

The Impact of the Bilingual/Biliterate Instruction for Bilingual Youth (BBILY) Program on Student Achievement

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Introduction

Spanish-speaking multilingual learners (MLs) and students classified as English learners (ELs) thrive when educators build on and strengthen their existing language skills. Research has demonstrated that ELs make greater gains in overall language development and English literacy through dual language education relative to their peers in other types of bilingual education or English-only programs (Morales, 2024; Steele et al., 2017; Valentino & Reardon, 2015). Dual language programs leverage MLs' emerging bilingualism, building on their Spanish skills and facilitating cross-linguistic transfer to support their English acquisition and literacy (August & Shanahan, 2006; Proctor et al., 2017).

California serves the largest share of MLs in the nation. More than 19% of California students are classified as ELs, and the state strives to be a leader in the education of MLs (California Department of Education, 2024). The state has made, for example, improving outcomes for MLs through dual language programs a priority in its Global California 2030 initiative, and it highlights biliteracy in its state literacy plan (Sellery, 2024).

Despite these efforts, the demand for dual language education in California exceeds supply. Most dual language schools have enrollment waiting lists, and the state faces a long-standing and critical shortage of bilingual teachers (Cross, 2017; Williams, 2023). Moreover, many teachers who already hold bilingual authorizations are not teaching in bilingual programs because those placements are limited or require an increased workload due to the extra time teachers spend creating bilingual materials, translating documents, and preparing to teach in two languages (Amanti, 2019). Teachers and leaders also may believe they are not prepared or knowledgeable regarding best practices in bilingual education (Alvarado, 2024; Harris & Sandoval-Gonzalez, 2017; Lavadenz et al., 2021). These structural issues, however, are not easily addressed, particularly with uneven funding and a dearth of Spanish-language professional learning opportunities for bilingual teachers (Briceño, 2021; Williams et al., 2024).

Bilingual/Biliterate Instruction for Bilingual Youth (BBILY) Professional Learning

To meet the demand for skilled bilingual teachers, the Bilingual/Biliterate Instruction for Bilingual Youth program (Proyecto BBILY) seeks to increase K–8 dual language teachers' efficacy to improve MLs' Spanish and English language arts achievement and English language proficiency. Funded by a National Professional Development (NPD) grant, the California-based program does this through high-quality online professional learning workshops delivered in Spanish and offered to both pre-service teachers (PSTs) participating in a teacher education program and in-service teachers (ISTs) serving as a teacher of record. In this report, we focus specifically on the students of California ISTs.

The workshops combined teaching of evidence-based instructional practices (Vaughn et al., 2009) with the use of evidence-based professional learning practices—both of which have been shown to improve student academic outcomes (Darling-Hammond et al., 2017). The online workshops were offered to ISTs across several states, including California, during the final four years of the five-year grant, between fall 2022 and fall 2026. Participation was voluntary and individual, meaning that a school may have had only one teacher participant or its entire bilingual teaching team enrolled.

ISTs participating in the BBILY program took one core workshop on the key components of bilingual theory and two mini workshops tailored to their grade-level strand—either K–3 or 4–8—for a total of 36 hours of asynchronous professional learning over roughly a 6-month period. The BBILY online workshops specifically included:

- Mini lecture videos addressing bilingual theory, cultural and linguistic responsiveness, formative assessment in dual language settings, and evidence-based biliteracy instruction,
- Annotated videos of bilingual classroom instruction,
- Online discussion boards where teachers interacted with one another,
- Quizzes and short writing assignments to assess participant understanding,
- Assignments that required teachers to plan, teach, and reflect on lessons integrating focal practices, and
- Opportunities for peer and instructor feedback on assignments (Briceño et al, 2025).

ISTs who completed the entire workshop sequence were eligible for a stipend and, in many cases, professional development hours required by their districts.

Research Question

In this report, we use student achievement data to address the following research question:

- What is the impact of BBILY professional learning on students' English language arts achievement, English language proficiency, and Spanish language arts achievement after one year of implementation?

Methods

This study relied on a quasi-experimental design (QED) to compare students taught by 21 BBILY teachers in California with students taught by comparison teachers in grades 4–8. We used state-and-teacher-provided information about teachers who implemented BBILY (BBILY teachers) to identify a similar group of non-BBILY California teachers to which we could compare them (comparison teachers). We then contrasted the performance of students taught

by BBILY and comparison teachers to estimate the impact of BBILY on student achievement after one year of exposure to the program.

