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FEATURE ARTICLES: THEORY, RESEARCH, POLICY, AND PRACTICE

Increasing the College Preparedness of At-Risk Students

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GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs) emerged in the late 1990s as a comprehensive outreach program seeking to enhance awareness of and readiness for college among low-income middle school students. After controlling for students' preprogram test scores and school characteristics, findings indicate that students participating in GEAR UP and in a comparison group gained in their reading and mathematics test scores. Analyses, however, found no statistically significant 2-year effects of program participation on students' reading scores, al-

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Over the past 30 years, a number of private organizations and state- and federal-level agencies have implemented a variety of college preparation and outreach programs all intended to increase the likelihood that the children of low-income parents will be ready for college at rates comparable to those of their more affluent peers. The public and private financial commitment to this goal has been substantial, and yet low-income students' level of preparation for college and college-going rates remain substantially below those of their counterparts from middle- and upper-income families (Cabrera, Burkum, & La Nasa, 2005; Mortenson, 2001; Perna, 2002; Terenzini, Cabrera, & Bernal, 2001).

The atomistic nature of most of the intervention strategies is increasingly being recognized as a possible culprit for this disparity in college participation rates (e.g., Gándara & Bial, 2001; Perna, 2002; Perna & Swail, 1998). Mounting research indicates that a student's decision to go to college, and his or her eventual ability to secure some sort of a postsecondary degree, are the result of a complex process that begins at the seventh grade, if not earlier. This research also shows that students are more likely to become aware of and ready for college when parents, schoolteachers and administrators, peers, and the community itself work together with the students (e.g., Cabrera et al., 2005; Cabrera & La Nasa, 2001; Hossler, Schmit, & Vesper, 1999; Kirst & Venezia, 2004; McDonough, 1997). In contrast to the systematic and longitudinal process students and their families go through when making college-choice decisions, most of the intervention efforts target specific elements or phases of the search and selection process (e.g., afterschool programs, tutoring in selected subjects, Big Brother/Sister programs, parental involvement efforts, financial aid advising).

This lack of alignment between outreach programs and research has been dramatically documented by two recent studies. Perna (2002), for instance, examined the extent to which 1,110 precollege outreach programs, aimed at four groups of students, reflect 11 known predictors of college enrollment. She found that only about 25% of the programs targeting low-income, first-generation, and historically underrepresented groups contained components that addressed 5 of the most critical predictors of college enrollment. Less than 6% of the programs she examined contained all 11 predictors of success. Gándara and Bial (2001) note that the lack of evaluation sharply limits assessment of these outreach programs' effectiveness. After reviewing 33 precollege programs, the authors concluded that attrition, lack of evidence on academic achievement, and the absence of longitudinal data on the students served severely limit our understanding of what works and what does not.

Although evaluation efforts have not documented the longitudinal effectiveness of such programs in contributing to those predictors relevant to college enrollment, analyses of national survey samples reveal that higher academic achievement, among other factors, strongly predicts the likelihood of college enrollment. In addition, research on college choice has documented the complex process parents and students undergo in becoming aware of and ready for college; a process that begins as early as seventh grade, when parental encouragement plays a major role in initiating the college planning process (Cabrera & La Nasa, 2000; Hossler, Braxton, & Coopersmith, 1989; Nora & Cabrera, 1992), and peaks by ninth grade, when most students have developed educational and occupational aspirations that are contingent on college enrollment (Eckstrom, 1985; Stage & Hossler, 1989). When students develop college plans during or prior to junior high school, it triggers a series of behaviors that puts students in a better position to secure the academic, social, and economic resources needed for the successful accomplishment of that goal. Such students and their parents begin planning for a college-track curriculum, striving to maintain a strong academic record, and collecting information about college costs and ways to pay for them as well as the college application process itself (Hossler et al., 1999; McDonough, 1997).

