

RESEARCH BRIEF

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A Research Brief
from the *Study of
California's Transitional
Kindergarten Program*

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The Impact of Transitional Kindergarten on California's Students

Summary of Findings from *The Study of California's Transitional Kindergarten Program*

California's Kindergarten Readiness Act of 2010 revised the cutoff date by which children must turn five for kindergarten entry in that year. The act established September 1 as the new kindergarten eligibility date—three months earlier than the previous date of December 2. The Kindergarten Readiness Act also established transitional kindergarten (TK), defined as the first year of a two-year kindergarten program, for all students affected by the birthdate eligibility change. Instead of enrolling in regular kindergarten, students who reach age five between September 2 and December 2 now receive an “age and developmentally appropriate” experience in TK prior to entering kindergarten the following year (California Department of Education, 2016; Governor's State Advisory Council on Early Learning and Care, 2013).

To determine whether California's TK program is effective at improving school readiness and learning outcomes for students, American Institutes for Research (AIR) conducted an evaluation of TK as it was implemented during the 2013–14 and 2014–15 school years. This study uses a rigorous regression discontinuity design to examine whether TK, as a new approach to prekindergarten education for age-eligible students, leads to positive outcomes, for which students, and under what conditions. Previous research has shown that participation in high-quality early education prior to kindergarten can improve young children's readiness skills for elementary school, positively affecting behavioral, social-emotional, and cognitive outcomes (e.g., Andrews, Jargowsky, & Kuhne, 2012; Yoshikawa et al., 2013).

Key Findings

This brief describes the impact of transitional kindergarten (TK), how this impact varies for different types of students, and how characteristics of TK classrooms are related to the program's effect. Key findings include:

- TK improves mathematics knowledge and problem-solving skills for participating students, giving them almost a three-month advantage for problem-solving skills over students who did not attend TK.
- TK also improves students' literacy skills, putting them ahead of their peers who did not attend TK by six months at kindergarten entry.
- There was no detectable impact of TK participation on students' executive function or incidence of behavioral problems.
- TK has a positive impact on the language, literacy, and math skills of all students at kindergarten entry. It has a particularly strong impact on the English language skills of English learners and on math skills of low-income students.
- TK has a persisting impact on all students' letter and word identification skills at the end of kindergarten, and on literacy and math skills for low-income students and math skills for Hispanic students.
- TK structured as a standalone classroom had a similar impact on students' skills as classrooms with TK and kindergarten combined.
- The benefit of TK for participating children varied little if at all with teachers' specific instructional practices. It may be that what is driving TK's impact is what TK classrooms have in common: highly qualified teachers, alignment with kindergarten, and mixed-income classrooms.

Specifically, the study addresses the following overarching questions:

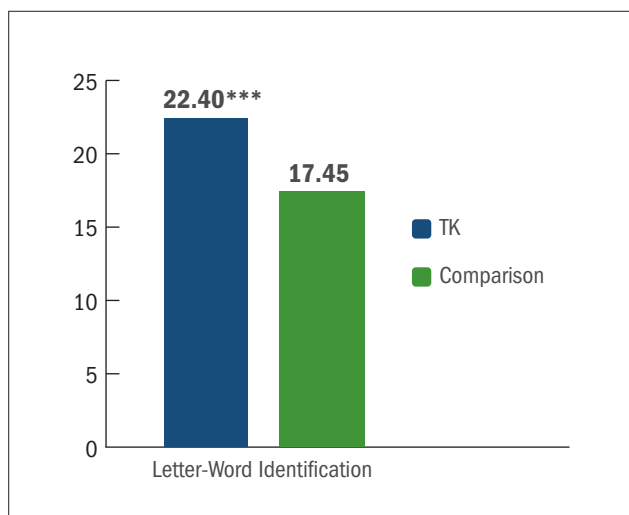
1. Does TK improve kindergarten readiness in the domains of early literacy/language, mathematics, and social-emotional skills?
2. How do impacts vary by student background characteristics, such as gender, English learner status, or poverty status?
3. To what extent are the impacts of TK sustained through the end of kindergarten?
4. What are the characteristics of TK classrooms, and how does the impact of the program vary with differences in these characteristics?

This brief, the sixth in a series highlighting findings from the *Study of California's Transitional Kindergarten Program*, summarizes what we have learned across the study about the impact of TK on students' school readiness skills, whether impacts vary for different student groups, whether those impacts are sustained, and which TK classroom characteristics are most supportive of positive outcomes.