Because teachers were not randomly assigned to participate in BBILY and no single comparison group provides a perfect counterfactual, we estimated impacts using three different comparison groups, described below. The three groups provided complementary tests of impact. We compared findings across the groups to assess the sensitivity of the estimates and examine whether the results were consistent across analytic approaches.

Data and Measures

We used statewide administrative data provided by CDE, including student assessment data, student demographic characteristics, and course enrollment, as well as teacher demographic information and teaching experience. We also obtained teacher credential data from the California Commission on Teacher Credentialing (CTC) and school achievement and background information from publicly available data.

Student outcomes consisted of scores on the Smarter Balanced English Language Arts assessment (SBAC ELA), the English Language Proficiency Assessments for California (ELPAC), and the California Spanish Assessment (CSA). SBAC ELA measures English language arts achievement, ELPAC measures English language proficiency among students classified as ELs, and CSA measures Spanish language arts achievement for Spanish-speaking MLs. Scores for each assessment were standardized to *z* scores (with a mean of 0 and standard deviation of 1) using the statewide student sample, separately by grade level and test administration.

Comparison Groups

Separate analytic samples were constructed for each outcome measure because assessment eligibility and participation differed across students. The three groups provide different levels of comparability with BBILY teachers.

CG1: Survey Respondent Comparison Group

Comparison Group 1 (CG1) consisted of nonparticipating teachers who completed SRI's study survey. Because both BBILY and comparison teachers chose to participate in the study survey,[1] this comparison may help align the groups on unobserved characteristics related to willingness and motivation to participate in research and therefore provided a relatively focused benchmark. Outcome-specific samples were smaller because not all students in grades 4–8 enrolled in eligible classes (see the Sample section) taught by the sample teachers were eligible for or had available records for each assessment. The resulting analytic samples including CG1

[1] CG1 teachers were recruited to take the study survey primarily through word of mouth and emailed communication. Several had heard of BBILY but did not have time to complete the PL sequence that year. Others were identified as practicing bilingual educators in similar schools as those participating and were directly asked to participate.

were relatively small, with the SBAC ELA and ELPAC analyses including 21 BBILY teachers and 23 comparison teachers, and the CSA analysis including only 10 BBILY teachers and nine comparison teachers. Some CG1 teachers taught in the same schools as BBILY teachers; therefore, the analysis may underestimate the BBILY impact if BBILY practices were shared with or influenced comparison teachers.

CG2: Matched Comparison Group

Comparison Group 2 (CG2) was designed to provide a larger comparison group than CG1 and the closest possible match to the BBILY teachers based on available teacher and school characteristics. To construct this group, we identified potential comparison teachers with the same bilingual education credentials as the BBILY teachers who taught grades 4–8 in the 11 districts in which the 21 BBILY treatment teachers taught, but we excluded teachers employed at the 16 specific schools with BBILY teachers. Using propensity score matching[2], we then matched each BBILY teacher with four comparison teachers. The matching model incorporated both teacher and school characteristics. Teacher characteristics included gender, ethnicity, age, total teaching experience, experience in the district, attainment of a master's degree or higher, and tenure status. School characteristics included grade level; schoolwide ELA performance; ELA performance among ELs; percentages of students who were ELs, identified as an ethnicity, and were economically disadvantaged; and number of students with disabilities (i.e., students with Individualized Education Programs [IEPs]).

The resulting matched sample included 21 BBILY teachers and 84 comparison teachers across 16 BBILY treatment and 57 comparison schools. For a teacher to be included in an outcome-specific analysis, at least one student in grades 4–8 enrolled in an eligible class taught by that teacher had to have an available score on the relevant assessment. Consequently, the analytic samples included 21 BBILY and 84 comparison teachers for SBAC ELA, 21 and 83 for ELPAC, and 10 and 5 for CSA, respectively.

CG3: Districtwide Eligible Comparison Group

Comparison Group 3 (CG3) included all eligible nonparticipating teachers in other schools in the same 11 districts as the BBILY teachers, excluding teachers employed at the 16 schools with BBILY teachers. This group was also the base sample we used to find CG2 matches. CG3 eligible teachers taught grades 4–8 and held comparable bilingual education credentials. This broader comparison maximized the available sample (404 comparison teachers) and therefore provided the strongest statistical power for the impact analyses. CG3 also captured the broader range of district business-as-usual practices and conditions as a contrast to BBILY. However, unlike CG2

[2] Propensity score matching estimates each teacher's likelihood of participating in BBILY based on observed teacher and school characteristics and matches BBILY teachers with comparison teachers who have similar estimated likelihoods (propensity scores). This approach improves comparability on measured characteristics, although it cannot account for unmeasured differences.

teachers, CG3 teachers were not matched to BBILY teachers on observed teacher and school characteristics, increasing the potential for preexisting differences between the groups.

