible school types needs to also be accompanied with larger sample sizes within those school types.

Description of the School Sample

Funding Cycles: Cohorts 7-10

Figure 1 situates the four cohorts within their relevant grant cycle. The first year of a cohort's grant cycle is the program development and planning year, or "building" year. Baseline measures are taken from this first year when possible.

Figure 1. Grant Cycles for Cohorts 7-10 by Academic Year

Academic Year	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Cohort 7	Grant Year 1	Grant Year 2	Grant Year 3	Grant Year 4			
Cohort 8		Grant Year 1	Grant Year 2	Grant Year 3	Grant Year 4		
Cohort 9			Grant Year 1	Grant Year 2	Grant Year 3	Grant Year 4	
Cohort 10				Grant Year 1	Grant Year 2	Grant Year 3	Grant Year 4

Confirmatory and Exploratory Outcomes

All confirmatory and one exploratory question pertain to high school students. The remaining two exploratory questions are examined for elementary, middle, and high school students.

- **Outcomes in confirmatory analysis:** Four- and 6-year graduation, 4- and 6-year completion, and postsecondary matriculation.
- **Outcomes in exploratory analysis:** Dual enrollment rate, FAFSA completion rate, dropout rate, attendance rate, and READ/SRD plan rate.

All students in funded schools were assumed to be affected by SCCGP funding, regardless of the degree to which they interacted with program activities. Through years of fidelity monitoring, and as documented in the legislative reports, we know the types of professional development programs and services funded by grants, as well as program reach. Nonetheless, we cannot observe the extent to which students engage in SCCGP-funded services. Thus, the findings reported in the outcomes analysis are interpreted through the lens of an intent-to-treat analysis.

The Sample of SCCGP-Funded Schools

Confirmatory Sample

We examined confirmatory questions for Cohorts 7-10. The confirmatory sample includes high school students who started ninth grade during the development year at a funded school. These students could have experienced full exposure, or the full "treatment," to grant funding. For these students, funding began in their freshman year and ended after their anticipated year of graduation. The analysis of confirmatory outcomes focuses only on student-level measures.

Table 1 summarizes the number of districts, schools, and students in each cohort during their baseline year. The matched analytic sample paired these schools with equivalent never-funded schools.

Table 1. SCCGP Funded Districts, Schools, and Students in the Confirmatory Analysis

Cohort	Districts	High Schools	Ninth Graders
Cohort 7 (Fall 2017)	20 (47.6%)	33 (54.1%)	4,050 (50.5%)
Cohort 8 (Fall 2018)	6 (14.3%)	6 (9.8%)	231 (2.9%)
Cohort 9 (Fall 2019)	8 (19.0%)	11 (18.0%)	1,262 (15.7%)
Cohort 10 (Fall 2020)	8 (19.0%)	11 (18.0%)	2,474 (30.9%)
Total	**42**	**61**	**8,017**
Unique Total	**33**	**57**	**7,781**

As shown in Table 1, funds reached 57 high schools in 33 districts across Colorado, covering 7,781 unique ninth graders. Four high schools were recipients more than once. The majority of students in funded schools were a part of Cohort 7.

Exploratory Sample

We examined exploratory questions for Cohorts 9 and 10 during their grant Years 2, 3, and 4. Also included in the exploratory sample are schools from Cohorts 7 and 8 that were in later stages of their grant cycle. Cohort 7 schools are included in the analysis on and after Year 3 of their grant cycle, so outcomes track Years 3 to 4. Cohort 8 schools are included on and after Year 2 of their grant cycle, so outcomes track changes from Year 2 to 3 and 4. The analysis of exploratory outcomes focuses only on school-level measures. The exploratory analysis differs from the confirmatory analysis in that it tracks cohorts during each grant year over time.

Table 2 presents the composition of schools that are to be matched in the exploratory analysis. Cohorts 7, 8, and 9 are combined into a single row. To maximize our sample, cohorts are not compared to their baseline year. Rather, we use a "reference year" in exploratory analyses. Three cohorts have a reference year of 2019-20: for schools with funding starting in the fall of 2017 (Cohort 7), their reference year is their grant Year 3; for schools with funding starting in the fall of 2018 (Cohort 8), their reference year is grant Year 2; for schools with funding beginning in the fall of 2019 (Cohort 9), their reference year is their baseline Year 1. The reference year for Cohort 10 is the 2020-21 school year, their baseline Year 1.

Table 2. SCCGP-Funded Districts, Schools, and Students in the Exploratory Analysis, by School Level

Cohort	Districts	Schools	H	M	E	M/H	E/M	E/M/H
Cohorts 7, 8, and 9	35	122	26	17	39	19	18	3
Cohort 10	13	41	6	8	18	3	4	2
Total	**48**	**163**	**32**	**25**	**57**	**22**	**22**	**5**
Unique Total	**40**	**159**	**32**	**24**	**57**	**22**	**19**	**5**

Note: E, M, H, M/H, E/M, and E/M/H indicate Elementary School; Middle School; High School; Middle and High School; Elementary and Middle School; and Elementary, Middle, and High School, respectively.

As shown in Table 2, funds reached 159 schools in 40 districts across Colorado. The plurality of schools were elementary schools, but sizable numbers of high schools, middle schools, and mixed-level schools were funded. One middle school and three mixed-level schools were funded more than once.

Analytic Sample Construction

Analytic Approach

The QED aims to estimate the causal effect of receiving SCCGP funding on a variety of student- and school-level outcomes. The QED is a nearest neighbor matching design, without replacement, leveraging propensity scores. In matching designs, control units are selected from a pool of eligible units and compared with treated units. In the present analysis, "treatment" refers to being awarded a grant, and comparison schools are drawn from a pool of contemporaneous never-funded schools according to their similarity to funded schools.