Despite the saliency of parental encouragement, parental education level, and socioeconomic background, some researchers have found that a student's level of academic preparation for college is not only inversely related to the negative influence of such background characteristics on a student's college destination (Baker & Velez, 1996), but may also be a more important predictor of whether students choose to enroll in a 2-year or a 4-year college (Alexander, Pallas, & Holupka, 1987). Berkner and Chavez (1997) have developed an index of college qualifications that has been shown to be a strong predictor of the chance that a student will enroll in college (Cabrera & La Nasa, 2000). The measures of achievement that are included in the index are high school class rank, GPA, SAT or ACT scores, and the National Educational Longitudinal Study(NELS) aptitude test percentile, with some adjustments added for the rigor or a student's high school curriculum. Furthermore, Adelman (1999) finds academic resources—a measure of high school curriculum, test scores, and class rank information combined into an index—to be one of the most powerful predictors of degree attainment among 4-year college students. Cabrera et al. (2005) concur that the pathway most likely to lead to a 4-year degree involves acquiring high academic resources in high school and entering a 4-year college on high school completion—a pathway rarely taken by low socioeconomic status (SES) students. Clearly, past research has shown that high school academic readiness has great explanatory power in determining college enrollment and success. Other research has indicated that low-income Latino middle school students are at risk of selecting or placing into high school math courses that are not likely to result in adequate preparation for enrollment in 4-year colleges (Swail, Cabrera, Lee, & Williams, 2005; Valadez, 2002).

Recent outreach programs have attempted to bring together the critical players and resources in comprehensive, integrated, and coordinated efforts aligned with empirically based recommendations that suggest that academic readiness for college and awareness of college procedures and options are two fundamental components of college enrollment success (e.g., Gándara & Bial, 2001; Kirst & Venezia, 2004; Perna, 2002; Perna & Swail, 1998; Rendón, 2002;). One of these comprehensive intervention programs (CIPs) is the U.S. Department of Education's Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP). This CIP outreach program is intended to enable nearly 1 million low-income middle school students and their families to learn about, plan for, and prepare for college. The program was designed in large measure to incorporate what the available research literature suggests are successful precollege interventions, with a primary focus on "accelerating the academic achievement of cohorts of students through their high school graduation" (GEAR UP, n.d.). The program funds partnerships of high-poverty middle schools, colleges and universities, community organizations, and businesses to work with entire grade levels of students, beginning not later than the sixth grade and staying with these students through high school. Other projects have some of these same goals and programmatic components, but GEAR UP is unique in working with entire grade cohorts of students, rather than individuals, as the focus of the intervention. In addressing grade-cohorts, the program's strategy is *systemic*, integrating multiple partners in efforts to elevate youngsters' and parents' awareness of college as an option, their college aspirations, and their level of preparedness for college, both academically and financially. Thus, GEAR UP incorporates most of the elements of other interventions, but it does so (at least in its design) in an integrated, collaborative, systemic, and very large national effort. As such, it represents one of a very small handful of CIPs and, thus, is the organizational focus of this research project.

THEORETICAL FRAMEWORK

Cultural and social capital development provides a conceptual basis to support the expectation that CIP-based initiatives will have a positive effect on readiness for college by addressing elements within the school environment known to foster the development of cultural and social capital. Various writers have drawn attention to the importance of social and cultural capital within the school context. According to Bourdieu (1977b), cultural capital derives from one's *habitus*, "a system of lasting, transposable dispositions which, integrating past experiences, functions at every moment as a matrix of perceptions, appreciations, and actions" (pp. 82–83). A child's cultural capital, therefore, consists of those cultural signals, dispositions, attitudes, skills, preferences, formal knowledge, behaviors, goals, and competencies that are both required and rewarded within particular contexts, such as school, to achieve particular outcomes, such as high achievement or high aspirations (Bourdieu, 1977a). A child's social group or class of origin necessarily influences his or her habitus, shaping his or her approach to schooling and educational aspirations.

According to this framework, students of lower socioeconomic status are disadvantaged in the competition for academic rewards because their habitus, or sociocultural environment, may not provide the types of cultural capital required for success in school, such as academic attention, certain linguistic patterns, behavioral traits, orientation toward schooling, high expectations, or encouragement of college aspirations. Lamont and Lareau (1988) contend that lack of access to such cultural capital results in "social and cultural exclusion" (p. 156). Bourdieu emphasizes that schools reproduce existing inequalities by essentially failing to teach students the valued cultural capital necessary to succeed. He acknowledges that by not teaching cultural capital, schools make it "difficult to break the circle in which cultural capital is added to cultural capital" (Bourdieu & Passeron, 1977, p. 493).

Lower income students also lack access to social capital, what Bourdieu defines as a set of durable, deliberate, institutionalized relationships and the benefits that accrue to individuals as a result of the existence of such social bonds (Bourdieu, 2001). Disadvantaged students are thus excluded from the benefits of such relationships and social networks and the kinds of social capital that lead to school success and eventual college enrollment. These networks shape college aspirations and provide information and guidance on what it means to be academically ready for college, what behavioral strategies to employ to get ready, how to prepare for college socially and financially, and how to apply for and make choices about college.

