Bridging the Gap

An Impact Study of Eight Developmental Summer Bridge Programs in Texas

Elisabeth A. Barnett
Rachel Hare Bork
Alexander K. Mayer
Joshua Pretlow
Heather D. Wathington
Madeline Joy Weiss

JUNE 2012

THE DEVELOPMENTAL SUMMER BRIDGE PROJECT

National Center for Postsecondary Research
www.PostsecondaryResearch.org

Bridging the Gap

An Impact Study of Eight Developmental Summer Bridge Programs in Texas

Elisabeth A. Barnett
Community College Research Center

Rachel Hare Bork
Community College Research Center

Alexander K. Mayer
MDRC

Joshua Pretlow
University of Virginia, Curry School of Education

Heather D. Wathington
University of Virginia, Curry School of Education

Madeline Joy Weiss
Community College Research Center

with

Evan Weissman, MDRC
Jedediah Teres, MDRC
Matthew Zeidenberg, Community College Research Center

June 2012

National Center for Postsecondary Research
www.PostsecondaryResearch.org

The National Center for Postsecondary Education is a partnership of the Community College Research Center, Teachers College, Columbia University; MDRC; the Curry School of Education at the University of Virginia; and faculty at Harvard University.

The National Center for Postsecondary Research (NCPR) was established by a grant (R305A060010) from the Institute of Education Sciences of the U.S. Department of Education. The Texas Developmental Summer Bridge Programs Study is supported by NCPR and by Houston Endowment.

The contents of this report were developed under a grant (R305A060010) from the Institute of Education Sciences, U.S. Department of Education. However, those contents do not necessarily represent the policy of the Institute or the U.S. Department of Education, and you should not assume endorsement by the federal government. The findings and conclusions in this report do not necessarily represent the official positions or policies of the funders.

For information about NCPR and NCPR publications, visit www.postsecondaryresearch.org.

Overview

Developmental summer bridge programs are a popular strategy for increasing college readiness among recent high school graduates. Aimed at providing an alternative to traditional developmental education, these programs provide accelerated and focused learning opportunities in order to help students acquire the knowledge and skills needed for college success.

The current study uses an experimental design to evaluate the outcomes of eight developmental summer bridge programs offered in Texas during the summer of 2009. At each college, students who consented to participate in the study were randomly assigned to either a program group that was eligible to participate in a developmental summer bridge program or a control group that was eligible to use any other services that the college provided. Based on a program model developed by the Texas Higher Education Coordinating Board, the developmental summer bridge programs in this study included four common features: accelerated instruction in developmental math, reading, and/or writing; academic support; a "college knowledge" component; and the opportunity to earn a $400 stipend.

After two years of follow-up, these are the main findings of this study:

- The programs had no effect on the average number of credits attempted or earned. Program group and control group students attempted the same number of credits (30.3). Students in the program group earned an average of 19.4 credits, and students in the control group earned an average of 19.9 credits; the difference in their outcomes is not statistically significant.

- The programs had an impact on first college-level course completion in math and writing that was evident in the year and a half following the program but no impact on first college-level course completion in reading during this same period. On average, students in the program group passed their first college-level math and writing courses at higher rates than students in the control group during this period. By the end of the two-year follow-up period, however, the differences between the two groups are no longer statistically significant.

- There is no evidence that the programs impacted persistence. During the two-year follow-up period, students in the program group enrolled in an average of 3.3 semesters, and students in the control group enrolled in an average of 3.4 semesters, a difference that is not statistically significant.

Contents

Appendix

List of Exhibits

Table

Figure

Box

Preface

Nationally, a significant portion of college students are deemed unprepared for college-level work in at least one subject area and are required or encouraged to enroll in developmental programs. A subset of these students — those with especially weak academic skills — must often complete two or more semesters of remedial coursework before attempting college-level courses in the relevant subject areas. But there is growing evidence that lengthy sequences of remedial coursework may not be beneficial for students. Few students who embark on a multi-course sequence complete those courses, and even fewer earn a postsecondary credential.

As a result, many colleges are pursuing innovative alternative approaches to developmental education that aim to accelerate students' progress in gaining important academic competencies. Summer bridge programs are one such approach. They offer underprepared students a chance to advance toward college-level coursework during the summer before they begin college. In the past several years, summer bridge programs have grown increasingly popular as a strategy for providing students with the knowledge and skills required for college success. Until recently, however, there has been little rigorous empirical research on their effectiveness.

NCPR's study of eight developmental summer bridge programs in Texas is the first on this subject to employ an experimental design. Using a randomized controlled trial, this study examined the impact of program participation over the course of two years — long enough to make some meaningful observations about how the programs influenced student outcomes in college. It is clear from the study's results that the program model was more successful in achieving short-term gains than it was in realizing long-term advantages for students. Program group students were more likely than control group students to pass their introductory college-level math and writing courses during the first few semesters in college after participation, but these higher rates of first college-level course completion began to diminish in the final semesters of the two-year follow-up period. Moreover, program group students were no more likely than control group students to persist in college or to earn more credits.

In exploring the meaning of these findings, the authors consider their implications for short-term programmatic interventions in general. If the developmental summer bridge programs in this study — which were well-established and well-implemented — produced only modestly positive effects that began to fade after a few semesters, can we reasonably expect any type of short-term intervention to have sizeable long-term effects? And if not, how can students best be offered the support they need as they work toward their long-term

academic goals? These considerations, along with the study's findings, will be of interest to policymakers and college leaders looking to reduce the time students spend in developmental education and increase the number of students who finish college.

Thomas Bailey
Director, NCPR

Acknowledgments

The NCPR research team would like to first express our deep gratitude to the administrators and faculty at each of the eight colleges that participated in this study: El Paso Community College, Lone Star College–CyFair, Lone Star College–Kingwood, South Texas College, Texas A&M International University, Palo Alto College, San Antonio College, and St. Philip's College. Each of these institutions welcomed our collaboration and courageously subjected their innovative programs to rigorous evaluation.

We would like to express special thanks to each of the site liaisons — Irma Camacho, Christine Timmerman, Ruben Flores, Michael Chavez, Ruben Izaguirre, Luzelma Canales, Conchita Hickey, Michael Flores, and Abel Gonzales — who devoted countless hours to the students, the bridge programs, and the research study. We also appreciate the assistance of our data liaisons at each of the colleges, who aided our data collection efforts by sending us student data files — Art Gonzalez, Carol Kay, Doug Schirmer, Troy Touchette, Kristina Lopez, Rhonda Johnson, Mecca Salahuddin, Brenda Cole, Jinhao Wang, Wesley Jennings, Siobhan Fleming, Daniel Dean, Frank Segovia, Robert Aguinaga, and Catherine Chapa.

We thank the Texas Higher Education Coordinating Board for their partnership and support. In particular, we want to thank David Gardner, Lynette Heckman, Robin Zuniga, Linda Hargrove, Belinda Hernandez, and Judith Loredo for sharing information with us, providing us with student data, and helping us to coordinate meetings with the colleges.

The Texas Developmental Summer Bridge Project is part of the National Center for Postsecondary Research (NCPR), which is generously supported by a grant (R305A060010) from the Institute of Education Sciences, U.S. Department of Education. Katina Stapleton, our program officer, has been a stalwart supporter of this project since its inception. We also received considerable financial support from Houston Endowment that enabled the summer bridge programs to recruit many more students than ever before. We thank George Grainger at Houston Endowment for his endorsement and support of this project.

Additionally, we want to acknowledge the varied and important contributions of members of NCPR who made this report possible. NCPR was designed to be a collaborative research center, and this research project has truly been a team effort. Thomas Bailey, director of NCPR, was instrumental in recruiting institutions, designing the study, and weighing in with useful comments at every critical juncture. Thomas Brock, Robert Ivry, and Mary Visher helped guide the design of the Texas Summer Bridge project and provided detailed suggestions on drafts of this report. Marie-Andrée Somers and Alison Rebeck Black provided invaluable technical advice on the statistical analyses, and Nicholas

Commins helped process and fact-check the data for the impact analyses. Clive Belfield devised and conducted the cost study. Kendris Brumfield worked tirelessly with the colleges to support recruitment efforts and random assignment procedures. Elliot Peterson and Vanessa Martin provided critical support in developing, implementing, and monitoring random assignment procedures. Scott Lloyd, Katherine Hughes, and Michelle Hodara conducted field research at the various college sites. Amy Mazzariello and Doug Slater skillfully edited the report and prepared it for publication.

Finally, we thank the hundreds of students who participated in this study. We hope the findings from this study will be used to improve the programs and institutions that serve them.

The Authors

Executive Summary

Across the country, a growing number of recent high school graduates are participating in summer bridge programs. These programs provide accelerated and focused learning opportunities in order to help students acquire the knowledge and skills needed for college success. The state of Texas has given particular attention to summer programs as a way to increase students' college readiness. During the past several years, the Texas Higher Education Coordinating Board (THECB) has provided support to colleges establishing developmental summer bridge programs offering intensive remedial instruction in math, reading, and/or writing, along with an introduction to college. In contrast with traditional developmental education course sequences, which may span several semesters, the summer bridge programs were designed to help underprepared students build competencies over the course of several weeks before entering college.

While THECB funding for summer bridge programs has diminished, this type of program model remains popular in Texas and across the country. Nevertheless, little rigorous empirical research has been conducted on the effectiveness of summer bridge programs (Ackermann, 1990; Garcia, 1991; Myers & Drevlow, 1982; Santa Rita & Bacote, 1997). To address this gap in the research, in 2009 the National Center for Postsecondary Research (NCPR)[1] launched an evaluation of summer bridge programs at eight sites in Texas to assess whether they reduce the need for developmental coursework upon fall matriculation and improve student outcomes in college.