A school's propensity score is its estimated likelihood of receiving funding, conditional on a set of observable characteristics.[4] Two schools are considered similar, and thus good matches, when they have similar propensity scores, but one school in the pair received funding and the other did not. Differences in outcomes are calculated for each pair and then aggregated to produce an average difference.

Matches were drawn from the full pool of eligible Colorado schools in each cohort/academic year using the MatchIt R procedure to obtain one nearest neighbor, never-funded comparison school. Never-funded matches were restricted to schools that did not receive funding in *any* of the cohorts examined. The order of matching was done sequentially starting with Cohort 7. Once a comparison school was identified, it was removed from the potential matching pool. Comparison schools were sampled without replacement within and across cohorts.

Matching Variables

We relied on Perna and Thomas' *Conceptual Model of Student Success* to guide the selection of matching characteristics, which draws on findings from economics, education, psychology, and sociology to provide a comprehensive understanding of individual, family, school, and community factors that influence outcomes ranging from college readiness to post-college attainment to ensure that study groups are as comparable as possible on key factors associated with academic success.[5]

Given that the implementation of SCCGP varied over time among cohorts, including impact of the COVID-19 pandemic, the matching process was conducted separately for each SCCGP cohort. A school match had to come from the same year as the grant was awarded. For the exploratory questions, where the analytic sample includes elementary, middle, and high schools, matches were also required to be of the same school level.

It is important to note that variables included as matching variables can be subsequently included in the estimation of the effect of funding on outcomes to increase estimate precision and ensure balance across the analytic sample. That said, these variables are not interpreted causally. The matching process generates a sample that aims to be similar along those variables, so the

differences between SCCGP-funded schools and non-funded schools will be mechanically as close to zero as possible.

For confirmatory and exploratory questions, schools were matched using the following categories in the baseline year or earliest year available.

- **School performance indicator rating**: Ratings are categorized as performance plan, improvement plan, priority improvement plan, or turnaround plan.[ii] Schools with a performance plan are meeting expectations on the majority of performance metrics. Schools with an improvement plan, priority improvement plan, or turnaround plan are not meeting expectations in some way. For matching, we generated a dummy variable indicating whether a school had a performance plan or not.
- **School-level demographics**: Schools were matched on the percentage of female students, the percentage of students that identified as non-White, the percentage of students eligible for free or reduced-price lunches (FRPL), the percentage of students with a disability, the percentage of ELLs, and the percentage of homeless students.
- **School characteristics**: Schools were matched on school locale (urban vs. rural),[iii] total student enrollment, school type (charter/institutional charter, alternative education campus (AEC), or standard campus), school dropout rate, school graduation rate, school completion rate,[iv] and participation in other grant programs.[v]

After matching at the school level, baseline equivalence tests were conducted to determine if funded and comparison schools were similar regarding school performance, school-level demographics, and school characteristics. Baseline equivalence analyses were also conducted to determine whether *students* in the funded and never-funded schools had similar demographic characteristics (gender, race, involvement in instructional program services), Colorado Measures of Academic Success reading, math, and science achievement scores (in the year prior to the baseline year, selected due to data availability),[vi] and eligibility for FRPL (in the baseline year).

[ii] Schools earn points on the performance framework based on three key performance indicators: academic achievement, academic growth, and postsecondary readiness (for high schools only). For more information about how the rating is calculated see: https://www.cde.state.co.us/accountability/performanceframeworks.

[iii] Locale classification by the National Center for Educational Statistics, which includes rural, town, suburban, and city. Schools classified as remote, outlying town, or outlying city were coded as rural, while schools classified as suburban or metropolitan were coded as urban.

[iv] Whether a student received a regular diploma or completed with a non-diploma certificate or High School Equivalency Diploma.

[v] School Health Professional Grant Program, Expelled and At-Risk Student Services program, and Student Re-engagement Grant Program.

[vi] The most recent Colorado Measures of Academic Success score for ninth graders were the scores from their eighth grade year. For cohort 10, due to COVID-19, we were limited to only reading and math achievement scores from their seventh grade year. Science scores for Cohort 10 were imputed based on all other observed student data.

The exploratory analysis comprised a variety of school levels including elementary, middle, high school, and some combination of these three (elementary-middle, middle-high, elementary-middle-high). Because different outcomes were examined according to school level, and because schools at different levels may be otherwise dissimilar on unobservable characteristics, schools were only matched with other schools of the same level.

Match Validation

Establishing equivalence at baseline is an important validation check necessary for a QED. Equivalence testing is used to determine whether key observed characteristics of the treatment and comparison groups are similar enough before the start of an intervention to derive a plausibly unbiased effect of treatment on outcomes of interest. In the present analysis, the propensity-score-based matching algorithm chose schools by minimizing the differences between funded and never-funded schools on observable characteristics.

According to What Works Clearinghouse (WWC) guidelines, baseline equivalence is met if there is less than a 0.05 standard deviation difference between groups on the baseline measure. If the groups differ by more than 0.05 but less than 0.25 standard deviations, baseline equivalence may still be met if statistical corrections are applied, and the study may still support causal interpretations of the impact of the intervention. However, effect sizes larger than 0.25 are considered unacceptably large differences between groups. Following this guidance, in cases where the differences between funded and non-funded schools or student characteristics are between 0.05 and 0.25, the variables will be included in the post-matching regression model as control variables. Establishing baseline equivalence is necessary for a QED to meet WWC group design standards "with reservations" and thus to possibly provide moderate levels of evidence under the Every Student Succeeds Act.[6]

Using each matched pair, we calculated measures of effect size following Hedges' *g* or Cox's index depending on if the variable is continuous or categorical, respectively. Both measures of effect size express the magnitude of average difference between the funded and non-funded groups in standard deviation units.

Baseline Equivalence

To further motivate the matching design, it is important to understand the degree of imbalance present in the original *unmatched* data and why a naïve comparison of funded to never-funded schools without matching would generate misleading results. The degree of imbalance between the 57 funded schools in the confirmatory analysis and the pool of 1,655 never-funded schools from which best matches are selected is summarized by listing the variables displaying balance, a moderate degree of imbalance, and a high degree of imbalance.