McDonough (1997) applies Bourdieu's concepts to highlight the important influences that the organizational structure and normative culture of the high school context can exert on a student's decision-making about their future. She suggests that schools can make a difference by exposing disadvantaged students to an alternate, organizational habitus, one that provides students and their parents, inside the school context, with the kinds of cultural and social capital that is often experienced by higher SES students both inside and outside the school setting.

By providing a network of services and associated benefits, GEAR UP and similar CIP-based programs enhance low-income students' access to the types of social and cultural capital that may otherwise be unavailable to working-class and racial-minority students. Given that prior research clearly suggests that college readiness begins to take shape in the early middle-school years, GEAR UP represents a CIP model that aims to facilitate the acquisition of important cultural and social capital across whole grades by enabling low SES students and their families to become more aware of and ready for college. Previous research highlights the multiple and intersecting ways that middle- and upper-class students and White students benefit from family-based resources, as well as from their similar and mutually reinforcing school and home environments (Bourdieu & Passeron, 1977; Lareau, 1987; Lareau & Horvath, 1999; Lewis, 2003; McDonough, 1997). GEAR UP tries to develop systemic relationships between and among students, parents, and school staff, to change the habitus, both inside and outside school, so as to promote academic readiness and college awareness.

PURPOSE OF THIS STUDY

As noted previously, academic achievement is one of the most critical predictors of college enrollment, yet we lack longitudinal evidence of the effectiveness of outreach programs in raising academic achievement, or academic "readiness" for college. This study seeks to examine the aggregate, or overall, impact of CIPs on students' preparedness for college, as reflected in their reading and mathematics achievement. In examining the relation between CIP participation and academic achievement, this project seeks to advance current knowledge about the educational attainment process that will benefit all parties concerned—students and parents, schoolteachers and administrators, colleges and universities, and communities and policy makers—as well as help guide future program and policy planning and implementation. Although the schools in this study offering CIP programs are all part of GEAR UP, it is important to be clear that GEAR UP is something of a prototype. This study focuses not on GEAR UP per se, but rather on the outcomes associated with the philosophical, policy, and structural concepts and kinds of activities and services that it embodies.

METHOD

Sample Selection

The original research design called for the selection of states with a large concentration of CIP partnerships. Particular attention was placed on the availability of school characteristics and readiness indicators in a format that would allow following up the performance of grade cohorts on those indicators within each school across time. After all, the effort of CIP partnerships is directed toward cohorts of students as they move from one grade to the next (e.g., from sixth grade to seventh grade). Of the five states considered, California[1] met our selection criteria most clearly. Between 1999 and 2000, 34 of 237 GEAR UP partnership awards went to California. The California Department of Education's (2001) Web site is also rich in indicators of school and students' readiness for college.

Databases

Analyses draw on two data sources maintained by the California Department of Public Instruction and that are publicly available on the Department's Web site (www.cde.ca.gov). The first data source is the Standardized Testing and Reporting

[1]California (34 partnerships), Texas (19), Florida (18), New York (13), Oklahoma (13), and Kansas (10) were our prime candidates.

(STAR) system. STAR database contains information at the grade-within-school level on student performance on the Stanford-9 tests administered in all public schools statewide between 1998 and 2002. The Stanford-9 is a nationally norm-referenced exam. Although some critics caution that such tests are not a valid measure of achievement, they—like the SAT, ACT, and NELS aptitude test—have nevertheless been shown to be highly associated with college enrollment and attainment outcomes. The specific test areas for which we have data include reading, mathematics, language arts, and spelling.

The second database is California's Academic Performance Index (API), which contains a rich array of student and school personnel characteristics at the school level. API databases are available since 1999. School-specific identifying codes allow for merging information from both databases.

Unit of Analysis

The analytical focal group in this study is cohorts of sixth graders attending California public schools in the fall of 1999. Our research plan called for following cohorts from Grade 6, a year before the GEAR UP partnerships began operation, to Grade 12. It was assumed that this strategy would allow us to partition long- and short-term effects associated with CIP-based activities. The vast majority of GEAR UP schools, however, were middle schools, serving only Grades 6, 7, and 8. Consequently, our target GEAR UP population was narrowed to those schools that served sixth to eighth graders from 1999 to 2001. We also made certain that the measures of readiness were consistently applied during our study's period of time. In 2003, the Stanford-9 test was replaced by the California Achievement Test (see http://star.cde.ca.gov/star2003).