The Developmental Summer Bridge Programs

The developmental summer bridge programs in this study were offered in the summer of 2009, primarily to recent high school graduates, at eight institutions of higher education — two open-admissions four-year institutions and six community colleges. Students attended the developmental summer bridge programs for three to six hours daily for four to five weeks and received instruction in at least one area of academic need — math, reading, or writing — and guidance in the "college knowledge" needed to navigate

[1]NCPR is a partnership funded by the Institute of Education Sciences of the U.S. Department of Education from 2006 to 2012. NCPR includes the Community College Research Center at Columbia University's Teachers College, MDRC, the Curry School of Education at the University of Virginia, and faculty at Harvard University. NCPR conducts studies that measure the effectiveness of programs designed to help students make the transition to college and master the basic skills needed to advance to a degree. Houston Endowment also contributed funds to support this research.

new academic terrain. All of the developmental summer bridge programs included four common features: accelerated instruction in math, reading, and/or writing; academic support; a college knowledge component; and the opportunity to earn a $400 stipend.[2]

The Research

The evaluation employed an experimental design to measure the effects of the programs on college enrollment and success. At each college, students who consented to participate in the study were randomly assigned to either a program group that was eligible to participate in a developmental summer bridge program or a control group that was eligible to use any services that the college provided other than the summer bridge programs. Random assignment creates two groups that are similar on all characteristics, including those that can be measured, such as age or academic attainment, and those that are more difficult to measure, such as motivation. This ensures that any differences in observed outcomes — called *impacts* — can be attributed to participation in the developmental summer bridge programs.

Eligible students who applied for admission into a developmental summer bridge program and agreed to participate in the study were included in the research sample. After consenting to participate and completing a baseline intake form, these students were randomly assigned to either the program group or the control group. About 60 percent of the students were assigned to the program group and given the opportunity to take one of the available slots in the summer bridge program (793 students), while about 40 percent were assigned to the control group and were able to participate in other college services but were not admitted to the program itself (525 students). Students in both groups consented to have their outcomes tracked for two full academic years.

NCPR collected and analyzed academic outcome data through the spring semester of 2011 for both program and control group students. This report presents the impact findings of the study, revealing whether the opportunity to participate in a summer bridge program influenced academic outcomes during the two years following participation. The primary outcomes tracked in this study were persistence, accumulation of credits, and progression through the developmental sequence and into students' first college-level math, reading, and writing courses.

[2]For more information on the implementation of the programs, see Wathington et al. (2011).

Main Findings

After two years of follow-up, these are the main findings of this study:

- The programs had no effect on the average number of credits attempted or earned. Program group and control group students attempted the same number of credits (30.3). Students in the program group earned an average of 19.4 credits, and students in the control group earned an average of 19.9 credits; the difference in their outcomes is not statistically significant.

- The programs had an impact on first college-level course completion in math and writing that was evident in the year and a half following the program but no impact on first college-level course completion in reading during this same period. On average, students in the program group passed their first college-level math and writing courses at higher rates than students in the control group during this period. By the end of the two-year follow-up period, however, the differences between the two groups are no longer statistically significant.

- There is no evidence that the programs impacted persistence. During the two-year follow-up period, students in the program group enrolled in an average of 3.3 semesters, and students in the control group enrolled in an average of 3.4 semesters, a difference that is not statistically significant.

Program Costs

NCPR performed an analysis of the cost of the developmental summer bridge program. The sites varied in terms of program duration, intensity, and enrollment, and total costs to run the program during the summer of 2009 ranged from $62,633 to $296,033. Across the eight sites, per student costs ranged from $835 to $2,349. The average cost per student across all eight sites was $1,319 (with a standard deviation of $502).[3]

We also calculated the college-level credit accumulation that the developmental summer bridge programs would have had to produce in order to be cost effective on this outcome measure. Specifically, we considered how many additional college credits a

[3]Some costs may be interpreted as "start-up" costs, which are unlikely to be needed if the programs are run in subsequent years. If these costs are amortized over three years, then the average cost of the programs is reduced. In addition, this figure includes the student stipend of up to $400 per participant.

developmental summer bridge program student would need to earn to justify the cost of the program. In order to do this, we assigned a monetary cost of $338 to college credits earned, based on the typical cost of providing these credits in Texas.[4] The program group would have had to earn an additional 3.8 college-level credits on average for the program to justify its costs or "break even."

Implications

The findings in this report suggest that the developmental summer bridge programs contributed to positive outcomes in college-level course completion in math and writing that were evident during the first year and a half after program completion. However, the programs did not lead to increases in persistence or overall credit completion, raising the question of whether our theory of change and the changes in measured outcomes that we hypothesized were reasonable were too ambitious. It may be that we should not expect to find long-term impacts on credit accumulation and persistence from a short, intensive summer program. First-year developmental education students may need further support for greater impacts to be achieved.

In addition, our research suggests that accelerating students' completion of introductory college-level courses in math or English may not lead to the accumulation of more college credits overall. If the ultimate goal is college credential attainment, and credit accumulation indicates progress toward attaining a credential, improving academic preparedness through developmental summer bridge programs or other similar programs may not adequately promote attainment of this goal. Policymakers and practitioners concerned with college completion may want to consider approaches that go further in assisting students in ongoing credit accumulation and credential attainment.

Finally, our break-even cost analysis suggests that students in the developmental summer bridge programs would need to have earned an average of almost four additional college credits to justify the cost of the program (courses are typically worth three credits). Given that no impact on credit accumulation was found, college practitioners and policymakers may reasonably view the programs as expensive. Educators may want to consider if there are ways to reduce costs by embedding support programs such as these into the regular high school or college schedule.

---

[4]This is the average of the expenditure per credit across seven of the eight colleges based on Integrated Postsecondary Education Data System (IPEDS) data of expenditures per FTE (2008 data uprated to 2011 dollars). Expenditures per FTE are adjusted to capture expenditures per credit attempted. One college did not have available IPEDS data.

Concluding Thoughts

Similar to other innovative developmental education programs that have been rigorously evaluated,[5] the developmental summer bridge programs studied here were found to have modest positive impacts in the short term. What is clear from this study and other developmental education research is that simple, short-term interventions yielding strong, long-term effects are difficult to find. With this in mind, we offer two suggestions for advancing the work of supporting underprepared students: (1) introducing new partnerships between high schools and colleges that reduce the need for remediation in college and (2) providing more support and transitional experiences to help students reach and sustain attainment goals. Because educational attainment is the result of a long process influenced by many factors, providing supports to students that span their years in high school and college may help them to develop the skills and knowledge required for postsecondary success.

[5]See, for example, findings from NCPR's Learning Communities Demonstration (Visher, Weiss, Weissman, Rudd, & Wathington, 2012).

Chapter 1

Introduction

In 1972, Alice Cooper declared that "school's out for summer" (Cooper, 1972, track 1). For many young students, these lyrics still capture the sense of freedom that accompanies their yearly reprieve from academic work. For a great number of recent high school graduates, however, the summer before college matriculation is no time for relaxation, nor is it an opportunity to work full time to save for future endeavors. Across the country, a growing number of recent high school graduates are participating in summer bridge programs. These programs provide accelerated and focused learning opportunities in order to help students acquire the knowledge and skills needed for college success.

Texas has provided support for programs to increase students' college readiness as part of a statewide initiative called *Closing the Gaps by 2015*, which is designed to increase rates of college participation and success. In 2007, the Texas Higher Education Coordinating Board (THECB) provided funding to 22 colleges to establish developmental summer bridge programs. These intensive summer programs offered eligible students remedial instruction in math, reading, and/or writing along with an introduction to college. In contrast with traditional developmental education course sequences, which may span several semesters, the summer bridge programs were designed to help underprepared students build competencies over the course of several weeks before entering college.

In Texas and across the country, summer bridge programs have become a popular strategy for increasing college readiness among recent high school graduates. In fact, a number of two- and four-year colleges in Texas have developed their own summer bridge programs independent of the guidelines and funds provided by the THECB. However, little rigorous empirical research on their effectiveness has been conducted in Texas or elsewhere (Ackermann, 1990; Garcia, 1991; Myers & Drevlow, 1982; Santa Rita & Bacote, 1997).

In 2009, the National Center for Postsecondary Research (NCPR)[1] launched an evaluation of summer bridge programs at eight sites in Texas to assess whether they reduce students' need for developmental coursework upon fall matriculation and improve student outcomes in college. The evaluation used an experimental design to measure the

[1]NCPR is a partnership funded by the Institute of Education Sciences of the U.S. Department of Education from 2006 to 2012. NCPR includes the Community College Research Center at Columbia University's Teachers College, MDRC, the Curry School of Education at the University of Virginia, and faculty at Harvard University. NCPR conducts studies that measure the effectiveness of programs designed to help students make the transition to college and master the basic skills needed to advance to a degree.

effects of the programs on college enrollment and success. At each college, students who consented to participate in the study were randomly assigned to either a program group that was eligible to participate in a developmental summer bridge program or a control group that was eligible to use any services that the college provided other than the summer bridge programs, including regular courses, orientations to college, counseling, etc.[2] Random assignment creates two groups that are similar on all characteristics, including those that can be measured, such as age or academic attainment, and those that are more difficult to measure, such as motivation. This ensures that any differences in observed outcomes — called *impacts* — can be attributed to participation in the developmental summer bridge programs.

NCPR collected academic outcome data through the spring semester of 2011 for both program and control group students. This report presents the impact findings of the study, revealing whether the opportunity to participate in a summer bridge program influenced academic outcomes during the two years following participation.

The Potential of Summer Bridge Programs

While none of the prior research on summer bridge programs employed rigorous experimental designs, some evidence suggests that underprepared students who participate in these programs show improvement in their academic performance (Bengis, 1991; Kallison & Stader, 2012; Strayhorn, 2011). Proponents of summer bridge programs suggest that there are several ways in which these programs may be more effective than traditional models of developmental education in helping students with below-average skill sets to build competencies and succeed in college.

First, the accelerated instruction provided by summer bridge programs may allow students at-risk of not completing college to advance through developmental education more quickly, ideally enabling recent high school graduates to enroll in college-level courses in the fall of their first year of college (Edgecombe, 2011). This may have a beneficial effect on subsequent academic outcomes; empirical evidence suggests that the length of time students spend in developmental education courses is negatively related to degree completion (Adelman, 1998; Attewell, Lavin, Domina, & Levey, 2006). One hypothesis that would explain this relationship is that developmental courses may discourage students and lead them to drop out. If this is the case, enrolling students in

[2]Enrollment data from the eight participating colleges show that 16 percent of students in the control group enrolled in a course at the college where they applied for admission to a summer bridge program during the summer of 2009.

college-level courses as soon as possible after high school may improve students' probability of degree attainment.