TK Improves Academic Skills and Engagement at Kindergarten Entry

The study found that TK gives students an advantage at kindergarten entry on all academic skills assessed. TK students outperformed comparison students on early literacy and language skills, including letter and word identification (Exhibit 1), phonological awareness, and expressive vocabulary; as well as mathematics skills, such as problem solving (Exhibit 2) and knowledge of mathematical concepts and symbols. These advantages are notable given the large percentage of students (over 80 percent, according to parent report) in the comparison group who attended preschool while TK students were enrolled in TK. TK gave students a six-month learning advantage on letter and word identification and a three-month learning advantage on problem-solving skills in math.

Exhibit 1. Mean Scores for TK and Comparison Students on Letter and Word Identification

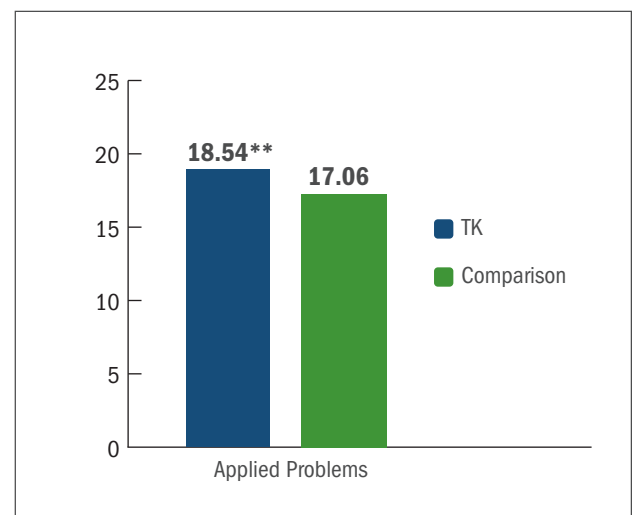


*** $p < .001$

Note. Effect size: 0.480. n -TK = 2,596, n -Comparison = 3,359.

Source: Authors' analysis of student scores on the Woodcock-Johnson Letter-Word test.

Exhibit 2. Mean Scores for TK and Comparison Students on Applied Problems



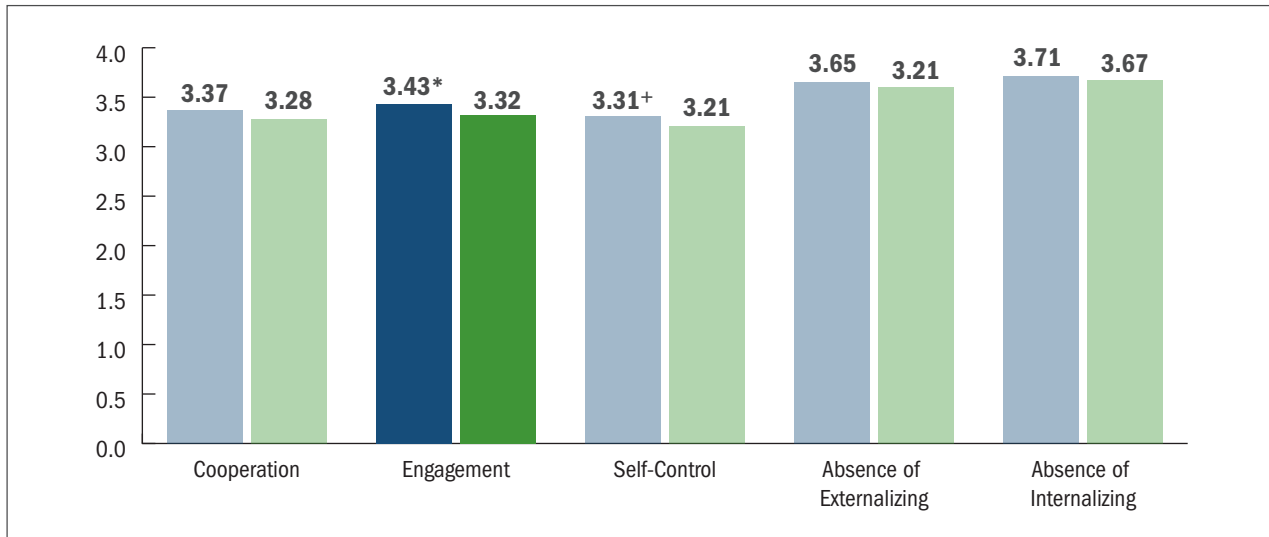
** $p < .01$

Note. Effect size: 0.202. n -TK = 2,607, n -Comparison = 3,435.