The ability to compare across similar schools was mandated by the first statewide accountability system for California's public schools, the Public School Accountability Act (PSAA), enacted into law in California in 1999. One of the main components of the PSAA was the creation of the API.[2] The API is a numeric index for each school that ranges from 200 to 1,000. Results from the STAR program are used to calculate the baseline APIs for each school and to set annual targets for growth. The PSAA also requires the ability to compare academic progress across schools that face similar challenges. The School Characteristics Index[3] in use in California was created to group similar schools and is a composite measure of several demographic and background characteristics that include, but are not limited to, pupil mobility, pupil ethnicity, pupil socioeconomic status, teacher's credentials, average class size at each grade level, and percentage of students who are English language learners. The California Department of Education Web site al-

[2]http://www.cde.ca.gov/psaa/api/api0203/base/infog02b.pdf
[3]http://www.cde.ca.gov/psaa/tech0400.pdf

lows for the retrieval of a list of 100 similar schools for any given school. This list contains the API scores for each of the schools and, in effect, provides for comparison of academic progress across schools while controlling for several demographic and background characteristics.

Schools

The selection of the peer schools was the product of a three-stage process involving: (a) retrieval of a list of 100 similar schools for each of the GEAR UP schools, (b) selecting the five schools with API scores closest to that of the target GEAR UP school, (c) elimination of GEAR UP schools as peers (i.e., no GEAR UP school could be a peer for another GEAR UP school), and schools that did not appear on the target school's 100 similar school list in each of the years under study.

The original selection criteria yielded 180 California schools as our targets of analysis. Following recommendations from the hierarchical linear modeling (HLM) literature (e.g., Hox, 2002; Little, Schnabel, & Baumert, 2000), we searched for potential outliers in both readiness measures (i.e., math, reading). On the math test, 13 schools (3 CIP and 10 nonCIP) had standardized residuals in either 1999–2000 or 2000–2001 that were over 2 standard deviation units above or below the mean. Eighteen schools (7 CIP and 11 nonCIP) showed standardized residuals in either 1999–2000 or 2000–2001 that were more than 2 standard deviation units above or below the mean in scaled reading scores. Additional schools were excluded because they lacked information in either school characteristics or readiness measures across the 1999–2001 period of study. As a result of this selection process, 107 and 112 middle schools were retained to examine the impact of CIP-based initiatives on measures of readiness in reading and math, respectively.

Variables

The two dependent variables in this study were the mean scaled scores on the Stanford-9 tests in reading and mathematics when these cohorts of students were in the sixth, seventh, and eighth grades. The mean scale scores take into account item difficulty and are recommended by the California Department of Education for assessing changes in academic performance across time (see 1998 California's STAR report[4]).

Schools in CIP programs were coded as 1, and peer schools were coded as 0. The percentage of teachers fully certified, percentage of students participating in the free or reduced-price lunch programs in the school, and the percentage of parents who had some college or were college educated were used as control variables

[4]The 1998 California STAR report is available at http://star.cde.ca.gov/star2000f/reporthelp_b.html

TABLE 1
Descriptive Statistics

	1999		2000		2001	
Factors	*M*	*SD*	*M*	*SD*	*M*	*SD*
Readiness						
Mean scaled reading scores	638.20	8.73	653.45	10.15	670.32	9.15
Mean scaled math scores	638.55	9.45	655.13	9.45	665.81	9.27
	1999 School Pool					
	M	*SD*				
School characteristics						
% Parents college educated	38.3	16.9				
% Teachers fully certified	78.2	12.6				
% Students with free or subsidized lunches	74.4	15.8				

for school characteristics. Teacher certification, a measure of teacher quality (Kaplan & Owin, 2001), has been found to be the most consistent and best predictor of student achievement in math and reading, next to students' levels of poverty, minority status, and English proficiency (Darling-Hammond, 2000; Lee, Smith, & Croninger, 1997). While examining determinants of the path to college followed by members of the 1988 eighth-grade cohort, Cabrera and La Nasa (2001) found that children of college-educated parents were more likely to acquire higher levels of academic preparation. Poor performance in standardized tests is also significantly associated with the percentage of students receiving subsidized lunches (National Research Council, 1999). All school-based characteristics were extracted from the 1999 API database. Table 1 reports the descriptive statistics for the variables employed in this study.[5]