Another reason that developmental summer bridge programs may be more effective than traditional developmental education sequences is that the former offer an array of support services to ease the transition, both academically and socially, from high school to college. Research suggests that at-risk students benefit from non-academic support programs that help them create social relationships, clarify their aspirations and academic commitments, and develop college know-how (Karp, 2011). Summer bridge programs may help participants develop non-academic skills in several ways. Introducing at-risk students to the college environment and actively teaching them how to navigate and take advantage of services may improve their likelihood of persistence (Deil-Amen & Rosenbaum, 2003; Rosenbaum, Deil-Amen, & Person, 2006; Tinto, 1993). In addition, through summer bridge programs, students have the opportunity to form relationships with mentors, peers, and faculty that may strengthen their academic and social support networks as well as their ties to the institution, which may in turn promote student persistence.

Finally, by offering a stipend to students for their participation, summer bridge programs may encourage students to take on an academic endeavor rather than a summer job. Stipends may also help to defray the costs of college.

Key Facts and Findings

NCPR began its work in Texas by establishing a cooperative agreement with the THECB. A number of developmental summer bridge programs had received THECB funding and technical assistance for two years prior to the beginning of the research, resulting in a pool of colleges with well-implemented, fully realized programs. NCPR and the THECB agreed to cooperate on the logistics of this study and to share data that could be used in assessing the implementation and impact of these programs. Houston Endowment also was interested in increasing participation and success rates in college and became a supporting partner in this study.

Following an intensive period of investigation into the kinds of programs offered around the state, eight colleges offering well-established developmental summer bridge programs were invited to participate in the research. NCPR worked closely with these colleges to refine program designs and recruit students; many of the colleges aimed to enroll more students than they did in previous years. The programs targeted students who had placed into developmental education based on their high school exit exam or college placement test scores. Interested students were randomly assigned to participate in the

available spaces in the eight programs. Sixty percent of students were assigned to the program group and 40 percent to the control group (See Table 1.1).

Prior to random assignment, all students gave consent for NCPR to obtain their enrollment and transcript data. Access to these data permitted researchers to assess whether participation in a summer bridge program affected key student outcomes, such as need for developmental education, credit accumulation, and persistence. In addition, NCPR researchers made site visits to participating colleges to learn how the summer bridge programs were designed and implemented. A prior report on this research provides information on program implementation and initial impact findings (Wathington et al., 2011). The current report provides a summary of student outcomes after following the students for two full academic years.

Texas Developmental Summer Bridge Programs

Table 1.1

Colleges Participating in the Study

Institution	Location	Program Students (60%)	Control Students (40%)	Total Students Randomly Assigned
El Paso Community College	El Paso	165	108	273
Lone Star College–CyFair	Houston	74	48	122
Lone Star College–Kingwood	Houston	51	35	86
South Texas College	McAllen	83	54	137
Texas A&M International University	Laredo	126	85	211
Palo Alto College	San Antonio	52	35	87
San Antonio College	San Antonio	89	58	147
St. Philip's College	San Antonio	153	102	255
Total		799	533	1,318

NOTE: More students were recruited (n = 1,332) than participated in the study (n = 1,318).

After two years of follow-up, these are the main findings of this study:

- The programs had no effect on the average number of credits attempted or earned. Program group and control group students attempted the same number of credits (30.3). Students in the program group earned an average of 19.4 credits, and students in the control group earned an average of 19.9 credits; the difference in their outcomes is not statistically significant.

- The programs had an impact on first college-level course completion in math and writing that was evident in the year and a half following the program but no impact on first college-level course completion in reading during this same period. On average, students in the program group passed their first college-level math and writing courses at higher rates than students in the control group during this period. By the end of the two-year follow-up period, however, the differences between the two groups are no longer statistically significant.

- There is no evidence that the programs impacted persistence. During the two-year follow-up period, students in the program group enrolled in an average of 3.3 semesters, and students in the control group enrolled in an average of 3.4 semesters, a difference that is not statistically significant.

Organization of This Report

The following chapters describe the study and its findings. Chapter 2 provides information on the design of the developmental summer bridge programs. Chapter 3 details the study's experimental methodology, data collection procedures, and analyses. The impact findings on primary and secondary outcomes, as well as subgroup analyses, are provided in Chapter 4. Chapter 5 reviews the developmental summer bridge program's costs and its potential for cost-effectiveness. Finally, Chapter 6 discusses the implications of these findings for policy, practice, and research.

Chapter 2

The Developmental Summer Bridge Program Model

The developmental summer bridge programs in this study were offered in the summer of 2009, primarily to recent high school graduates[1] at eight institutions of higher education — two open-admissions four-year institutions and six community colleges. Students attended the programs for three to six hours daily for four to five weeks and received instruction in at least one area of academic need — math, reading, or writing — and guidance in the "college knowledge" needed to navigate new academic terrain. The programs were free for students at five of the eight sites.[2] All of the programs included four common features: accelerated instruction in math, reading, and/or writing; academic support; a college knowledge component; and the opportunity to earn a $400 stipend.[3]

Table 1.1 shows the eight participating institutions and the number of students they recruited. Of the eight developmental summer bridge programs included in the study, four were *course-based*, while the other four were *freestanding*[4] (see Table 2.1). Course-based programs were essentially standard developmental courses, modified or condensed to fit the summer timeframe. Freestanding programs provided students the opportunity to advance multiple levels in the developmental education sequence, but they did not require students to enroll in a developmental educational course over the summer. Students in freestanding programs did not receive developmental education credit for their participation. Students in course-based programs were enrolled at the college and did receive developmental education credit upon successful course completion.[5] Freestanding programs had more opportunities to make changes in content or instructional methods than did course-based programs, which followed established course outlines.

---

[1]All colleges reached out to students who were likely to enroll (or already registered) in the fall. Some of the colleges made significant efforts to recruit students who were undecided about college attendance in hopes that the summer bridge program could provide an extra impetus for them to attend college in the fall.

[2]The two Lone Star College sites (CyFair and Kingwood) charged students $150 to participate in the developmental summer bridge program. The funds were deducted from the student stipend. San Antonio College charged tuition but helped students to obtain financial aid to offset the cost of participation.

[3]For more information on the implementation of the programs, see Wathington et al. (2011).

[4]The program at St. Philip's College is classified as a freestanding program because students did not receive developmental education credit for participation. However, students were required to enroll in St. Philip's over the summer in order to participate in the program. In NCPR's first report on the developmental summer bridge programs, St. Philip's was characterized as a course-based program.

[5]Developmental education credits are awarded for financial aid eligibility purposes but cannot be applied toward a degree.

Texas Developmental Summer Bridge Programs

Table 2.1

Characteristics of Developmental Summer Bridge Programs

Institution	Hours of Instruction	Weeks of Instruction	Course-Based?	Subjects Offered	Levels Below College Level	Student Ability Levels
El Paso Community College	100	5	No	Math, Reading, and Writing	All	Mixed
Lone Star College–CyFair	67	4	Yes	Math, Reading, and Writing	1	Not Mixed
Lone Star College–Kingwood	52 (Writing) 64 (Math)	4	Yes	Math and Writing	1	Not Mixed
South Texas College	80–100	4	No	Math	All	Mixed
Texas A&M International University	100	5	No	Math	All	Mixed
Palo Alto College	60–76	4	Yes	Math	2 and 3 (lowest)	Not Mixed
San Antonio College	Approx. 97	5	Yes	Math, Reading, and Writing	All	Not Mixed
St. Philip's College	Approx. 35–95	4	No	Math, Reading, and Writing	All	Mixed

As with a standard developmental course, students enrolled in course-based programs were graded based on performance; students who earned a C or better earned developmental credit and were allowed to advance to the next course in the sequence. Students in the freestanding programs were not given traditional grades. Rather, they worked toward retaking and passing the institution's placement test (COMPASS, ACCUPLACER, etc.) at the end of the program. All programs were designed to help developmental students advance at least one level of proficiency.

Table 2.1 shows the characteristics of each developmental summer bridge program included in the study. Though the eight programs shared many common elements, each had unique features to accommodate the institution's student population or, in some cases, to fit

with the academic calendar or institutional culture. This section describes each of the four core program features in detail. Descriptions of the programs at the individual colleges are included in Appendix B.

Developmental Summer Bridge Program Features

Accelerated Instruction in Math, Reading, and/or Writing

All sites offered developmental education instruction in an accelerated format, with some degree of contextualized and active learning. Formats, schedules, and content differed from site to site and were influenced by subject areas taught and by program goals. South Texas College, Texas A&M International University (TAMIU), and Palo Alto College offered only math; Lone Star College–Kingwood offered math and writing; and St. Philip's College, El Paso Community College (EPCC), Lone Star College–CyFair, and San Antonio College offered a combination of math, reading, and writing. A few programs taught students of different developmental levels together in a freestanding program.

The length and intensity of the developmental summer bridge programs varied, as shown in Table 2.1. While all programs ran for four to five weeks, the hours spent in class differed. The minimum time required to complete a program was about 35 hours for a student taking only one subject at St. Philip's College, though a large majority of this college's students took two courses for over 50 hours of program time. Students enrolled at EPCC or TAMIU spent approximately 100 hours on campus. These hours represent required time at the college and do not include hours spent on homework or group project assignments.

Academic Support

Academic support was an important part of the developmental summer bridge programs, not only because it supported the instructional component but also because it helped to integrate students into the life of the program and the college. This support generally took the form of tutoring, mentoring, or access to learning labs and computer-based programs. The math programs generally utilized some form of mandatory computer-aided instruction and independent practice in a lab setting, as did some of the reading and writing programs. If students had Internet access outside of school, they could log on remotely, but this was not required by any of the programs.

All of the programs except for San Antonio College and St. Philip's College provided tutors as part of the summer bridge program. Programs used varied approaches to tutoring, such as assigning a tutor to each class for a few hours per week, placing a tutor in every classroom for the entire period, or having three tutors roaming among five classes.

While San Antonio College did not provide tutors, math students were encouraged to spend ten hours per week in the math lab, where tutoring was available.

College Knowledge Component

College knowledge instruction is defined as sharing information about college contexts (e.g., through tours or introductions to student services), college expectations (e.g., those regarding study skills, classroom norms, and time management), college planning (e.g., course-taking, plans for transfer), aligning educational goals with career plans, and paying for college. All programs in the study provided some explicit means to help students gain college knowledge, but the specific content and delivery method varied.