- **Balanced**. Only one school characteristic showed balance. This variable was the percentage of students with a disability. The effect size was below 0.05.
- **Moderate imbalance**. Eight school characteristics showed moderate levels of imbalance. Their effect sizes were between 0.05 and 0.25. Those variables were whether the school

was a charter school, an AEC school, was a School Health Professional Grant Program (SHPG) grant recipient, was in an urban setting, 4-year graduation rate at baseline, 4-year completion rate at baseline, school size, and the percentage of dropouts at baseline.

- **Highly imbalanced**. Eight school characteristics showed high levels of imbalance. Their effect sizes were above 0.25. Those variables were whether a school was an Expelled and At-Risk Student Services (EARSS)or Student Re-engagement Grant Program (SRGP) recipient, the presence of a performance plan, the percentage of students who were homeless, the percentage of students who were eligible for FRPL, the percent of minority students, the percent of female students, and the percentage of ELLs.

Overall, it is clear from the high degree of imbalance reported that any direct comparison without matching would be flawed. Using this as a reference, we will now have a sense of just how much the match process helped create a valid comparison group and further justifies the propensity score matching approach.

Confirmatory Variable Equivalence

On the whole, for both confirmatory and exploratory analyses, the propensity score matching procedure minimized group differences on observable characteristics to an acceptable level. After matching, no effect sizes, as measured by Hedges' *g* or Cox's index, exceeded 0.25 standard deviations.

Specifically, in the confirmatory sample, no difference in means or proportions was large enough to generate effect sizes of 0.25 or greater. Thus, the confirmatory matching met WWC criteria with statistical adjustments. Comparing the unmatched to the matched confirmatory samples, we went from eight variables displaying a high degree of imbalance to zero. Nonetheless, most of the matching variables displayed small to moderate degrees of imbalance even after matching, so it was clear that the empirical approach to estimating the impact of SCCGP funding on outcomes required the inclusion of nearly all matching variables.

Exploratory Variable Equivalence

We did not find any effect size over 0.25 in absolute value for variables in the exploratory matched sample. The five school type indicator variables are perfectly balanced because funded schools were forcibly matched to never-funded schools of the same level. Overall, the analytic sample used in the exploratory analysis is well-balanced but still merited the inclusion of the nine covariates that display an effect size of 0.05 or greater in absolute value in the final estimation. This ensured we met WWC criteria.

Post-Matching Estimation

Post-matching, multilevel logistic random-effects models are estimated to examine student-level outcomes for the confirmatory research questions. Multilevel models help account for the grouping of students within schools and for unmeasured school-level influences outside of SCCGP, such as counselor characteristics, by parameterizing both within and between-school variance. We

conducted the analyses to compare outcomes between funded and never-funded schools, controlling for cohort to avoid issues related to the potential variance of SCCGP implementation over time.

In compliance with WWC standards, baseline equivalence testing was used to determine which student- and school-level characteristics were important to adjust for to ensure the comparability of the funded and never-funded schools; this included any characteristics that differed by more than 0.05 and less than 0.25 (in absolute value) standard deviations in the equivalence tests.

Confirmatory Analysis

At the school-level, then, covariates include all the covariates except SHPG grant receipt and presence of a performance plan. Student-level covariates include all covariates except whether a student is female, an ELL, and/or has a disability. However, we elected to include all matching and baseline equivalence testing variables as controls in the model. These characteristics are theoretically important predictors of both funding and the outcomes, and their inclusion increased the precision of estimates. Additionally, inclusion of all school-level matching criteria as covariates (i.e., cluster-level means of student characteristics) helped meet an important assumption of the multilevel models–that the random term is uncorrelated with predictors.[7]

We also conducted moderation analyses to investigate potential differential impacts of SCCGP funding by student characteristics. Our focus was on students of different races/ethnicities, students eligible for FRPL the National School Lunch Program, ELLs, students with disabilities, and students experiencing homelessness. The purpose of these analyses was to determine whether the SCCGP funding had a greater impact on any particular subgroup, which may be an indication that the program can help address systemic academic disparities in Colorado.

Outcomes are presented as odds ratios, marginal effects, and Cox's indices. Odds ratios are interpreted as the change in odds of achieving a certain outcome from SCCGP funding. Marginal effects represent the percentage difference in the predicted probability of an outcome between SCCGP-funded and never-funded schools, keeping covariates constant at their means. Cox's index effect size transforms the magnitude of the difference between two groups into standard deviation units. We run models with and without heteroskedasticity-robust standard errors.[vii]

Exploratory Analysis

For exploratory analysis questions, the evaluation team estimated linear regressions at the school level by grant year to examine potential differences in outcomes. Estimating models by grant year allow us to uncover any trends in the impact of SCCGP funding over time.

Exploratory models include the covariates highlighted in the equivalence tests and a control for the outcome measure during the reference year to account for the fact that different schools become recipients at varying initial outcome levels. Not only can this improve estimate precision, since

[vii] The use of heteroskedastic-robust standard errors does not change the results.

baseline outcome values are correlated with post-funding outcomes and determine the gains possible from funding, including the outcome at baseline can reduce omitted variable bias. As with the confirmatory analysis, we control for cohort to minimize unobserved heterogeneity in program implementation over time.

Following WWC guidance, covariates that need to be included are school characteristics that differed by more than 0.05 standard deviations in absolute value (but less than 0.25 standard deviations) after matching. Therefore, we control for campus type (charter/institutional charter, AEC, or standard campus when applicable), urban setting, the percentage of students with a disability, percent of non-White students, percent of female students, and percent of ELL students. For dual enrollment and FAFSA enrollment outcomes, we are able to also include controls for the initial dropout rate, and initial 4-year graduation and completion rates.