Research Design

This study employs a multilevel, repeated-measures design and analytical procedures to examine the effects of exposure to CIP programs and activities on two measures of readiness for college. This analytical strategy is highly suited to examining the effects attributable to different levels of data aggregation, in this case

[5]Although three measures of school characteristics are employed in this analysis, it is important to remember that the methods for selecting peer institutions—use of the API and SCI—essentially provide controls for numerous other school characteristics.

grades nested within schools (Hox, 2002; Little et al., 2000; Raudenbush & Bryk, 2002; Snijders & Bosker, 2002). At Level 1, changes in readiness are assumed to be the by-product of individual growth trajectories due to transitions from sixth to seventh grade and from seventh to eighth grade. At Level 2, changes in readiness across grade levels are presumed to be the result of school characteristics, including participation in CIP programs. In short, this model simultaneously takes into account both time and school effects on readiness for college (see Hox, 2002; Little et al., 2000; Raudenbush & Bryk, 2002; Snijders & Bosker, 2002). All statistical analyses are based on HLM procedures for Windows (Version 5.05; Raudenbush, Bryk, Cheng, & Congo, 2001).

Following recommendations by Snijders and Bosker (2002), a three-stage procedure was used in estimating the effect of both growth trajectories and school characteristics. A model assuming that changes in readiness scores could be accounted for only by changes in grades from sixth through eighth was first estimated. This model provides a baseline for assessing whether the remaining, unexplained variation in readiness scores that exists across schools could be explained by school characteristics and participation in CIP programs. The second model introduces schools characteristics. In so doing, this model views changes in readiness as the by-product of both changes in grades from sixth to eighth and school characteristics. This model, known as a fixed occasions or compound symmetry model (see Snijders & Bosker, 2002), also presumes that the effects of each grade do not vary across schools. The third model, known as a random slopes model, assumes that the effect of each of the three grades under consideration varies across schools. HLM, with the full maximum likelihood option, was employed for all models. Tests of changes in scaled deviances were conducted to assess each competing model. For instance, contrasting the scaled deviance of Model 2 versus the one for Model 1 provides an indication of whether school characteristics by themselves contribute to explaining changes in readiness measures for college above and beyond what transition across grades does explain. Table 2 displays the equations for each model.

RESULTS

All data, including the Stanford-9 reading and math test scores (the dependent variables) come from the Web site of the Policy and Evaluation Division of the California Department of Education. Tables 3 and 4 show the results of testing alternative models for mean-scaled scores in reading and math.

Under the baseline model, the intraclass correlations for reading and math are large ($\hat{\rho}_{\text{READING}} = 0.91$ and $\hat{\rho}_{\text{MATH}} = 0.89$). About 90% of the variance in scaled reading and math scores can be attributed to school characteristics. These two

TABLE 2
Models Tested

Baseline Model	*Fixed Occasions Model*	*Random Slopes Model*
Level 1 $Y = \beta_0 + \beta_1 \cdot 7thGrade + \beta_2 \cdot 8thGrade + \gamma$	Level 1 $Y = \beta_0 + \beta_1 \cdot 7thGrade + \beta_2 \cdot 8thGrade + \gamma$	Level 1 $Y = \beta_0 + \beta_1 \cdot 7thGrade + \beta_2 \cdot 8thGrade + \gamma$
Level 2 $\beta_0 = \gamma_{00} + \mu_0$ $\beta_1 = \gamma_{10}$ $\beta_2 = \gamma_{20}$	Level 2 $\beta_0 = \gamma_{00} + \gamma_{01} \cdot CIP + \gamma_{02} \cdot PARENT +$ $\gamma_{03} \cdot TEACHER + \gamma_{04} \cdot LUNCH + \mu_0$ $\beta_0 = \gamma_{10} + \gamma_{11} \cdot CIP + \gamma_{12} \cdot PARENT +$ $\gamma_{13} \cdot TEACHER + \gamma_{14} \cdot LUNCH$ $\beta_{20} = \gamma_{20} + \gamma_{21} \cdot CIP + \gamma_{22} \cdot PARENT +$ $\gamma_{23} \cdot TEACHER + \gamma_{24} \cdot LUNCH$	Level 2 $\beta_0 = \gamma_{00} + \gamma_{01} \cdot CIP + \gamma_{02} \cdot PARENT +$ $\gamma_{03} \cdot TEACHER + \gamma_{04} \cdot LUNCH + \mu_0$ $\beta_0 = \gamma_{10} + \gamma_{11} \cdot CIP + \gamma_{12} \cdot PARENT +$ $\gamma_{13} \cdot TEACHER + \gamma_{14} \cdot LUNCH$ $\beta_{20} = \gamma_{20} + \gamma_{21} \cdot CIP + \gamma_{22} \cdot PARENT +$ $\gamma_{23} \cdot TEACHER + \gamma_{24} \cdot LUNCH + \mu_1$

large intraclass correlations argue on behalf of including variables that can capture the contribution of the school itself in changes in math and reading across grades.