College knowledge can be divided into social and academic components. In the developmental summer bridge programs, academic knowledge was stressed more than social knowledge. The programs covered a variety of academic topics, including study and test-taking strategies, time management, career assessment, learning styles, tours of the campus, introduction to college resources, financial aid, and course or degree plans. The information needed to make the social transition to the college was covered to some degree in all summer bridge programs, with some instruction provided in social college knowledge topics such as personal financial responsibility, motivation, behavioral expectations, and stress management.

Content was formally delivered in two main ways. Three programs (Palo Alto College, San Antonio College, and St. Philip's College) offered a modified version of a student development course (sometimes referred to as Student Success or College 101) of the type typically offered to new college students. These courses were often taught by college advisors and had a designated time slot in the day's schedule. The other five programs provided presentations focused on different college knowledge topics, such as financial aid and career assessments. These colleges generally offered four or five one-hour presentations, once per week. Presentations were not generally integrated into the curriculum and were taught by either advisors or mentors.

In addition, some programs used mentors to help students better understand the transition to college. Structured mentoring was offered at EPCC, TAMIU, Lone Star College–CyFair, and Lone Star College–Kingwood. EPCC and TAMIU had strong mentoring programs in which students met with mentors at specific times to cover a series of topics identified in advance. This structure appears to have maximized the effectiveness of the time students spent in mentoring sessions. The two Lone Star Colleges assigned their

College Connection [6] advisors as mentors because these individuals had extensive experience in high schools. The Lone Star Colleges did not have a structured training program or predetermined topics for the mentors to cover with students.

While most of the programs offered some assistance with financial aid, assistance in the preparation of financial aid forms was explicitly provided at several colleges. The Alamo Colleges (San Antonio, Palo Alto, and St. Philip's) helped students to complete the Free Application for Federal Student Aid (FAFSA) as they were enrolling in the program. Completing this application enabled students to receive financial aid to cover program costs and to obtain the funds needed to further pursue their education.

Stipend

All of the features described above were a part of the intensive summer experience model framed by the THECB. The addition of the opportunity to earn a $400 stipend was initiated and funded by NCPR. The stipend incentive was built into the program design to boost recruitment and increase the likelihood that students would complete the program once enrolled. Students typically received $150 at the beginning of the program and $250 once they successfully completed the program. Each college independently defined successful completion. More information about the stipend can be found in Chapter 4.

Theory of Change

Before we began studying developmental summer bridge programs, we hypothesized that these programs would have a positive impact on students' academic outcomes through several mechanisms. These were the basis upon which the outcome measures used in this research were selected.

First, we presumed that students would be academically and socially better prepared for college after attending the summer bridge program. We hypothesized that this preparation — combined with better knowledge of and comfort with college enrollment procedures, campus facilities, and other aspects of college life — would lead to higher rates of enrollment in the fall and persistence in subsequent semesters. We also believed that it would lead to higher rates of credit accumulation.

We also hypothesized that students' early and accelerated exposure to developmental coursework would lead them to test out of developmental course requirements or begin

[6] College Connection advisors are used throughout the state to assist high school students in the transition to college. They are typically employees of the colleges and based in the high schools.

college further along the developmental course sequence. This would allow them to earn and accumulate college-level credits sooner than they would have been able to without the program. Further, we expected that students would be more likely to utilize on-campus services, which would influence their pass rates and thus their credit accumulation.

Finally, we conjectured that students would be more likely to apply for and receive financial aid, specifically grants and subsidized loans (which are seen as “better” forms of aid than unsubsidized and/or private loans). This could support persistence and credit accumulation by allowing students to afford to take more classes and/or spend less time working.

Chapter 3

Data and Methods

This study employs an experimental design methodology to evaluate the effectiveness of eight developmental summer bridge programs offered in Texas in the summer of 2009. Although the programs varied in their delivery and implementation, they all contained four common features — an accelerated format, a college knowledge component, academic support, and a stipend. Their common design features made these programs sufficiently similar to permit pooling of data across all eight sites for analysis. Our site visits during the summer of 2009 allowed us to verify the presence of these four features, giving us confidence that the programs were substantially similar.

This chapter details the methodology used in conducting this study. We first outline our general research design and describe the student sample that participated. Then, we enumerate the data sources used for analysis and explain our statistical approach to the data analysis. It should be noted that implementation research was an important part of the overall study, allowing us to learn how developmental summer bridge programs were designed and deployed and to assure that there was fidelity to the intended program design. The interim report on this research (Wathington et al., 2011) offers our findings on the implementation of these eight developmental summer bridge programs.

Research Design

Beginning in the winter of 2008–09, students were recruited at eight participating institutions throughout the state of Texas. Eligible students were those whose scores on a college placement test (which was usually administered by a college in a high school) indicated the need for remediation in a subject offered by the college's summer bridge program. At most institutions, only graduating high school seniors were eligible, though at South Texas College, returning adults could also participate.

Eligible students who applied for admission into a developmental summer bridge program and agreed to participate in the study were included in the research sample. After consenting to participate and completing a baseline intake form, these students were randomly assigned to either the program or the control group. About 60 percent of the students were assigned to the program group and given the opportunity to take one of the available slots in the summer bridge program (793 students), while about 40 percent were

assigned to the control group and were able to participate in other college services but were not admitted to the program itself (525 students).[1] Students in both groups consented to release their program, enrollment, and transcript data to the researchers for two full academic years — from the summer of 2009, when the program was held, through the spring of 2011.

Because students were randomly assigned to the program and control groups, any difference between the groups' average outcomes can be interpreted as the result of being permitted to participate in the program (the average treatment effect). Unlike alternative methodologies often used to evaluate summer bridge programs and similar interventions, the experimental design of this study eliminates concerns of selection bias in the program group. For example, an evaluation that compared the outcomes of students who participated in a developmental summer bridge program with the outcomes of other students at the college who did not would not be able to account for unobservable differences in student characteristics. It is possible that, in this scenario, the summer bridge students could be more motivated and higher in ability than the nonparticipating students, leading to better average outcomes that were the result not of the intervention but of differences between the two groups. In an experimental design, the program and control groups are alike on both observable characteristics (e.g., gender, race/ethnicity) and unobservable characteristics (e.g., motivation, time management skills), allowing us to draw causal inferences about the average treatment effect of the program.

In order to preserve the experimental design, our study measures differences between the average member of the entire program group and the average member of the entire control group. Within these groups, individual students did not necessarily have identical educational experiences during the summer when the bridge programs were offered. Not all students assigned to the program group enrolled in and completed the summer bridge program. In addition, while students in the control group were not permitted to enroll in the summer bridge program, some opted to participate in other substantive educational activities that could have affected their later outcomes.

Among those selected to participate in the developmental summer bridge programs, 689 students (86 percent) enrolled. Students assigned to the control group were free to pursue any other summer activities, including enrolling in other courses at the colleges where the summer bridge programs were held. Enrollment data from the eight participating colleges show that, during the summer of 2009, 16 percent of students in the control group enrolled in a summer course at the college where they had applied for admission to a

[1]Several students were removed from the sample due to missing documentation. This accounts for the discrepancy between these numbers and those in Table 1.1.

summer bridge program. We can gain further insights into the activities of the control group from their responses on an intake form completed prior to random assignment, on which students were asked what they expected to do during the summer of 2009 if they did not attend the summer bridge program. Of those who responded, 32 percent expected to take classes at the summer bridge program college or elsewhere, and 74 percent expected to find a summer job (some planned to do both). Only 6 percent of students expected to do neither.

Sample Characteristics

Student baseline data collected at the eight colleges participating in this study show that the overall demographic and educational characteristics of the program and control groups were very similar, as expected following random assignment. An omnibus test for significant differences between the two groups found that there were no systematic differences between program and control group students on the set of background characteristics collected, confirming that the random assignment process successfully created two comparable groups of students. Table 3.1 shows the characteristics of students in the sample.

The students in the summer bridge programs were predominately Hispanic and recent graduates of high school. However, students' demographic characteristics varied by college. In terms of race and ethnicity, El Paso Community College, San Antonio College, Palo Alto College, South Texas College, and Texas A&M International University served more than 90 percent Hispanic students. At both Lone Star College–Kingwood and Lone Star College–CyFair, fewer than half of students were Hispanic (the balance was comprised of White, African American, and small numbers of Asian American students). All institutions served more females than males, with Palo Alto College having the most imbalanced gender ratio, at almost 3:1.

Students were willing to spend long hours in the summer studying to prepare themselves to enter college in the fall. (As one said, "I want to attend so I can take college classes and not remedial courses and waste money.") Responses on the intake form suggest that the recruited sample of students was highly motivated despite their remedial need. Nearly a quarter of students had previously attempted college credits (through dual enrollment or otherwise). All students intended to attend college the following fall, and more than three quarters intended to do so full time.

Texas Developmental Summer Bridge Programs

Table 3.1

Demographics of Full Sample at Baseline

Characteristic	%
Gender	
Female	62.4
Male	37.6
Age as of June 1, 2009 (Mean = 19.0)	
18 or under	84.7
19 or 20	11.2
21 or over	4.1
Race/ethnicity	
African American	6.6
Hispanic	84.3
White	8.7
Other	1.8
Aspirations	
High school	12.4
Some college	1.4
Certificate	1.5
Associate degree	10.5
Bachelor's degree	34.8
Master's degree	34.6
Doctoral or professional degree	3.9
Previously attempted college credits	24.2
Previously earned college credits	21.2
Date of high school graduation (among graduates)	
2007 or earlier	4.4
2008	2.7
2009	92.8
Fall 2009 college attendance plans	
Full-time (4 courses per term or more)	77.6
Part-time (3 courses per term or less)	22.4
Texas Success Initiative (TSI) status	
Met math standards	20.5
Met reading standards	17.7
Met writing standards	38.9

SOURCE: Self-reported by students on the Baseline Information Form.