The potential impact of SCCGP funding is represented by an indicator for funding receipt and an interaction term between the baseline outcome measure and funding status. Coefficients from the linear regression models are presented to show the differences for each outcome between funded and never-funded schools through SCCGP grant years.

Results

Confirmatory Analysis

The first row of values in Table 3 displays the odds ratio estimates of the five student-level confirmatory outcomes using the analytic sample. Included with the odds ratios are standard errors below estimates in parenthesis, p-values, marginal effects estimated at covariate means, Cox's indices, the number of school clusters in the hierarchical model, and total number of student observations. Covariate estimates are not reported (see the Baseline Equivalence section above for the full list).[viii]

Table 3. Student-Level Confirmatory Outcomes

Variable and Related Statistic	4-year Graduation (1)	6-year Graduation (2)	4-year Completion (3)	6-year Completion (4)	Matriculation (5)
SCCGP funding	1.078 (0.086)	1.092 (0.074)	1.100 (0.084)	1.126* (0.078)	1.236* (0.148)
p-value	0.341	0.192	0.211	0.088	0.077
Marginal effect	0.015	0.015	0.018	0.019	0.047

[viii] The matching procedure and empirical strategy are focused on estimating the causal effect of receiving SCCGP funding. Covariates serve the purpose of increasing estimate precision and accounting for factors that could bias our estimate of funding.

Variable and Related Statistic	4-year Graduation (1)	6-year Graduation (2)	4-year Completion (3)	6-year Completion (4)	Matriculation (5)
Cox index	0.045	0.054	0.056	0.074	0.129
Significant interactions	No	Yes	No	Yes	No
School clusters	113	74	113	74	74
Sample size	16,080	9,595	16,080	9,595	9,595

Note: Stars indicate statistical significance, with * p<0.10, ** p<0.05, and *** p<0.01. Standard deviations are displayed in parentheses below odds ratio estimates. Heteroskedasticity-robust standard errors were estimated but not reported. Covariate estimates are omitted from the table.

In results not presented, for each outcome of the five outcomes in Table 3, we estimated five additional models. These models investigated the interactive impact of receiving SCCGP funding by non-White, FRPL, disability, homelessness, or ELL status. Interactive terms help investigate whether there are significant moderating differences in the odds ratio by group affiliation. In each of these, SCCGP funding at the school level is interacted with a binary term specifying either "Yes" or "No" with respect to each group. For clarity, we only report statistically significant estimates, discussed in the body of the text. In Table 3, the row labeled "Significant interactions" indicates whether we found a statistically significant interaction term in any of the five interactions.

Four- and 6-Year Graduation

Starting with column 1, the odds of a student graduating high school within 4 years were 1.078 times higher at SCCGP-funded high schools compared to students at never-funded schools. The odds ratio is greater than 1, meaning a higher likelihood of graduation for students at SCCGP-funded schools, but the estimate is not statistically significant and magnitude does not provide compelling evidence of an association between funding and 4-year graduation. In the five model specifications where an interaction term is included, the odds ratio estimates were similar and stayed above 1, but none were statistically significant. The five interaction effects did not suggest significant differences by subgroup.

Expressed as a marginal effect, the difference between funded and never-funded schools is small. On average, students attending SCCGP-funded schools were 0.015 points (1.5 percentage points) more likely to graduate in 4 years compared to students at never-funded schools. The Cox index value of the impact can be classified as very small.

The 6-year graduation odds ratio is not far off of the 4-year estimate. The odds of a student graduating high school within 6 years was 1.092 times higher at SCCGP-funded high schools compared to students at never-funded schools. Once again, however, the estimate was not statistically significant. The marginal effect and Cox index value are again negligible.

Interestingly, in two of the five interaction models for 6-year graduation, we find statistically significant interactions, disability status (OR=1.466; p=0.008<0.01) and ELL status (OR=1.380; p=0.016<0.05). To further interpret these odds ratios, we calculated the marginal effects using each group's mean values for the covariates. For high school students with a disability, attending a school with SCCGP funding increased their probability of graduation by 0.10 points (10 percentage points) relative to students with a disability at never-funded schools. Similarly, for high school ELL students, attending a school with SCCGP funding increased their probability of graduation by 0.08 points (8 percentage points) relative to ELL students at non-funded schools. SCCGP funding does not appear to impact students who do not have a disability or who are not ELL students. These results are summarized in Figures 2 and 3.

Figure 2. Predicted Probability of High School Graduation in 6 Years for Students with a Disability