The chi-square tests for the difference between the fixed occasions model and the baseline model shows a significant improvement of fit for the fixed model relative to the baseline model for both reading ($\chi^2_{reading}$ = 1,938 – 1,801 = 135, *df* = 17 – 5 = 12, $p < .00$) and math (χ^2_{math} = 2,064 – 1,984 = 80, *df* = 17 – 5 = 12, $p < .00$). Furthermore, the amount of unexplained variance across schools went down from 79.5 to 28.4 (see school-level variance row in Table 3), in the case of reading, and from 79.8 to 45.0, in the case of math (see school-level variance row in Table 4), once school characteristics variables were taken into account. In other words, school characteristics and CIP-based programs explained around 64% and 44% of the variance in reading and math scores, respectively, across schools.

The hypothesis stating that grade levels have a differential effect across schools is not tenable. No significant change in chi-square tests was observed between the fixed occasions model and the random slopes model across both reading ($\chi^2_{reading}$ = 1,803 – 1,800 = 3, *df* = 19 – 17 = 2, $p > .5$) and math (χ^2_{math} 1,984 – 1,980 = 4, *df* = 19 – 17 = 2, $p > .5$). Consequently, the fixed slope model (Model 2) was retained in examining the impact of CIP-programs on the two measures of readiness across grades.

TABLE 3
Results of Alternative Models for Mean Scaled Reading Scores

Model	*School-Level Variance*[a]	*Grade-Level Variance*[b]	*Deviance*	*df*
Baseline	79.507	7.803	1938.000	5
Fixed occasions	28.391	6.784	1802.611	17
Random slopes	28.523	6.289	1799.982	19

Note. [a]τ^2. [b]σ^2

TABLE 4
Results of Alternative Models for Mean Scaled Math Scores

Model	*School-Level Variance*[a]	*Grade-Level Variance*[b]	*Deviance*	*df*
Baseline	79.811	9.011	2063.687	5
Fixed occasions	44.993	8.297	1983.554	17
Random slopes	51.380	7.093	1979.721	19

Note. [a]τ^2. [b]σ^2

Tables 5 and 6 present the results of the multilevel repeated measures. On average, and across all schools, students' reading and math scores improved significantly from Grades 6 through 8. By the end of the seventh grade, and irrespective of participating in CIP programs, students had increased their reading scores by 21.3 points. By the end of the eighth grade, all students displayed a significant gain of 30.5 points in relation to their corresponding scores in the sixth grade (see Table 5). In math, by the end of the seventh grade, students had increased their scores by 21.4 points. One grade later, all students displayed a significant gain in math skills of 24.7 points in relation to their corresponding scores in the sixth grade (see Table 6). In other words, holding constant school characteristics and participation in CIP programs, students, on average, increased their readiness levels as they moved from Grades 6 through 8.

Consistent with the school effectiveness literature, the percentage of teachers fully certified and the percentage of students participating in subsidized lunch both had a significant effect on the study's two measures of college readiness. In general, cohorts tend to perform lower in reading and math when the proportion of students receiving subsidized lunches increases, whereas the opposite is true when the proportion of fully certified teachers in their schools increases (see Tables 5 and 6).

TABLE 5
Effects of Time, Participation in CIP, and School Measures on Students' Reading Scaled Scores on the Stanford-9 Test

	Coefficient	*SE*
6th Grade *M* for nonCIP (γ_{00})	623.639**	6.067
CIP vs. nonCIP (γ_{01})	–2.628*	1.244
Teachers certified (γ_{02})	0.178**	0.042
Students in lunch programs (γ_{03})	–0.127**	0.046
Parent education (γ_{04})	0.293**	0.046
Growth in 7th grade (γ_{10})	21.286**	5.000
CIP versus nonCIP (γ_{11})	–0.617	0.832
Teachers certified (γ_{12})	0.063*	0.029
Students in lunch programs (γ_{13})	–0.110**	0.038
Parent education (γ_{14})	–0.072	0.031
Growth in 8th grade (γ_{20})	30.531**	5.516
CIP versus nonCIP (γ_{21})	–0.547	0.848
Teachers certified (γ_{22})	0.037**	0.032
Students in lunch programs (γ_{23})	0.005**	0.044
Parent education (γ_{24})	–0.041	0.035

Note. CIP = comprehensive intervention program; SE = standard error.
$^*p < .05$. $^{**}p < .01$.