NOTES: Sample includes 1,318 students. TSI status is determined by a student's scores on one of several placement tests (i.e., ASSET, COMPASS, ACCUPLACER, and THEA) and indicates readiness to enroll in freshman-level academic coursework. While institutions can set higher minimum passing scores than the state, this report relies on the cut scores established by Texas. There were no statistically significant differences between the program and control group students in any of the three areas (math, reading, or writing) at baseline.

Data Sources

Several data sources were used for the analyses of impact presented in this report, including two that were not available when we published our first report on the results of this research.[2] The outcomes of students participating in the research were tracked through the end of the spring 2011 semester, allowing for two full years of follow-up.

The Baseline Information Form (BIF), a student background questionnaire administered prior to random assignment, was used to ensure that the program and control groups were similar on baseline characteristics. The BIF was also used to create subgroups based on certain demographic characteristics — namely, gender and mother's highest level of education. Subgroups were analyzed separately to determine whether programs had different effects for men and women or for students with parents with different levels of education.

Institutional administrative data provided to NCPR by participating program sites was our primary data source for most student outcomes. Institutional data was available for all eight of our program sites (El Paso Community College, Lone Star College–CyFair, Lone Star College–Kingwood, Palo Alto College, San Antonio College, Saint Philip's College, South Texas College, and Texas A&M International University), as well as the rest of the Lone Star College System and two additional colleges that served a large number of students in our sample (Laredo Community College and the University of Texas at El Paso). From these colleges, we received complete student transcripts as well as additional data on enrollment, financial aid receipt, graduation, and placement test scores. These institutional records were our only data sources for several key measures, including total credits earned and financial aid received.

Texas Higher Education Coordinating Board data, which contained student-level information from all Texas colleges, provided a secondary source of information for many of our variables. An advantage of the THECB records is that they provided information on students in our sample who did not attend one of the colleges for which we have institutional records. Though the state of Texas did not yet collect transcript records during the time we tracked our students, the THECB data *did* contain detailed information on students' developmental progression and first college-level courses in math, reading, and English. In this study, we also used the THECB definitions of the courses considered to be first college-level courses in each subject area. Additionally, the data provided information on enrollment, credits attempted, and graduation.

---

[2]The two new sources of data were the National Student Clearinghouse data and student survey data obtained using a follow-up telephone and email survey.

National Student Clearinghouse data, containing enrollment and graduation information from more than 3,300 colleges around the country, was used as an additional source. We anticipated that a significant number of students might enroll in private or out-of-state colleges whose data would not be available from any of our other sources. However, less than 1 percent of the sample was found to enroll at such colleges.

Follow-up surveys were administered only to students who did not appear in any of our records as having enrolled in college as of spring 2010. Surveys were conducted via telephone and email; respondents included students participating in the research or their relatives. Data from these surveys supplemented our other sources of information and allowed us to learn more about what students who did not continue in college were doing instead. The research firm HumRRO was retained to conduct this survey. A total of 332 students were targeted, and 213 were successfully surveyed (a 64 percent response rate).[3]

Because we utilized several data sources in constructing our dataset for analysis, we had to make decisions on how to prioritize the different data sources when we encountered discrepancies or missing information.[4] In some of the more prominent areas of discrepancy, we tested alternate methods of data prioritization and confirmed that prioritizing data sources in a different way did not significantly affect the results. The most important of these decisions and alternate analyses are noted in the text and tables throughout this report.

Overview of the Data Analysis

In comparing outcomes for the program and control groups, we focused on a limited number of primary outcomes and several secondary outcomes.[5] The primary outcomes

[3]Out of 154 students who were *never* found to be enrolled in college through one of our other data sources, 96 were successfully surveyed. Of these, 26 students reported being enrolled at some time during our tracking period.

[4]In general, for outcomes that were available from a limited number of data sources, students missing information from that data source were coded with "0" rather than missing. For example, since we only had information on earned credits from the institutional records, a student whose data was not available from these institutions would be considered to have earned 0 credits, even if records from the THECB or the National Student Clearinghouse suggested that the student may have been enrolled elsewhere. Though this might reflect itself as an underestimate of the baseline levels of credits earned, there is no reason to think that program and control group students would be disproportionately affected, and therefore there should be no bias in the analysis. If we had only analyzed these outcomes based on students with non-missing values, our results might be biased because the program and control groups could be disproportionately enrolled (and therefore have disproportionately missing values for these outcomes).

[5]We focus on a smaller set of primary outcomes in order to avoid bias arising from multiple hypothesis testing. When hypothesis tests are conducted on multiple outcomes with multiple subgroups of students and/or schools, it increases the likelihood of concluding that some findings are statistically significant when in fact they are not (resulting in a "Type I" error or a "false positive").

include a measure of academic persistence, total college-level credits earned, and completion of college-level courses in math, reading, and writing. All other outcomes were considered secondary.

Given that this was a randomized controlled experiment, the model we employed to estimate impacts was fairly simple. Our analysis was accomplished by fitting the following impact model to the analysis samples:

$$Y_i = \beta_0 T_i + \sum_K \lambda_k C_{ki} + \varepsilon_i \quad (1)$$

In this model, Y_i is the outcome of interest for student *i.* T_i is an indicator of treatment group membership (treatment status) equal to 1 if student *i* was assigned to the summer bridge program and zero otherwise. C_{ki} is a dummy equal to 1 if student *i* is at campus *k* and zero otherwise. ε_i is an error term. β_0, therefore, is the estimated impact of the program on outcome *Y*.

β_0 is an estimate of the impact of the developmental summer bridge program for the average student in the analysis sample. The students were not selected to be a random sample of a larger population of sites, and the impact estimates are not generalizable to a larger population of colleges or students. Indicators for each college (C_k) are included in the model because random assignment was conducted separately for each college and because including these indicators allows us to obtain more precise estimates by reducing the influence of variation across colleges.

Limitations

Our study design and data availability limit what we can say about our findings in several ways. First, in order to reach the sample size required to detect minimum effects, we had to pool data across the sites. This research was not designed to detect effects at the level of the individual participating college.

Second, like most research designs that estimate program effects, the random assignment design evaluates the overall impact of the developmental summer bridge program but cannot determine if certain program components are more effective than others. For example, we cannot separate the effect of the student stipend from the effect of the coursework provided.

Third, for each outcome, we conducted analyses using the best data available. For two important outcomes — total college credits earned and financial aid receipt — we were only able to examine outcomes for students who attended college at one of the ten

institutions from which we obtained data directly. For students who enrolled at other colleges, no data were available for these outcomes. Additionally, we found some discrepancies in the data from different sources for the same students, forcing us to make decisions about how to prioritize our data sources. The existence of such discrepancies suggests that there may be substantial "measurement error" in our data, though as noted above, we confirmed that alternate methods of prioritizing data sources did not significantly affect our results.

Fourth, we would ideally be able to compare pre-random assignment and post-random assignment results on placement tests, but we were unable to obtain these for our entire sample. Therefore, we could not precisely determine the impact of assignment to a developmental summer bridge program on placement into math, reading, and writing in the fall. Instead of directly measuring placement, we measured the impact of the program on the courses that students attempted and passed. We primarily focused on students' completion of their first college-level courses in math, reading, and writing because these outcomes are well defined for the entire sample (regardless of college enrollment), and therefore we were able to examine these outcomes causally. We additionally performed an exploratory and non-experimental analysis on students' progression through the developmental sequence in each of these three subjects.

Fifth, the results obtained through this study may be limited in their external validity and may not be applicable to all summer bridge programs. The programs we studied were located in a single state and targeted a population with specific developmental needs. Programs that target different populations and programs at colleges that offer a different experience for the control group (such as more or less intensive alternative program offerings) may see different results.

Despite these limitations, our use of experimental design should inspire confidence in the results of this study. Because of its rigorous design, this study provides the strongest evidence to date on the effectiveness of developmental summer bridge programs.

Chapter 4

Impact Findings

The primary purpose of this chapter is to examine whether participation in developmental summer bridge programs led to better student outcomes in terms of credit accumulation, persistence, and completion of students' first college-level courses. This chapter presents impact findings at the end of the two years following random assignment, and it includes estimates for each semester of the two-year follow-up period. After a brief overview of the main findings, the chapter describes the measures used to evaluate the program and presents the impact findings in more detail. This chapter also explores whether program students experienced a reduced need for remediation in college, whether impacts varied between subgroups, and whether the program influenced outcomes related to financial aid.

After two years of follow-up, these are the main findings of this study:

- The programs had no effect on the average number of credits attempted or earned. Program group and control group students attempted the same number of credits (30.3). Students in the program group earned an average of 19.4 credits, and students in the control group earned an average of 19.9 credits; the difference in their outcomes is not statistically significant.

- The programs had an impact on first college-level course completion in math and writing that was evident in the year and a half following the program but no impact on first college-level course completion in reading during this same period. On average, students in the program group passed their first college-level math and writing courses at higher rates than students in the control group during this period. By the end of the two-year follow-up period, however, the differences between the two groups are no longer statistically significant.

- There is no evidence that the programs impacted persistence. During the two-year follow-up period, students in the program group enrolled in an average of 3.3 semesters, and students in the control group enrolled in an average of 3.4 semesters, a difference that is not statistically significant.

Impact Estimates for Primary Outcomes

Table 4.1 presents impact estimates two years after random assignment for key outcomes central to the program's theory of change. Box 4.1 discusses how to read the tables in this report.

Texas Developmental Summer Bridge Programs

Table 4.1

Key Academic Outcomes Two Years After Random Assignment

Outcome	Program Group	Control Group	Difference (Impact)	*p*	Standard Error
Semesters registered at any college[a]	3.3	3.4	-0.1	.37	0.1
Total credits attempted[b]	30.3	30.3	0.0	.98	1.2
College-level	24.2	23.5	0.7	.54	1.1
Developmental	6.1	6.7	-0.6*	.09	0.4
Total credits earned	19.4	19.9	-0.5	.59	1.0
College-level	15.9	15.9	0.0	.97	0.9
Developmental	3.5	4.0	-0.6**	.03	0.3
Passed first college-level math course (%)	46.5	43.0	3.5	.19	2.7
Passed first college-level reading course (%)	72.6	71.6	1.0	.68	2.4
Passed first college-level writing course (%)	71.7	68.3	3.3	.18	2.5
Sample size (total = 1,318)	793	525			

SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

[a]The number of semesters registered at any college is calculated based on Texas Higher Education Coordinating Board data, college transcript data, National Student Clearinghouse data, and student survey data.