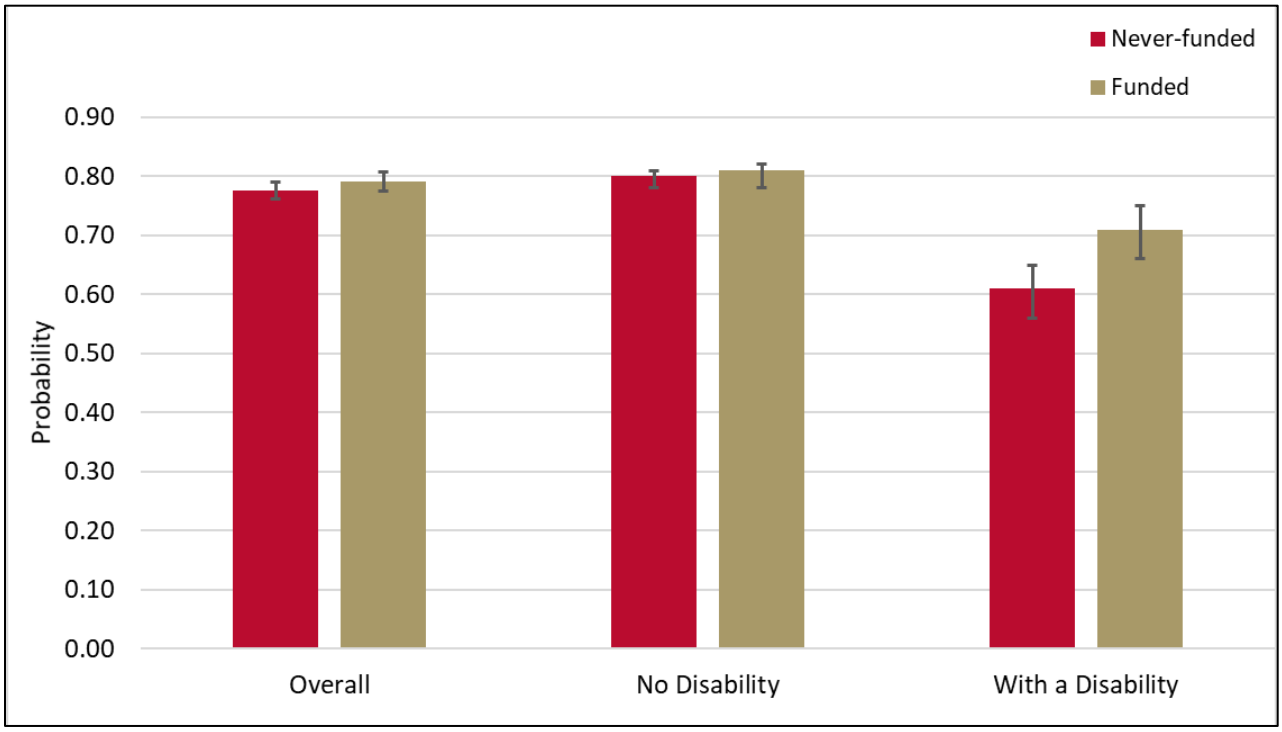
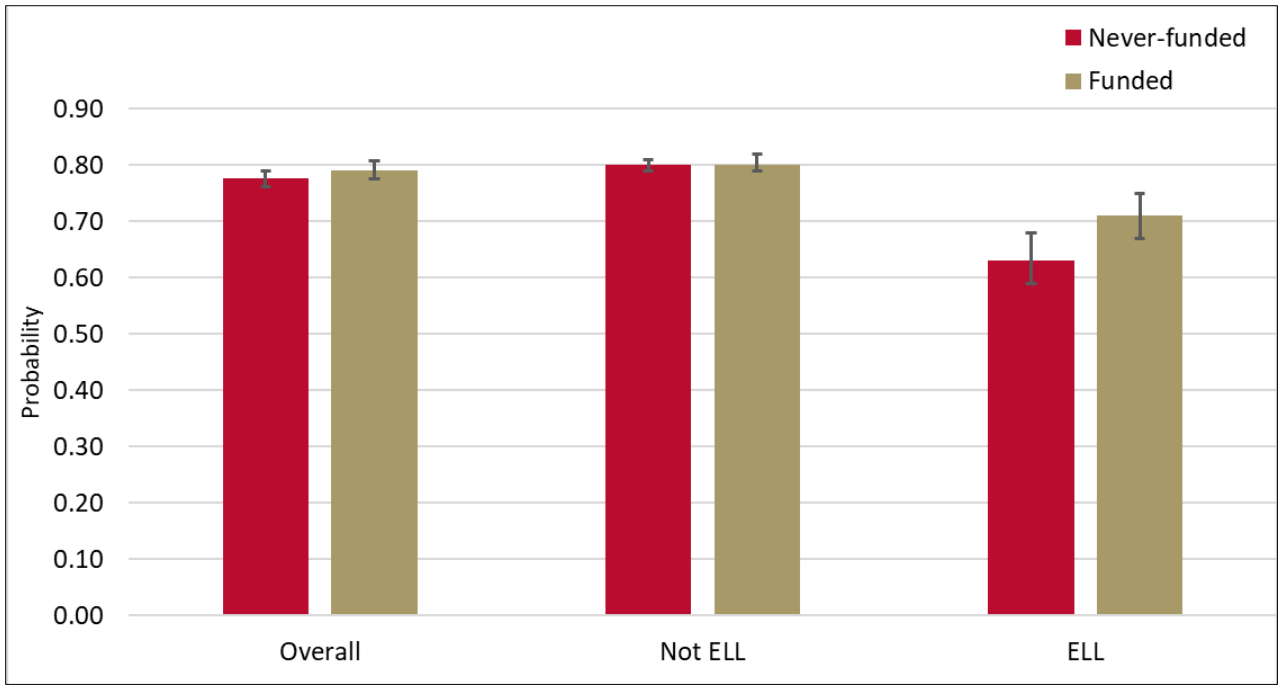


Figure 3. Predicted Probability of High School Graduation in 6 Years for English Language Learners



Four- and 6-Year Completion

Columns 3 and 4 report the estimates for completion outcomes. The odds of a student completing high school within 4 years were 1.100 times higher at SCCGP-funded high schools compared to students at never-funded schools. Again, the odds ratio is greater than 1, but the estimate is not statistically significant and magnitude does not suggest an association between funding and 4-year completion. In the five model specifications where interaction terms are included, the odds ratio estimates are similar and stay above 1, but similar to what we saw with 4-year graduation, the five interaction effects investigated do not display any significant differences by subgroup.

Expressed as a marginal effect, the difference between funded and never-funded schools on 4-year completion is small. On average, students attending SCCGP-funded schools were 0.018 points (1.8 percentage points) more likely to complete in 4 years compared to students at never-funded schools. The Cox index value of the impact can be classified as very small.

Six-year completion does show suggestive evidence of a small increase in the likelihood of completion for students at SCCGP-funded schools. The odds of a student completing high school within 6 years were 1.126 times higher at SCCGP-funded high schools compared to students at never-funded schools. The estimate is statistically significant at the 10% level and the effect is larger, but the Cox index value of effect size is still considered very small.