TABLE 6
Effects of Time, Participation in CIP, and School Measures on Students' Math Scaled Scores on the Stanford-9 Test

	Coefficient	*SE*
6th Grade *M* for nonCIP (γ_{00})	632.107**	8.512
CIP versus nonCIP (γ_{01})	–0.998	1.766
Teachers certified (γ_{02})	0.204**	0.062
Students in lunch programs (γ_{03})	–0.190**	0.066
Parent education (γ_{04})	0.122	0.066
Growth in 7th grade (γ_{10})	21.373**	4.204
CIP versus nonCIP (γ_{11})	2.048**	0.810
Teachers certified (γ_{12})	0.056*	0.026
Students in lunch programs (γ_{13})	–0.081*	0.033
Parent education (γ_{14})	–0.097	0.028
Growth in 8th grade (γ_{20})	24.676**	5.509
CIP versus nonCIP (γ_{21})	1.184	1.053
Teachers certified (γ_{22})	0.075*	0.031
Students in lunch programs (γ_{23})	–0.017	0.043
Parent education (γ_{24})	–0.060	0.033

Note. CIP = comprehensive intervention program; SE = standard error.
$^*p < .05$. $^{**}p < .01$.

Figures 1 and 2 display the growth trajectories for both math and reading across grades while holding constant school characteristics at their mean value across all California schools.

In the case of reading, nonCIP schools slightly outperformed CIP schools at the sixth grade, just before CIP funding began (see Table 5 and Figure 1). This difference was nonetheless statistically significant after controlling for parents' education, the percentage of students eligible for free and reduced-price lunches, and the percentage of teachers in the school who were fully certified. By the end of the seventh grade, no significant differences were noted between CIP and nonCIP schools. As can be seen in Figure 1, the growth trajectories for both types of schools were similar starting at Grade 7, although the trend line for CIP programs from sixth to seventh grade, in comparison with the nonCIP peer schools, is in the hypothesized direction.

In math, and before CIP funding began, CIP schools performed slightly lower than their peer schools in math; this difference, however, was not statistically significant net of other school factors and parents' education. By the end of the seventh grade, the year in which CIP had begun, CIP schools slightly but significantly outperformed their nonCIP counterparts in math. The magnitude of growth favored CIP schools by a 2.05 mean-scaled math score (see Table 6 and Figure 2). By the end of the eighth grade, CIP schools outperformed their counterparts by a 1.2

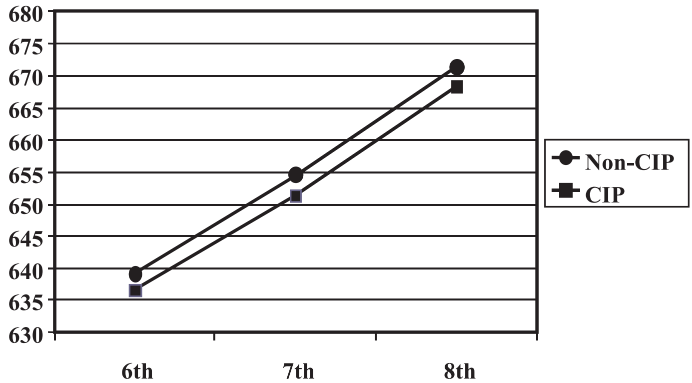

FIGURE 1 Mean reading scores across grades.