The three comparison groups were designed to provide complementary benchmarks for estimating the impact of BBILY, with different strengths and limitations. CG1 compared BBILY teachers with nonparticipating teachers who also engaged with the study by completing the survey, potentially increasing comparability on interests in the study and motivation regarding learning about best practices in bilingual instruction. However, CG1 provided a relatively small sample and included some nonparticipating teachers in BBILY schools who may have indirectly benefited from BBILY. CG2 expanded the sample and used propensity score matching to create the closest comparison to BBILY teachers based on observed teacher and school characteristics. CG3 included the broader population of eligible teachers in the same districts, providing the largest sample and representing district business-as-usual conditions, but with greater potential for preexisting differences from BBILY teachers and schools. Examining findings across all three groups allows us to assess whether estimated impacts are robust to different comparison group definitions and their associated trade-offs between comparability, statistical power, and representation of typical district practice.

Analysis Approach

For each outcome, SRI estimated impacts separately against CG1, CG2, and CG3 using two-level regression models with students nested within teachers. The models compared standardized student outcome scores between BBILY and comparison teachers while adjusting for students' baseline achievement and the available student, teacher, and school characteristics.

The reported treatment effect—the impact—is the adjusted difference between the BBILY and comparison groups. Because the design was quasi-experimental, the estimates adjust for observed differences but may still reflect unobserved differences between participating and nonparticipating teachers or their students.

Sample

Across the three comparison approaches, the analytic sample included 21 BBILY teachers for SBAC ELA and ELPAC and 10 BBILY teachers for CSA. Comparison-group sizes ranged from 23 teachers in CG1 to 404 teachers in CG3 for SBAC ELA.

Exhibit 1 presents teacher characteristics for the BBILY treatment group and the three comparison groups. Across all three comparison groups, BBILY teachers were more likely to be female and Hispanic/Latine and, on average, were younger and had fewer years of teaching and district experience than comparison teachers. Differences were generally smaller for educational attainment and tenure. CG2 was selected through propensity score matching to improve comparability on these observed teacher and school characteristics, although some smaller differences remained.

Exhibit 1. Teacher Characteristics Across Analytic Groups

Characteristic	BBILY teachers (n = 21)	CG1 teachers (n = 23)	CG2 teachers (n = 84)	CG3 teachers (n = 404)
Female	90.5%	73.9%	86.9%	77.0%
Age, years	38.2 (9.1)	43.3 (11.8)	42.3 (10.3)	46.5 (10.7)
Hispanic/Latine	81.0%	69.6%	72.6%	66.3%
Total teaching experience, years	11.4 (9.4)	14.3 (10.5)	13.9 (9.9)	17.3 (10.2)
Experience in current district, years	10.1 (8.6)	12.6 (10.8)	12.4 (9.6)	15.2 (10.3)
Master's degree or higher	42.9%	47.8%	50.0%	58.2%
Tenured	66.7%	69.6%	69.0%	75.0%

Note. Entries are percentages for indicator variables and means (standard deviations) for continuous variables.

Exhibit 2 presents school characteristics for the analytic groups. Across the three comparison groups, BBILY treatment schools generally served higher percentages of students classified as ELs and Hispanic/Latine students than the broader CG3 schools, whereas CG1 and CG2 schools were more similar to BBILY schools on these characteristics. School ELA performance levels were also similar across BBILY, CG1, and CG2 schools. Differences remained on some characteristics, including economic disadvantage, students with disabilities, and school grade level. These observed characteristics were accounted for in the impact models.