[b]Credits attempted and earned are calculated based on college transcript data and include summer 2009 and summer 2010 terms.

Box 4.1

How to Read the Impact Tables in This Report

Many tables in this report use a similar format. The example table below displays impacts on two academic measures. The first row, for example, shows that 10.7 percent of the program group members and 4.8 percent of the control group members passed the first college-level math course.

Because individuals were assigned randomly either to the program group or to the control group, the effects of the program can be estimated by the difference in outcomes between the two groups. The column labeled "Difference (Impact)" shows the differences between the two research groups' outcomes — that is, the program's estimated impacts on the outcomes. For example, the estimated impact on passing the first college-level math course can be calculated by subtracting 4.8 percent from 10.7 percent, yielding an increase or estimated impact of 5.9 percentage points (rounded). The term *impact* refers to the "added value" of the program, or the program's effects that go above and beyond the effects of the services provided to the control group. This difference represents the *estimated* impact rather than the *true* impact because, although study participants are randomly assigned to the program and control groups, there is still a possibility that differences could be observed by chance.

Differences marked with one or more asterisks are *statistically significant*, meaning that there is only a small probability that the observed difference occurred by chance. The number of asterisks indicates the probability of observing differences at least as extreme as the observed differences if the program's true impact is zero. One asterisk corresponds to a 10 percent probability; two asterisks, a 5 percent probability; and three asterisks, a 1 percent probability. For example, as the first row of the example table shows, the program's estimated impact on students passing the first college-level math course is 5.9 percentage points. The three asterisks indicate that this difference is statistically significant at the 1 percent level, meaning that there is less than a 1 percent chance of observing a difference this large if the program's true impact is zero. In other words, one can be 99 percent confident that the program had a positive impact on students passing the first college-level math course.

The statistical significance is calculated using the standard error of the impact estimate, shown in the rightmost column. The standard error is a measure of uncertainty or variability around the impact estimate. There is about a 90 percent chance that the true impact is within plus or minus 1.65 standard errors of the estimated impact, roughly a 95 percent chance that the true impact is within plus or minus 1.96 standard errors of the estimated impact, and about a 99 percent chance that the true impact is within plus or minus 2.58 standard errors of the estimated impact. For example, in the first row of the table below, there is roughly a 99 percent chance that the program's impact on students' likelihood of passing the first college-level math course lies between 2.03 and 9.77 percentage points, calculated as $5.9 \pm (2.58 \times 1.5)$.

Outcome	Program Group (%)	Control Group (%)	Difference (Impact)	Standard Error
Passed first college-level math course as of Fall 2009	10.7	4.8	5.9***	1.5
Passed first college-level reading course as of Fall 2009	32.1	28.8	3.3	2.4

Persistence

Persistence toward the completion of a credential is of major concern to those involved in higher education. Participation in developmental summer bridge programs could cause students to have a successful initial experience with college, which may encourage them to persist. Persistence is measured by the cumulative number of semesters that students enrolled in college over the two-year period of the study.[6]

There is no evidence that the program impacted persistence in college. Table 4.1 shows that, as of the end of the follow-up period, students in the program group enrolled in an average of 3.3 semesters, while students in the control group enrolled in an average of 3.4 semesters; the difference in their outcomes is not statistically significant. Table 4.2 shows impact estimates for persistence and enrollment for each semester of the two-year follow-up period after the summer 2009 program semester. The first row for each semester shows the percentage of students in the program and control groups who registered at any college. The second row for each semester shows the cumulative average number of semesters that students in each group registered up to that time.

In the fall 2009 semester, 81.6 percent of students in the program group registered at a college, compared with 80.6 percent of students in the control group. The difference is not statistically significant. Consequently, there is no evidence that the program impacted enrollment in the semester immediately following the summer bridge programs. In general, the programs do not appear to have impacted registration rates in other semesters during the two-year follow-up period either, although a statistically significant difference does arise in the summer of 2010. This, however, could simply be due to chance because, all else being equal, the likelihood of observing a statistically significant impact increases as more semesters and more outcomes are considered. The magnitude of the summer 2010 estimate also appears to be an anomaly.

The semester-by-semester estimates for persistence parallel this trend. As of the fall 2009 semester, both groups of students had enrolled for an average of 0.8 cumulative semesters. The cumulative number of semesters enrolled grows for each subsequent semester and reflects a running total. For every semester, the difference between program and control group students in the cumulative semesters registered remains close to zero, and at no point is the difference statistically significant. In short, the program does not appear to have meaningfully impacted registration or persistence at any point in the follow-up period.

---

[6]The cumulative number of semesters is estimated using transcript data from the colleges, data from the THECB, and data from the National Student Clearinghouse. Data from summer 2009 are not included in this measure. Including them does not significantly change the two-year findings. The summer 2010 session is counted as distinct. Due to data limitations, winter sessions are included with spring semesters.

Texas Developmental Summer Bridge Programs

Table 4.2

Persistence and Enrollment Outcomes by Semester

Outcome	Program Group	Control Group	Difference (Impact)	*p*	Standard Error
Fall 2009					
Registered at any college (%)	81.6	80.6	0.9	.67	2.2
Total semesters registered at any college	0.8	0.8	0.0	.67	0.0
Spring 2010					
Registered at any college (%)	79.1	79.5	-0.4	.86	2.3
Total semesters registered at any college	1.6	1.6	0.0	.89	0.0
Summer 2010					
Registered at any college (%)	39.6	45.5	-5.9**	.03	2.7
Total semesters registered at any college	2.0	2.1	-0.1	.33	0.1
Fall 2010					
Registered at any college (%)	66.8	67.7	-0.9	.74	2.6
Total semesters registered at any college	2.7	2.7	-0.1	.39	0.1
Spring 2011					
Registered at any college (%)	63.9	65.8	-1.9	.49	2.7
Total semesters registered at any college	3.3	3.4	-0.1	.37	0.1
Sample size (total = 1,318)	793	525			

SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data, college transcript data, National Student Clearinghouse data, and student survey data.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

Credit Accumulation

Credit accumulation serves as a rough proxy for progress toward a degree. Compared with students who have similar developmental education needs, students who earn more developmental credits are generally making greater progress toward completing developmental course sequences, and students who earn more college-level credits are generally moving closer to satisfying degree requirements.[7] This evaluation considers the total number of credits attempted and earned during the follow-up period, including estimates for both college-level (i.e., degree-applicable) and developmental credits.[8]

As Table 4.1 shows, there is no evidence that the program impacted attempted credits or earned total credits on average. By the end of the spring 2011 semester, students in the program and control groups had attempted an average of 30.3 credits (these include both college-level and developmental credits). Students in the program group earned an average of 19.4 credits, and students in the control group earned an average of 19.9 credits, a difference that is not statistically significant. These estimates include students who did not earn any credits.

There is also no statistically significant difference in the estimated average number of attempted college-level credits (24.2 for students in the program group and 23.5 for students in the control group) or the average number of college-level credits earned (15.9 for both groups).

For developmental credits, the estimated difference is statistically significant on both measures. On average, program students attempted 0.6 fewer developmental education credits than students in the control group and also earned an average of 0.6 fewer developmental credits. Further analysis, however, suggests that these differences do not reflect real differences in the amount of developmental classroom time in which students in the two groups participated. Instead, several colleges' developmental summer bridge programs involved freestanding developmental education work for which students did not receive credit. Subgroup analyses show that program students who enrolled in these colleges earned fewer developmental credits than their counterparts in the control group, even though they participated in developmental work through the program; they simply did not earn credit for this work. At colleges where course-based summer bridge programs did

[7]All of the students in this study were deemed unprepared for college-level courses in at least one subject, so very few students were expected to earn two-year degrees within the two-year period. Results indicate that 3.3 percent of the program group and 2.7 percent of the control group earned degrees (the difference is not statistically significant).

[8]All estimates related to credits attempted and earned are derived from transcript data from the colleges. The THECB provided data on all attempted credits but only on developmental education credits earned. Including the available THECB data does not substantively change the findings.

award credit for developmental education work, program and control group students earned about the same number of developmental education credits. Consequently, the overall difference in developmental credits earned appears to be driven by colleges with freestanding programs that did not award credit for developmental education classroom time; the data do not suggest that the program reduced the amount of developmental work that students completed (see Table A.7 for more detail).

Table 4.3 shows cumulative impact estimates for attempted credits and earned credits for each semester of the two-year follow-up period after the summer 2009 program semester. In general, there do not appear to meaningful differences in credits attempted or credits earned at any point during the two-year follow-up period. Although statistically significant differences do arise for developmental credits, they do not appear to reflect meaningful differences in the amount of developmental work attempted and completed by students.

College-Level Course Completion

We also examine whether the developmental summer bridge programs helped students advance to and complete their first college-level courses in math, reading, and writing. This indicates whether program group students were less likely to need remediation in college or had advanced more rapidly through the developmental course sequence.

The last three rows in Table 4.1 show whether the program helped students advance into and through first college-level courses in math, reading and writing. These rows indicate the percentage of students in the program and control groups who passed first college-level courses in each subject up to two years after random assignment.[9] Although the program group does initially show small gains over the control group (discussed below), at the end of the two-year follow-up period, none of the differences in their outcomes are statistically significant. After two years, 46.5 percent of students in the program group passed college-level math, compared with 43.0 percent of students in the control group. In reading, 72.6 percent of students in the program group passed a college-level course, compared with 71.6 percent in the control group. In writing, 71.7 percent of students in the program passed a college-level course, compared with 68.3 percent of students in the control group.

[9]Transcript data from the colleges and the THECB data provide information about college-level course completion. For this report, students are determined to have passed a college-level course in a given subject if either data source identifies them as passing the course in any semester. Considering the data sources separately or prioritizing one data source over the other does not significantly change the substantive conclusions.