Source: Authors' analysis of student scores on the Woodcock-Johnson Applied Problems test.

Students who attended TK were also rated as more engaged by their teachers, compared to their peers (Exhibit 3). However, there were no differences detected between TK and non-TK students on other social skills measured or on executive function, perhaps because other early childhood programs or experiences of comparison students provided a similar focus on social-emotional and behavioral skills.

Exhibit 3. Mean Scores for TK and Comparison Students on Teacher Ratings of Social-Emotional Skills



+ $p < .10$, * $p < .05$

Note. Effect sizes: 0.183 for Engagement and 0.162 for Self-Control. $N_{TK} = 2,223$, $N_{Comparison} = 2,928$.

Lightly shaded bars indicate no statistically significant differences between groups.

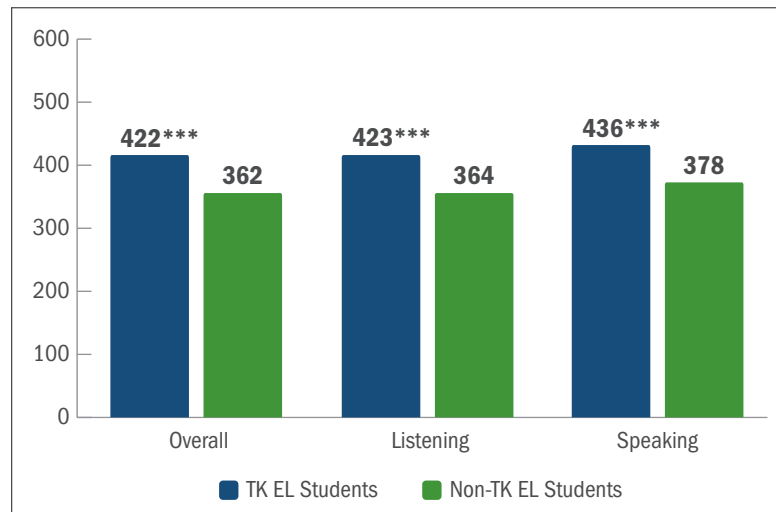
Source: Authors' analysis of teacher responses on the SSIS Rating Scales.

Analyses of the impact of TK for different groups of students suggest that the program is effective for all students. In addition, the program showed a particularly strong impact on math skills for low-income students at kindergarten entry.

Transitional Kindergarten Improves Language, Literacy, and Math Skills for EL Students

The study also looked more closely at effects for English learners (ELs), a group that makes up a notable 33 percent of kindergartners in California. Consistent with overall study results, TK has an impact on EL students' language, literacy, and mathematics skills at kindergarten entry. Statewide data also indicate that TK gives EL students a particularly strong advantage over EL students who did not attend TK in speaking, listening, and overall English language skills as measured by the California English Language Development Test (CELDT) (Exhibit 4). This advantage was found for all language groups tested: Spanish, East Asian, South Asian, Southeast Asian, and West Asian/Middle Eastern languages.

Exhibit 4. Adjusted Mean Scores for TK EL Students and Comparison Students on Overall English Language Skills



*** = $p < 0.001$, n for TK EL students = 15,902; n for non-TK EL students = 38,952

Note. Effect sizes: 0.747 for Overall, 0.685 for Listening, and 0.583 for Speaking.

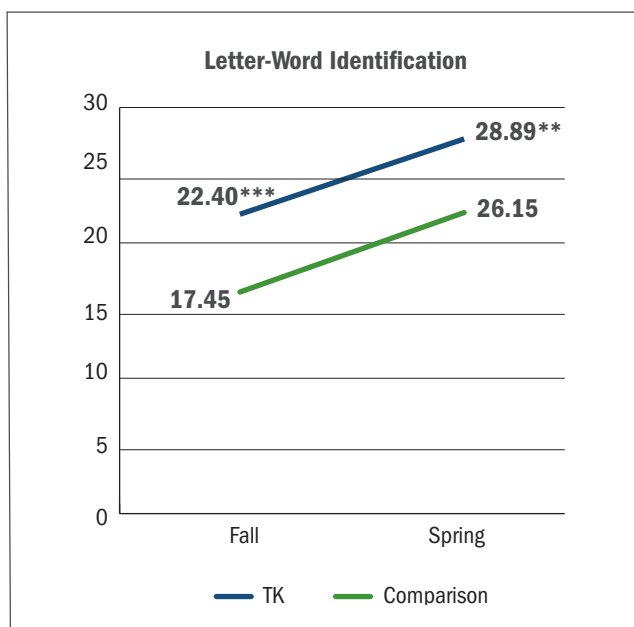
Source: Authors' analysis of student scores on the CELDT.