Exhibit 2. School Characteristics Across Analytic Groups

Characteristic	BBILY schools (n = 16)	CG1 schools (n = 20)	CG2 schools (n = 57)	CG3 schools (n = 221)
School ELA performance level	2.25 (0.58)	2.15 (0.81)	2.28 (0.70)	2.60 (1.20)
English learner ELA performance level	2.31 (1.25)	2.70 (1.42)	2.30 (1.02)	2.28 (1.67)
English learners	43.3% (15.1)	45.1% (13.0)	41.3% (13.9)	27.4% (18.2)
Hispanic/Latine students	78.5% (16.0)	79.6% (14.2)	75.6% (14.4)	61.3% (22.5)
White students	8.4% (9.4)	7.7% (6.9)	6.8% (8.2)	15.0% (15.6)
Economically disadvantaged students	78.5% (14.5)	77.3% (14.3)	82.2% (12.0)	69.8% (23.2)
Students with disabilities	11.8% (4.1)	11.9% (4.1)	15.3% (4.8)	14.3% (4.7)
Elementary school	50.0%	70.0%	61.4%	52.0%
Middle school	6.3%	5.0%	10.5%	24.4%

Note. Entries are means (standard deviations), except school-type indicators, which are percentages. School-level ELA performance was measured using CDE's five California School Dashboard color levels, coded from 1 to 5 (red, orange, yellow, green, and blue, respectively), with higher values indicating stronger performance on a combinatin of statewide SBAC and alternate ELA assessments.

Once the teacher samples were established, we selected students in grades 4–8 who were enrolled in eligible classes taught by the sample teachers to include in the impact analyses. Eligible classes included self-contained classrooms and courses in ELA, world languages, and Spanish, as well as other subject-area courses (e.g., history and science) taught in Spanish.

Exhibit 3 shows student characteristics across the analytic groups for the SBAC ELA analytic sample, which was the largest of the three outcome samples and included more students than the ELPAC and CSA samples. BBILY treatment students differed most from CG3 students, the broader sample of eligible students. Compared with CG3 students, BBILY students were substantially more likely to be Hispanic/Latine (92.0% versus 61.7%), speak Spanish at home (67.8% versus 37.7%), and be classified as ELs (37.7% versus 18.6%). Differences were smaller for CG2, the matched comparison group, although BBILY students were still more likely to be Hispanic/Latine, speak Spanish at home, and be ELs. BBILY and CG1 students were generally similar across the demographic characteristics examined.

Exhibit 3. Student Characteristics Across Analytic Groups for the SBAC ELA Sample

Characteristic	BBILY students (n = 735)	CG1 students (n = 686)	CG2 students (n = 2,944)	CG3 students (n = 17,000)
Female	52.5%	51.7%	48.7%	49.6%
Hispanic/Latine	92.0%	87.0%	80.1%	61.7%
Black	1.0%	3.8%	5.4%	6.3%
White	4.1%	5.2%	5.3%	15.5%
Asian	1.0%	1.9%	7.0%	10.2%
Other race/ethnicity	2.0%	2.0%	2.1%	6.3%
Home language – Spanish	67.8%	68.1%	58.8%	37.7%
English learner (EL)	37.7%	37.6%	29.9%	18.6%
Economically disadvantaged	76.2%	78.3%	85.8%	68.6%
Individualized Education Program (IEP)	12.2%	11.4%	14.4%	12.9%

Exhibit 4 presents standardized baseline achievement scores for BBILY and comparison groups. Baseline achievement was reasonably well balanced between BBILY students and students in all three comparison groups. Across the three outcomes and comparison groups, standardized baseline differences ranged from 0.01 to 0.22 in absolute value, with all differences below the What Works Clearinghouse (WWC) threshold of 0.25 standard deviations for establishing baseline equivalence. Baseline achievement was adjusted in impact models to further account for preexisting differences between BBILY and comparison students and improve precision of the estimates.

Exhibit 4. Baseline Assessment Scores and Standardized Differences Across Analytic Groups

Group or comparison	Statistic	SBAC ELA	ELPAC	CSA
BBILY	Mean	-0.18	-0.28	0.12
	SD	0.90	0.83	1.03
	N	735	292	317
CG1	Mean	-0.25	-0.17	-0.02
	SD	0.93	0.75	1.09
	N	686	265	226

Group or comparison	Statistic	SBAC ELA	ELPAC	CSA
CG2	Mean	-0.27	-0.27	-0.11
	SD	0.90	0.83	1.03
	N	2,944	992	128
CG3	Mean	-0.02	-0.37	-0.05
	SD	0.99	0.86	1.00
	N	17,000	3,546	581
BBILY vs. CG1	Std. difference	0.07	-0.14	0.14
BBILY vs. CG2	Std. difference	0.10	-0.01	0.22
BBILY vs. CG3	Std. difference	-0.16	0.11	0.17

Note. Standardized differences compare BBILY with each comparison group.