Texas Developmental Summer Bridge Programs

Table 4.3

Persistence and Enrollment Outcomes

Outcome	Program Group	Control Group	Difference (Impact)	*p*	Standard Error
Fall 2009					
Total credits attempted	9.7	9.4	0.3	.45	0.4
College-level	6.2	5.7	0.4	.16	0.3
Developmental	3.5	3.7	-0.2	.44	0.2
Total credits earned	6.1	6.2	-0.1	.68	0.3
College-level	4.0	4.0	0.1	.74	0.3
Developmental	2.0	2.3	-0.2	.20	0.2
Spring 2010					
Total credits attempted	17.4	17.0	0.4	.52	0.6
College-level	12.4	11.6	0.8	.13	0.5
Developmental	5.0	5.4	-0.4	.16	0.3
Total credits earned	10.8	11.0	-0.2	.76	0.5
College-level	8.0	7.8	0.2	.66	0.5
Developmental	2.9	3.2	-0.4*	.10	0.2
Summer 2010					
Total credits attempted	19.1	19.0	0.1	.85	0.7
College-level	13.9	13.4	0.5	.41	0.6
Developmental	5.2	5.6	-0.4	.22	0.3
Total credits earned	12.0	12.5	-0.5	.41	0.6
College-level	9.0	9.2	-0.1	.81	0.5
Developmental	3.0	3.4	-0.4	.11	0.2
Fall 2010					
Total credits attempted	25.2	24.8	0.4	.66	1.0
College-level	19.4	18.5	0.9	.28	0.9
Developmental	5.8	6.3	-0.5	.14	0.3
Total credits earned	16.0	16.4	-0.4	.64	0.8
College-level	12.7	12.5	0.2	.81	0.7
Developmental	3.3	3.8	-0.5**	.03	0.3
Spring 2011					
Total credits attempted	30.3	30.3	0.0	.98	1.2
College-level	24.2	23.5	0.7	.54	1.1
Developmental	6.1	6.7	-0.6*	.09	0.4
Total credits earned	19.4	19.9	-0.5	.59	1.0
College-level	15.9	15.9	0.0	.97	0.9
Developmental	3.5	4.0	-0.6**	.03	0.3
Sample size (total = 1,318)	793	525			

SOURCE: NCPR calculations from college transcript data.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

First College-Level Course Completion in Math

Figure 4.1 compares the cumulative percentage of students in the program and control groups who passed the first college-level math course in each semester of the follow-up period. There is strong evidence that the program positively impacted the percentage of students who passed the first college-level math course in the semester following the developmental summer bridge program, and the impact is evident for the first year and a half. In fall 2009, 10.7 percent of students in the program group passed college-level math, compared with 4.8 percent of students in the control group — a statistically significant difference of 5.9 percentage points. In the spring of 2010, the estimated difference grows to 9.4 percentage points and remains statistically significant. In subsequent semesters, however, the estimated difference steadily decreases, although it remains statistically significant through the fall of 2010. By the end of the follow-up period in the spring of 2011, the difference is no longer statistically significant.

First College-Level Course Completion in Reading

Figure 4.2 shows the percentage of students in each group who passed their first college-level reading course in each semester of the follow-up period. In every semester, students in the program group passed college-level reading at slightly higher rates than students in the control group, but the difference is only statistically significant (at the 10-percent level) in the spring of 2010. It is difficult to tell whether this marks a real impact or a difference due to chance. The pattern of positive differences is suggestive, but conclusions about impacts on college-level reading are more tentative than those for math. By the end of the follow-up period, the estimated difference decreases to one percentage point and is not statistically significant, suggesting the program had no impact on completion of the first college-level reading course at the end of two years.

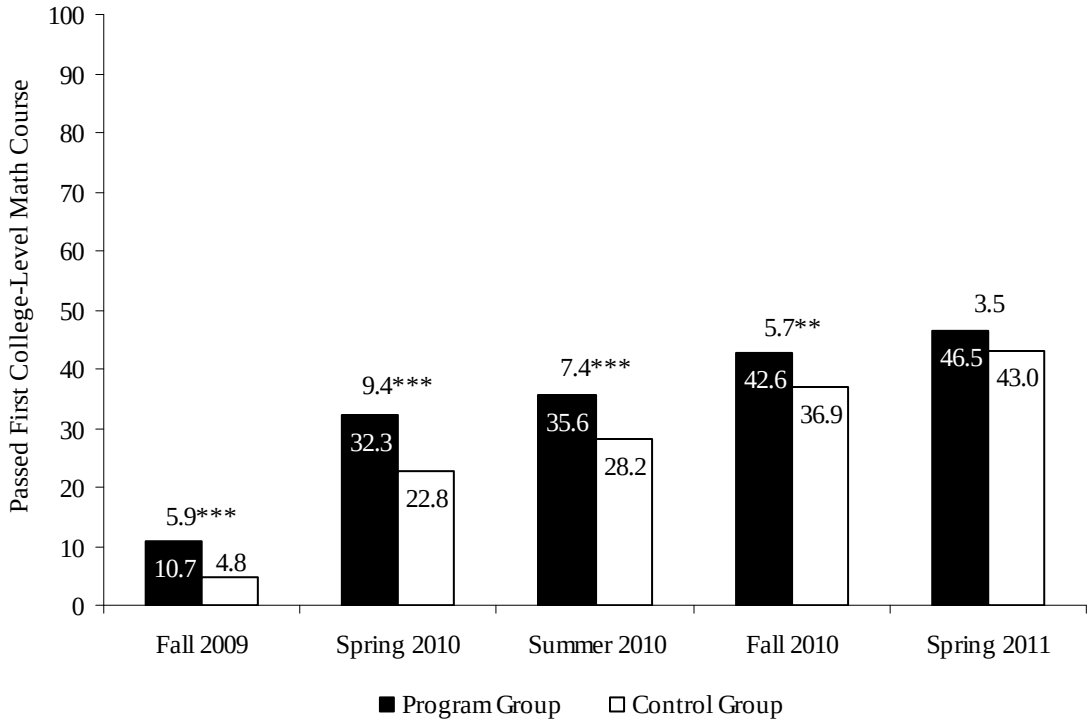
First College-Level Course Completion in Writing

Figure 4.3 shows the percentage of students in each group who passed the first college-level writing course in each semester of the follow-up period. There is strong evidence that the program positively impacted the percentage of students who passed the first college-level writing course in the semester following the developmental summer bridge program. Figure 4.3 shows that 32.9 percent of students in the program group passed college-level writing in the fall of 2009, compared with 28.8 percent of students in the control group, and the estimated difference of 4.1 percentage points is statistically significant at the 10-percent level. The estimated difference is positive throughout the follow-up period and statistically significant for the first four semesters, but as with math, by the end of the final semester, the difference is no longer statistically significant.

Texas Developmental Summer Bridge Programs

Figure 4.1

Cumulative Percentage of Students Passing College-Level Math by Semester



SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data.

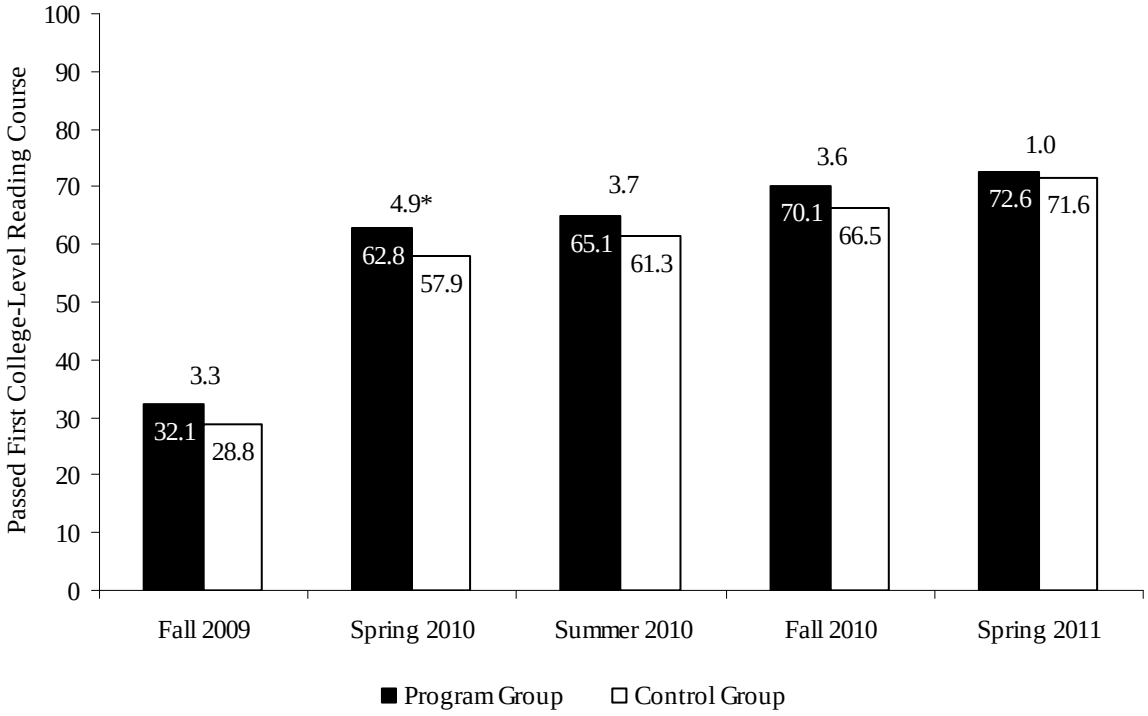
NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

Texas Developmental Summer Bridge Programs

Figure 4.2

Cumulative Percentage of Students Passing College-Level Reading by Semester



SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data.