Similar to what we observed with 6-year graduation, we see significance on the same two interaction terms when we estimate the interaction models. Looking at their estimated marginal effects, for high school students with a disability, attending a school with SCCGP funding increased

their probability of completion by 0.10 points (10 percentage points) relative to students with a disability at never-funded schools. Similarly, for high school ELL students, attending a school with SCCGP funding increased their probability of completion by 0.06 points (6 percentage points) relative to ELL students at never-funded schools. Attending a school with or without SCCGP funding does not appear to impact students who do not have a disability or who are not ELL students. These results are summarized in Figures 4 and 5.

Figure 4. Predicted Probability of High School Completion in 6 Years for Students with a Disability

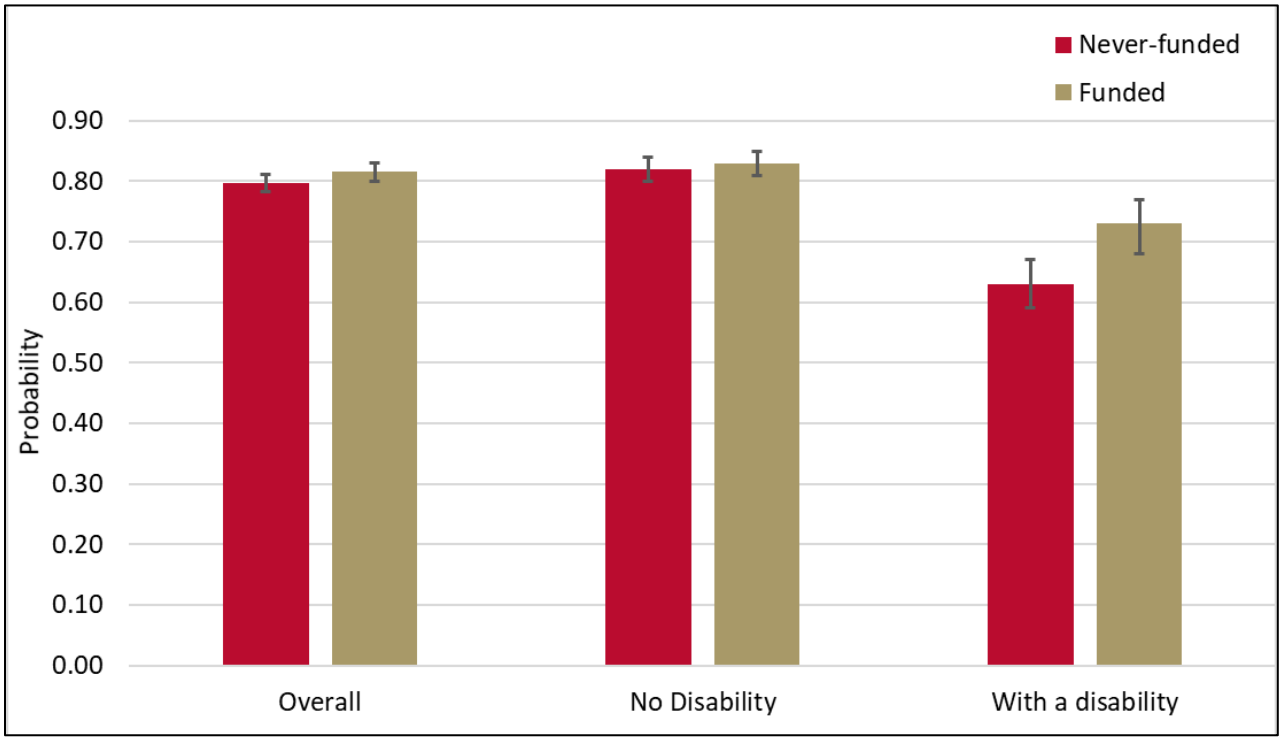
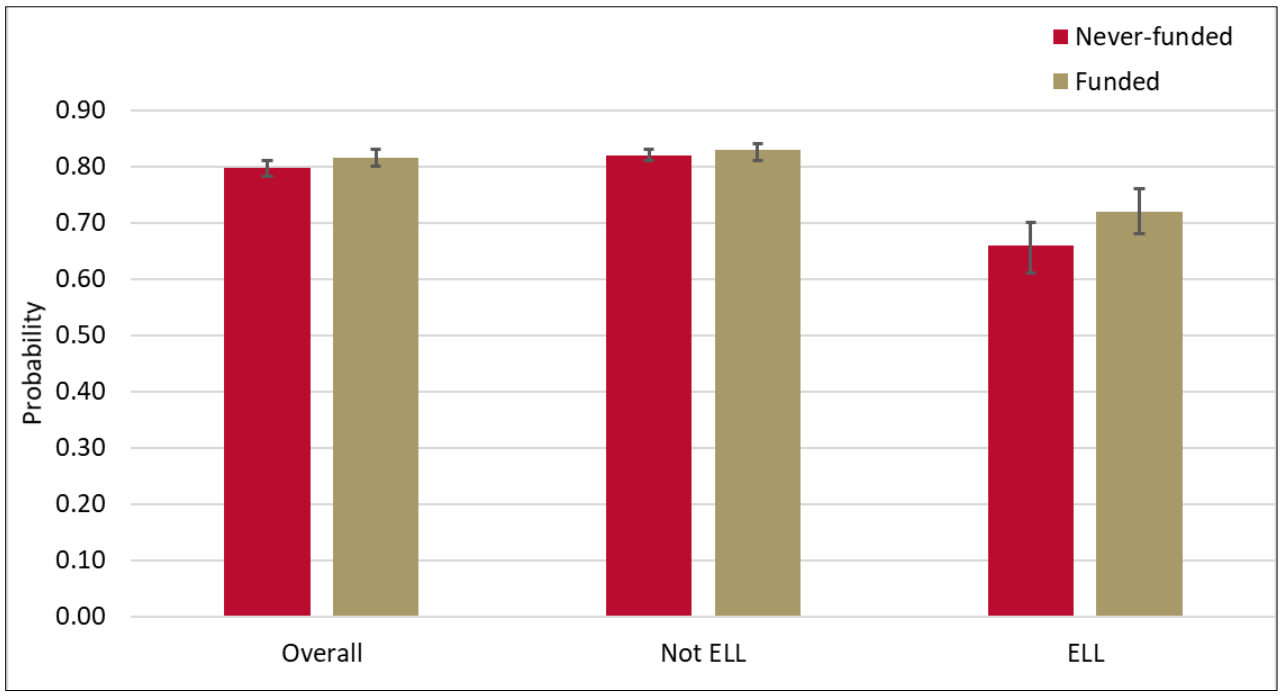