Results

Exhibit 5 reports the estimated impacts of BBILY across the three comparison groups. The estimates were small and not statistically significant for SBAC ELA or ELPAC in any comparison. CSA estimates were positive in all three comparisons, with a statistically significant positive estimate in the matched CG2 analysis. The estimate suggests that students of BBILY teachers performed about 0.29 standard deviations higher on the CSA than students of the CG2 matched comparison teachers, after adjusting for observed student, teacher, and school characteristics.

Exhibit 5. Impact Estimates Across Comparison Groups

Comparison group	Outcome	Estimated impact	Std. error	*p* value	BBILY *N* teachers	Comp. *N* teachers
CG1: Survey respondent comparison teachers	SBAC ELA	-0.07	0.06	.24	21	23
	ELPAC	-0.12	0.07	.11	21	23
	CSA	0.07	0.11	.51	10	9
CG2: Matched teachers in other schools	SBAC ELA	-0.04	0.05	.45	21	84
	ELPAC	-0.09	0.06	.14	21	83
	CSA	0.29*	0.14	.04	10	5
CG3: All eligible teachers in other schools	SBAC ELA	-0.04	0.04	.37	21	404
	ELPAC	-0.09	0.06	.12	21	330
	CSA	0.13	0.11	.22	10	24

* Stastically significant at $p < .05$.

The CG2 CSA finding should be interpreted with some caution. The analysis included only 10 BBILY teachers and five comparison teachers, so the estimate may be sensitive to the assessment participation and performance of a small number of teachers and students. The positive pattern across all three comparison groups is encouraging, but replication with a larger

CSA sample is needed before drawing a firm conclusion about BBILY's impact on Spanish achievement.

As discussed previously, each comparison group addressed a different source of uncertainty. CG1 offered a focused comparison among teachers who expressed interest in BBILY professional learning and engaged with the study but yielded a small sample. CG2 improved comparability on observed teacher and school characteristics, but the CSA sample was particularly small. CG3 provided substantially more comparison students, teachers and schools, but the broader group may differ from BBILY participants in ways not fully captured by the regression controls of observed student, teacher and school characteristics. The consistency of the nonsignificant SBAC ELA and ELPAC findings across these alternatives strengthens the conclusion that the study did not detect an English language impact after one year of intervention. By contrast, CSA impact estimates were consistently positive across all three comparison groups and statistically significant in the CG2 matched analysis, providing suggestive evidence that teachers' completion of BBILY had a positive impact on their students' Spanish language arts achievement.

Discussion

Overall, these findings provide limited evidence that BBILY changed student achievement during the one-year study period. Across all three comparison approaches, impacts on SBAC ELA and ELPAC were not found to be statistically significant. On the other hand, CSA estimates were positive across all comparisons, and the matched CG2 estimate was statistically significant.

A positive Spanish language effect is plausible given BBILY's focus on bilingual and biliterate instruction and its delivery of professional learning primarily in Spanish. The workshops may have strengthened participating teachers' capacity to provide Spanish language instruction or created more consistent opportunities for their students to develop Spanish literacy. The present analyses, however, cannot identify the instructional mechanism that produced the positive CG2 finding.

The absence of significant effects on SBAC ELA and ELPAC after one year does not rule out the possibility of longer-term impacts on English language and literacy outcomes. Impacts on English language outcomes may take longer to emerge as teachers integrate BBILY concepts and practices into their instruction. Because the professional learning was delivered primarily in Spanish and emphasized bilingual and biliterate instruction, changes in teachers' Spanish language instruction and corresponding effects on students' Spanish literacy may emerge more quickly. Improvements in Spanish language and literacy skills may subsequently support English language development, but these benefits may require additional time to become detectable on English language and literacy assessments.

This study has several limitations. Participation in BBILY was not randomly assigned, so unmeasured differences may remain even after matching comparison teachers and regression

adjustment. The study included only 21 BBILY teachers, and the CSA analyses included 10 or fewer BBILY teachers and as few as five comparison teachers. In addition, CSA participation may also reflect differences in dual language programming or assessment opportunities across schools.

Future research should replicate the analyses with additional BBILY cohorts of varying grade levels, larger numbers of CSA-tested students, longer-term impacts beyond the first year of implementation, and direct measures of instructional practice. A larger sample would improve precision and make it possible to test whether effects differ by grade, program model, student EL status, and teacher implementation of the BBILY practices.

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