Impacts of Transitional Kindergarten Are Smaller by the End of Kindergarten

During the kindergarten year, both TK and comparison students showed continued learning, with both groups demonstrating growth at or above what would be expected for their age on letter and word identification, expressive vocabulary, and problem solving in math. However, comparison students showed greater growth during the year, suggesting that they were “catching up” rather than advantages of TK “fading out.” By the end of kindergarten, the only remaining statistically significant impact of TK was on students’ letter and word identification skills (Exhibit 5); marginally significant effects on knowledge of mathematics concepts and symbols and on expressive vocabulary were also observed. It is not unexpected that non-TK students will “catch up” in kindergarten, as teachers may focus their attention on students who need the most support to be ready for first grade. In addition, all students in kindergarten, including those who attended TK, showed more growth on these literacy and mathematics measures when their teachers incorporated more differentiation strategies in the classroom.

The impact of TK on the literacy and math skills of low-income students and on math skills for Hispanic students also persisted through kindergarten. The only negative effect observed was a reduction in teacher-reported self-control skills among Hispanic students at the end of kindergarten. It is unclear what is behind this finding, but it may be related to these students’ specific classroom contexts, including fewer of their peers with pre-K experience (Barnett & Yarosz, 2007; Lindsey & Howard, 2013; Mamedova & Redford, 2015) or highly segregated school environments (Orfield & Ee, 2015), which do not adequately support these students’ continued growth.

Exhibit 5. Adjusted Mean Score Growth on Letter and Word Identification from Fall to Spring of Kindergarten



** $p < .01$; Note. Fall: n -TK = 2,596, n -Comparison = 3,359; Spring: n -TK = 2,518, n -Comparison = 3,317; significance indicators reflect a difference between the TK and comparison groups at one time point (i.e., fall or spring).

Source: Authors’ analysis of student scores on the Letter-Word Identification assessment.

TK is Effective Across Different Structures and Practices

Though they share many characteristics, TK classrooms are not all the same. For example, most are structured as standalone TK classrooms, although about one-quarter have TK students combined in a class with kindergarten students. Most are also full day classes. Teacher-child interactions as measured by the Classroom Assessment Scoring System (CLASS) tool were similar to other pre-kindergarten classrooms; on average, TK teachers provided moderately high-quality instruction in the CLASS domains of Emotional Support and Classroom Organization and received scores in the low to low-mid range on Instructional Support. The use of instructional practices considered to be developmentally appropriate for young students varied notably.

To understand what features of TK programs and classrooms are most effective, the study team examined how the impact of TK varied with these characteristics. Although research on early childhood education quality has shown that student-teacher ratios, teacher-child interactions, and developmentally appropriate instructional practices matter for student learning and growth, our analyses found little variation in the effect of TK by classroom characteristics or instructional quality. That is, the impact of TK on student readiness for kindergarten is similar even when the program is implemented slightly differently in different classrooms.

Conclusions and Considerations

In conclusion, this study indicates that TK is effective for preparing students in the program's target age range for kindergarten by increasing their academic skills more than the early childhood experiences of the comparison group. We also found that TK benefits students from all groups. Some of these benefits persist until the end of kindergarten, although the difference between students who attended TK and students who did not declines over the kindergarten year as non-TK students catch up. The study also found that the impact of TK is notably robust to variations in approach. In other words, characteristics that research has suggested are related to child outcomes in early childhood education programs, in general, did not moderate the effect of TK in this study's analyses. It may be that the features that all TK programs have in common—bachelor's degree-level teachers with kindergarten teaching experience, curricula and classrooms that facilitate transitions to kindergarten, and classrooms that are inclusive of students at all family income levels—are what drive TK's impact.