Figure 5. Predicted Probability of High School Completion in 6 Years for English Language Learners



Postsecondary Matriculation

Among the confirmatory outcomes in Table 3, matriculation shows the largest odds ratio, marginal effect, and Cox index value. The odds of a student enrolling in a postsecondary educational institution in the school year immediately following graduation from high school are 1.236 times higher for students at SCCGP-funded high schools compared to students at never-funded schools. The estimate is statistically significant at the $p<0.10$ level.

In the five model specifications where interaction terms are included, the odds ratio estimates remain similar and again stay above 1. Similar to what we saw with 4-year graduation and completion, the five interaction models do not suggest any significant differences by subgroup.

Expressed as a marginal effect, the difference between funded and non-funded schools is 0.047. On average, students attending SCCGP-funded schools are 0.047 points (4.7 percentage points) more likely to matriculate in postsecondary education or training immediately following high school graduation compared to students at never-funded schools. The Cox index value meets the threshold of a small impact.

Summary of Confirmatory Results

Figure 6 summarizes the confirmatory results in a checklist-type table format. The first row shows that for all outcomes, odds ratios are greater than 1, indicating greater odds for students at SCCGP-funded schools. The second and third rows summarize statistical significance at the 0.10 and 0.05 levels. The fourth row reports the effect size classification as determined by the Cox index value.

The fifth row reports the marginal effects as the percentage point difference between students at SCCGP-funded schools and students at never-funded schools. The last row indicates for which student subgroups we found statistically significant effects. Highlighted cells are those that indicate some evidence for the outcome, but these should be interpreted holistically (as above).

Figure 6. Summary of Confirmatory Outcomes

	4-year Graduation	6-year Graduation	4-year Completion	6-year Completion	Matriculation
Odds ratio>1	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
p<0.1	No	No	No	**Yes**	**Yes**
p<0.05	No	No	No	No	No
p<0.01	No	No	No	No	No
Cox's effect size	Very small	Very small	Very small	Very small	**Small**
Average difference	1.5% points	1.5% points	1.8% points	1.9% points	**4.7% points**
Significant interactions	None	**Disability; ELL**	None	**Disability; ELL**	None

Exploratory Analysis

Attendance Rates

The first row of values in Table 4 reports the estimated coefficients on an SCCGP-funding indicator variable from the linear model. Standard errors for these estimates are reported in parentheses, as well as their corresponding p-value. The estimated coefficient on the term interacting the SCCGP-funding indicator with reference year attendance is also reported, along with standard errors and p-values of that coefficient.

To help interpret the SCCGP and interaction terms together, we report marginal effects at the bottom of the table. Due to the inclusion of an interaction term in the model, the marginal effect changes depending on the reference year level of the outcome, therefore we provide a specific marginal effect estimated at mean values of all the covariates–including the reference year level of the attendance outcome. The mean level of reference year attendance is included in the table for context.[ix]

All of the funding indicator variables and interactions are statistically significant across all years. This is true for both the full school sample and the sample that only contains elementary and middle schools.

In Year 2, according to marginal effect, schools that received SCCGP funding experienced less than half a percentage point lower attendance rate. This is relative to a mean attendance rate of 91%. We see this value shrink in Years 3 and 4 to less than one-tenth of a percentage point. Looking across the 3 years, the results demonstrate that, on average, an initial attendance gap between SCCGP-funded schools and comparable never-funded schools narrowed over time.

Table 4. School-Level Exploratory Attendance Rate Outcomes

	Year 2	Year 3	Year 4
SCCGP funding	-0.177** (0.071)	-0.156*** (0.058)	-0.233*** (0.053)
p-value	0.013	0.008	<0.001
Reference interaction	0.190** (0.078)	0.169*** (0.064)	0.256*** (0.058)
p-value	0.016	0.008	<0.001
Reference mean	0.91	0.91	0.91
Marginal effect	**-0.46**	**-0.27**	**-0.05**
Sample size (all school levels)	314	313	308

Note: Stars indicate statistical significance, with * p<0.10, ** p<0.05, and *** p<0.01. Standard deviations are displayed in parentheses below coefficients estimates. Heteroskedasticity-robust standard errors were estimated but not reported. Covariate estimates are omitted from the table.

A similar pattern is present when we narrow the sample to only elementary and middle schools. Initially, SCCGP-funded schools had 0.35 percentage points lower attendance rates compared to

[ix] The marginal effect at other baseline values of attendance can be approximated by -0.177+0.190*baseline measure and then multiplied by 100. Differences can arise due to rounding.

never-funded schools, but the number shrank and then reversed to where SCCGP-funded schools have a 0.26 percentage point higher attendance rate.

Dropout, Dual Enrollment, FAFSA Completion, and READ Plan/SRD Rates

We do not find any statistically significant effects of SCCGP funding on dropout, dual enrollment, FAFSA completion, or READ plan/SRD rates. This was the case for both the indicator for grant receipt and the interaction of grant receipt with rates in the reference year.

That said, it should be noted that we lacked data for some of these measures, so we are not able to claim the same level of rigor as in the confirmatory analysis. For example, we only had access to 1 year of dual enrollment and FAFSA completion rates, there were gaps in the READ plan/SRD rate reporting across years, and CDHE had difficulties in providing up-to-date information during the study period.