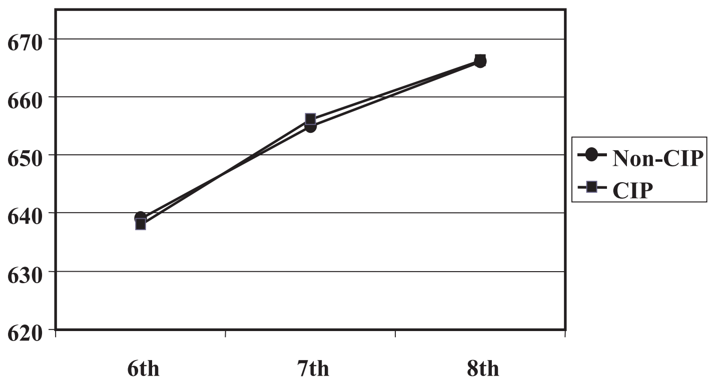

FIGURE 2 Mean math scores across grades.

mean-scaled math score. This advantage, however, was not statically significant (see Table 6 and Figure 2).

DISCUSSION

Any of several reasons might account for the findings regarding the lack of an effect of CIP on reading as well as by the lower-than-anticipated performance in both reading and math displayed by CIP sixth graders. To begin, the small number of cases, particularly in CIP schools, in each grade level can produce statistical power attenuation. Also, the effects of CIP programs may well be cumulative, and the 2-year CIP effects period studied here may not be long enough for small (if real) effects to manifest themselves. Finally, only the *overall* impact of CIP activities at the school level could be estimated in this study. The potential differential effects of the number, kinds, and intensities of CIP programs and activities are unexamined in this study. Thus, the *relative* impact of the CIPs different programmatic components at the school and partnership levels remains to be explored

Given the CIPs' holistic and sustained approach to readiness for college, one might expect students participating in CIP schools to show a higher rate of growth in both their reading and math test scores. The results suggest that, in reading, the CIP activities and services appear to have had some effect, but the gains are modest and not statistically significant, at least over the 2 years studied here. It is noteworthy, however, that the trend is in the hypothesized direction, and the lag in reading performance, favoring nonCIP versus CIP schools, disappeared once the schools' participation in CIP programs began. In math, however, CIP students appear to have gained at a higher rate in both Grades 7 and 8 than did their peers not exposed to CIP interventions. The gains are consistently positive in both years although reaching a statistically significant level only for Grade 7.

Does participation in CIP programs enhance students' college readiness in reading and math across school grades? Although the results of this study are more suggestive than conclusive in answering that policy question, they provide evidence that comprehensive and coordinated intervention programs may, indeed, be more effective than traditional approaches to promoting the reading and math skills of low-income students as they progress toward college entry.

CONCLUSIONS

Comprehensive efforts to intervene in ways that will affect children's middle school environment—the organizational habitus in which they learn and achieve on a daily basis—can have important consequences. This study sought to ascertain how multiple interventions might provide access to forms of cultural and social capital that are usually unavailable to low-income students, thereby improving students' performance and increasing college readiness. CIPs are extensive in their reach and touch the lives of over a million students each year. However, the nature of the available data leaves researchers with statistically small numbers of units to analyze. Nevertheless, given the small sample size in this study, the fact that the differences found are significant even after controlling for school-related factors suggests that CIPs are contributing something real to students' college readiness.

Because these analyses represent the first controlled study that examines the impact of CIP programs on two objective measures of readiness, these results signal the importance of further research, particularly in understanding the impact of CIPs on math achievement, a factor shown to be important in subsequent college success (Adelman, 1999). The impact of CIPs may be greater in the first year than in succeeding years. Clearly, evidence from more than 2 years will be needed to test this proposition. However, the findings suggest that the CIPs studied have closed the performance gap in math and even provided a statistically significant advantage to CIP students over their counterparts in similar, nonCIP schools. Furthermore, although this study finds important aggregate effects, getting inside the 'black box' regarding the type of specific services provided and their effects is a worthy task for future research. For example, preliminary analyses of GEAR UP partnerships nationally suggest that service-providers tend to focus academic services more on math than on reading.

Furthering our understanding of what can be done to improve students' math preparation at a relatively early time in their schooling would be no minor accomplishment. Adelman (1999) finds that a combined measure of students' high school curriculum and academic performance exhibits one of the strongest influences on successful college completion, and "of all the components of curriculum intensity and quality, none has such an obvious and powerful relationship to ultimate completion of degrees as the highest level of mathematics one studies in high school" (Adelman, 1999, p. 16). In particular, students' exposure to math beyond Algebra 2 is one of the most important influences on bachelor's degree attainment, because students with better math skills can be expected not only to do better at each successive grade level, but consequently, to take more math courses as they move toward their senior year in high school. Therefore, the improvements that CIPs can foster among middle-school children can potentially set them on a path toward college enrollment and success—a path that may be very different from the one they were on before the intervention.

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