Findings of this evaluation suggest that TK should continue to be offered as a “universal” program—that is, available to students from all socio-economic groups. Though results provide limited guidance regarding specific classroom practices, preliminary analyses of kindergarten classroom practices suggest that differentiated instruction may be important to continue supporting the learning and growth of all students. Additional research is needed to better understand the mechanisms driving TK's effectiveness and whether it will lead to longer-term benefits for students.

Even with these positive impacts, there is room to improve TK in California. First, the lack of impact on executive function and many social-emotional outcomes suggests that more attention could be given to these developmental skills and behaviors in TK classrooms. In addition, there is more work to be done to support the continued learning of TK graduates in kindergarten and beyond.

Study Methodology

Findings in this report are based on analysis of data from two cohorts of students: students who entered kindergarten in the fall of 2014 and those who entered kindergarten in the fall of 2015 who were born close to the Dec. 2 birth date cut off for TK eligibility. Both cohorts included students who were eligible for TK (born before Dec. 2, in this sample between Oct. 2 and Dec. 2) and students who were not eligible for TK (born after Dec. 2, in this sample between Dec. 3 and Feb. 2). Twenty California school districts and 168 elementary schools, sampled to be broadly representative of the regions and students in California, participated in the study. We also obtained data for all English learners in the state on the California English Language Development Test (CELDT).

Academic outcomes directly assessed included mathematics skills of counting, basic mathematical operations, and problem-solving skills (Woodcock-Johnson Applied Problems assessment), and understanding of mathematical symbols and measurement (Woodcock-Johnson Quantitative Concepts). Language and literacy outcomes included phonological awareness [Clinical Evaluation of Language Fundamentals Preschool-2 (CELF-2P Phonological Awareness)], expressive vocabulary (CELF-2P Expressive Vocabulary), and letter and word identification (Woodcock-Johnson Letter-Word Identification). Executive function was directly assessed through the Head Toes Knees Shoulders (HTKS) task. Teachers also completed questionnaires to rate students on their social skills, using items from the Social Skills Improvement System-Rating Scales (SSIS). In addition, districts provided demographic data on study students, including special education status, free or reduced-price lunch eligibility, and gender; we also gathered parent education and early childhood program participation information from parent surveys.

The study team used a regression discontinuity (RD) approach to compare outcomes for students who were eligible for TK (those born between Sept. 2 and Dec. 2) with students with birth dates just on the other side of the Dec. 2 cutoff date. These younger students (the “non-TK” group) entered kindergarten at the same time as the TK students but without the TK experience. The RD method controls for age such that differences detected in outcomes cannot be attributed to the small differences in age between the groups. All models controlled for available student demographic characteristics and clustered standard errors to account for clustering of students within schools. This study's design enables researchers to attribute differences in outcomes between TK students and non-TK students to participation in TK, though the generalizability of the results to students outside of the narrow age range around the cutoff date may be limited.

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About the Study

In 2010, then-Governor Arnold Schwarzenegger signed the Kindergarten Readiness Act into law, moving up the date by which students must turn five years of age to enter kindergarten, aligning California's kindergarten enrollment policy with the policies of most other states in the country, and creating the transitional kindergarten (TK) program for young 5-year-olds affected by the change. To determine whether TK is effective in improving school readiness and learning outcomes for students, American Institutes for Research conducted an evaluation of the impact of TK in California. The goal of this study was to assess the impact of TK on California students' readiness for kindergarten across multiple domains of development critical for success in school. Using a regression discontinuity design, this study examined whether TK participation improves kindergarten readiness in the domains of early literacy and language, mathematics, executive function, and social-emotional skills. Funding for this study was provided by the Heising-Simons Foundation, the David and Lucile Packard Foundation, and First 5 California.

More information about the study is available at <http://tkstudy.airprojects.org>.

About AIR

Established in 1946, with headquarters in Washington, D.C., American Institutes for Research (AIR) is an independent, nonpartisan, not-for-profit organization that conducts behavioral and social science research and delivers technical assistance both domestically and internationally. As one of the largest behavioral and social science research organizations in the world, AIR is committed to empowering communities and institutions with innovative solutions to the most critical challenges in education, health, workforce, and international development.

AIR's early childhood development research focuses on evaluating programs and policies, improving professional development, examining accountability and assessment systems, investigating program quality and classroom practices, and translating research to practice to aid young children and their families.



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