Discussion of Results and Concluding Remarks

The confirmatory outcomes show limited evidence of a positive impact of receiving funding on educational attainment and postsecondary continuation. Overall, we found suggestive evidence that funding increased the odds of 6-year completion and slightly stronger evidence of postsecondary matriculation for high school students. Considering the expansion of the grant program to elementary and middle schools, it is possible a more precise measurement would have been possible if the cohorts had contained more high schools. That said, the estimated standardized effect sizes point to relatively small differences between funded and never-funded schools, and these are unlikely to change significantly with a larger sample size.

Considering the intent-to-treat nature of the analysis, the evidence presented points in the direction of possible larger impacts. Within schools, the impacts of funding are dispersed amongst a diverse population of students who are anticipated to receive varying degrees of exposure to grant-funded services. A non-trivial percentage of students will either not have any exposure or very limited exposure to grant-funded activities; therefore, we should not necessarily expect to see improvements in outcomes for these students. When low-contact students are combined with high-contact students in a cohort-level average, the impact seen for high-contact students is attenuated.

This hypothesis is consistent with what we see when we compare the impact for all students against the impact for specific subpopulations. The impact on students with disabilities and ELLs could reflect counselor efforts to target these students, in accordance with program objectives. It could also reflect the fact that these students may already be better positioned to take advantage of expanded resources via already established relationships with school counselors and administrators.

In the exploratory analysis, there is evidence that attendance rates at SCCGP-funded schools are initially slightly lower, but the gap shrank throughout the grant cycle. This is an encouraging finding and worth further investigation. The initial gap in attendance is in line with grant criteria aimed at

funding schools with higher dropout rates and other indicators of lower performance, so this initial gap may not be surprising. That said, despite meeting baseline equivalence with a diverse set of variables, the presence of an initial gap early in the grant cycle suggests that the matching process in the exploratory analysis may not have captured all the relevant matching variables. It is very possible that the inclusion of attendance rates at baseline would eliminate the significant findings.

Furthermore, exploratory questions were examined annually during the grant cycle. Given that the composition of the student body fluctuates and students in different grades receive different levels of exposure to the SCCGP, readers should treat the results of exploratory questions as trends instead of the specific estimate of grant impact.

None of the results in the dropout, dual enrollment, FAFSA completion, and READ plan/SRD rate analyses were statistically significant. Overall, we cannot glean many insights from the exploratory analysis, but we also do not see any evidence of a detrimental effect of funding.

Limitations

In the discussion, we noted the intent-to-nature approach and potential issues in the exploratory analysis, but the study faced a number of additional challenges, most of which were beyond the control of the Colorado Lab and CDE. In this section, we briefly discuss those challenges.

- **Program outcomes may not be observable in the time available during funding.** Longer-term outcomes are slow-moving, so disruptions in implementation can derail the progress made. Staff turnover posed a major challenge to sustaining and building on the gains initially established during SCCGP funding. In some cases, grantees note that even hiring a qualified counselor in the first place can be challenging.
- **All four cohorts were affected by the COVID-19 pandemic**. While COVID-19 also affected comparison schools, it means that counselors' work was likely done partially virtually. Because a counselor's role is relational, this intervention may have been less effective for these cohorts than if activities had been conducted in person.
- **Data availability and access posed substantial barriers to painting a comprehensive picture of what SCCGP funded.** Extenuating challenges at CDHE prevented comprehensive data sharing and limited the Colorado Lab's ability to look at postsecondary outcomes. Future examination of program outcomes will require that data partners establish clear roles and responsibilities for data sharing within and between agencies. Ideally, data would be coordinated through a key, central representative with big picture knowledge. This will help determine what data can be shared and with whom in timely ways that facilitate program learning and improvement.
- **Expansion of the program to include elementary and middle schools could have reduced the statistical power needed to uncover impacts for high schools.** Funding was required to be spread across elementary, middle, and high schools, potentially diluting our ability to statistically uncover impacts at the school level.

- **It was possible that during the 4-year period of the SCCGP grant, schools might also receive other funding or have engaged in other work related to school counseling**. To minimize the risk of spillover from these other grants biasing estimates of effect size, we matched schools on whether they participated in the following three programs over the life of the grant: SHPG, EARSS, or SRGP. In cases where there still remained differences in grant participation after matching, we also included controls in the outcome analysis; however, we were not able to examine all potential grant programs or other related counseling work being undertaken by schools. Therefore, the impacts of SCCGP may be influenced by such programs.
- **Within certain districts, only some schools received funding or support to implement the SCCGP as designed**. While most grantees spend the money directly at the sites listed on the grant award, some districts may have purchased items that were used across multiple schools (e.g., curriculum, professional development events). This raises the potential for contamination, which would bias the treatment effect toward zero since some schools in the control group could receive benefits from awards to other schools in the same district.
- **Propensity score matching can still be a biased solution for deriving causal inferences**. Effective matching requires a comprehensive set of matching variables that can solidly predict the probability a school would have received funding. The more matching variables, the better the potential match. That said, the more variables used to match, the more potential school matches are required to find a best match. Researchers cannot know if their pool of control schools is "large enough," so there is the possibility that the matched control schools are not valid counterfactuals. This is potentially even more an issue in situations of matching without replacement.

  While valid, the concerns noted need to be balanced against the availability of viable alternatives for evaluating the program. SCCGP grant awards were never intended to be randomly assigned, making it impossible to conduct a randomized controlled trial of the program's effectiveness. Unfortunately, there are also no natural comparison groups present in the sample or other exogenous changes that we could identify, which would potentially provide strong alternatives for deriving causal inferences. Given the remaining options for QEDs under these circumstances, the propensity score matching designed described here is sufficiently rigorous to meet WWC standards for identifying the causal impact of educational programs "with reservations", providing "moderate evidence of effectiveness."

Endnotes

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