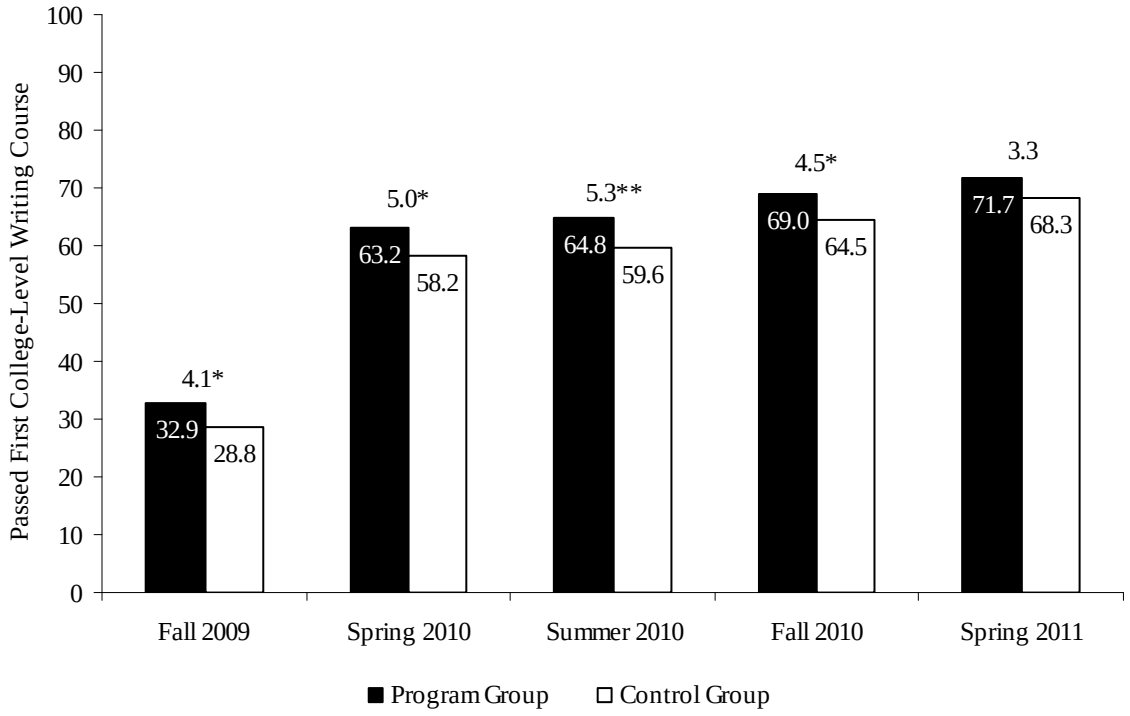
NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

Texas Developmental Summer Bridge Programs

Figure 4.3

Cumulative Percentage of Students Passing College-Level Writing by Semester



SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

Secondary Measures of Program Effects

In addition to the primary outcome measures discussed above, this evaluation examines students' progression though the developmental sequences, students' receipt of financial aid, and variation in program impacts for different student subgroups.

Progression Through Developmental Education Sequences

To examine whether program and control group students progressed through the developmental education sequences at different rates, we performed an analysis of the highest level that students completed in math, reading, and writing.[10] Interpretation of this analysis is complicated because not all students in the sample attempted courses in each subject. Generally, around 85 percent of students attempted at least one course in a given subject by the end of the follow-up period. Because the program and control group students who attempted each subject may have differed systematically from each other and from the larger sample, estimates pertaining to students' progression should not be interpreted causally.

Table A.1 (located in Appendix A) presents data on the percentages of students in the program and control groups who attempted each subject and compares the groups' average highest level completed in each subject. The indices in this table are measures of how far students who attempted each subject area had progressed, on average, by the end of the two-year follow-up period. This information is shown on a scale of 0 to 3, where 0 is college level and 3 is three levels below college-level. For example, program group students who attempted math were, on average, 0.8 courses below college-level in math at the end of the two-year period. Control group students who attempted math were 1.0 course below college-level, a little lower in the math sequence. This difference was not statistically significant. Both groups of students were, on average, just below college-level in reading and writing at the end of the two-year period.

Financial Aid

As discussed in Chapter 1, the college knowledge component of the developmental summer bridge programs included information about financial aid. At the Alamo Colleges (San Antonio, Palo Alto, and St. Philip's), in particular, students received assistance in filling out financial aid application forms when they enrolled in the program. Consequently, we examined whether program group students received more financial aid than control

[10]Transcript data from the colleges and the THECB data provide information about college-level course completion. For this report, students are determined to have passed courses in a given subject if they were identified as doing so by either data source.

group students and whether differences are evident for the students in the program group at the Alamo Colleges.[11] Table 4.4 shows the estimated impacts on financial aid.

The program positively impacted the percentage of students who received financial aid during the fall semester following the summer program: 59.2 percent of students in the program group received some form of financial aid, compared with 54.1 percent of students in the control group. The 5.1 percentage point impact estimate is statistically significant at the 10-percent level and appears evenly distributed across the receipt of Pell grants (3.4 percentage point estimate) and other aid (3.1 percentage point estimate). There is no evidence that program group students received greater amounts of aid on average than control group students.

What is more, there is no evidence that program students continued to receive more financial aid after the fall semester following the summer program (see Table A.3). Subgroup analyses comparing Alamo Colleges to the other colleges provide a potential explanation. There is some evidence that the impact in financial aid is related to how the program was implemented at the Alamo Colleges, where students appear to have received more intensive assistance with completing their financial aid forms. The impacts on financial aid receipt were significantly larger at the Alamo Colleges than at the other colleges; this appears to be driving the average impact on financial aid receipt (see Table A.4). Because these impacts are evident only during the first year and only at the Alamo Colleges, it may be that intense assistance is necessary to produce an effect.

Subgroup Analyses

Additional analyses examined whether student outcomes varied in relation to factors thought to be predictive of student success. Demographic characteristics examined included gender and socioeconomic status as indicated by mother's highest level of education.[12] We also examined whether course-based and freestanding developmental summer bridge programs produced different impacts. There is no evidence that program impacts varied by any of these characteristics (see the Tables A.5–A.7 for detailed estimates).

[11]Financial aid data provided by the colleges are used to examine this measure.
[12]See Ensminger et al. (2000) for more detail about this measure.

Texas Developmental Summer Bridge Programs

Table 4.4

Financial Aid Outcomes in the 2009–10 Academic Year

Outcome	Program Group	Control Group	Difference (Impact)	*p*	Standard Error
Fall 2009					
Registered at summer bridge school (%)	71.6	70.1	1.5	.56	2.5
Received financial aid (%)	59.2	54.1	5.1*	.06	2.8
Pell grant	47.0	43.7	3.4	.22	2.8
Other aid	49.7	46.6	3.1	.27	2.8
Average aid received ($)	1,053	1,008	45.4	.48	63.9
Pell grant	954	899	55.0	.39	63.8
Other aid	355	370	-15.3	.63	32.0
Sample size (total = 1,318)	793	525			
Spring 2010					
Registered at summer bridge school (%)	66.7	64.6	2.1	.41	2.6
Received financial aid (%)	58.4	55.0	3.4	.22	2.7
Pell grant	46.8	45.2	1.6	.57	2.7
Other aid	50.5	49.5	1.0	.73	2.8
Average aid received ($)	1,014	1,002	12.5	.84	62.5
Pell grant	918	897	21.0	.74	62.3
Other aid	404	416	-11.3	.73	32.8
Sample size (total = 1,050)	525	525			

SOURCE: NCPR calculations from college transcript and financial aid data.

NOTES: Rounding may cause slight discrepancies in sums and differences. Aid amounts are rounded to the nearest dollar. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.
*$p < .10$. **$p < .05$. ***$p < .01$.

Chapter 5

Program Costs and Cost Analysis

The cost analysis of the developmental summer bridge programs was originally conducted to provide descriptive information on program costs as well as to conduct a cost–benefit or cost-effectiveness analysis. While the analysis of program costs was straightforward, we were unable to perform a cost-effectiveness analysis because the outcomes with positive impacts (e.g., passing college-level math in the first year and a half following the program) are not easily monetized. Instead, we performed a "break-even" analysis using a cost-effectiveness analysis framework. In our examination, we considered two questions. First, what factors contributed to the variations in the costs of running the programs across the eight sites? Second, what impact on college-level credit accumulation would the programs have had to produce in order to be considered cost effective?

Summary of Program Costs

Program costs were calculated using the ingredients method, which attempts to identify and assign a cost to each of an intervention's many parts (Levin & McEwan, 2001). Information on costs was collected via a standard questionnaire devised by NCPR for the developmental summer bridge programs.[1] The costs are summarized costs in Table 5.1. None of the colleges applied a direct cost-recovery formula for program overhead, so a uniform rate of 30 percent was applied on all direct costs.[2] For simplicity, we divided the cost ingredients into four areas: staffing, other costs, student resources, and overhead.

Across the eight sites, approximately one third of the costs were for staffing (instructional, managerial, and administrative staff), and just over one quarter were for student stipends. The programs' summer 2009 recruitment budgets were higher than usual as a result of the experimental design, which required a higher number of applicants to the program than could be served. NCPR encouraged participating colleges to recruit vigorously and provided resources and technical assistance for that purpose.

---

[1] The questionnaire, which was administered to program staff, collected information on ten components: participation rates; program duration; teaching staff; non-teaching, administrative, and recruitment staff; in-kind resources; course preparation; materials, facilities, and overhead costs; funding sources; tuition and fees; and any other expenses. Wage estimates include fringe benefits (if incurred). The questionnaire form is available on request.

[2] The 30 percent overhead rate is based on review of overhead rates applied at colleges across the U.S. We test for sensitivity to the overhead rate below.

Texas Developmental Summer Bridge Programs

Table 5.1

Program Costs

	El Paso	CyFair	Kingwood	South Texas	TAMIU	Palo Alto	San Antonio	St. Philip's	Average
Program group members	165	75	52	83	126	53	91	154	100
Staffing costs ($)	504	222	393	418	726	278	587	168	426
Other costs ($)	68	183	425	165	570	365	97	175	235
Student resources ($)	414	238	424	451	512	357	-38	373	354
Overhead ($)	296	193	373	310	542	300	194	215	304
Cost per program group member ($)	1,282	835	1,615	1,343	2,349	1,299	840	930	1,319
Total cost ($)	211,512	62,633	83,963	111,463	296,033	68,853	76,458	143,218	123,160

NOTE: Costs are reported in 2009 dollars.

Total costs ranged from $62,633 to $296,033 per college. Part of the variation in costs is due to variations in program duration, intensity, and enrollment. The large variation in students served is the most important driver of the cost variation. Table 5.1 shows the average cost per participant. Across the eight sites, average costs ranged from $835 to $2,349. The average across all eight sites was $1,319 (with a standard deviation of $502).[3] Unsurprisingly, there is no strong evidence of economies of scale in terms of numbers of students enrolled; the high-value stipend (up to $400, but averaging $354 for students who received a stipend) is a constant for each student.

Cost Variation

The costs of running the developmental summer bridge programs varied widely across institutions. Examining two institutions with above average costs and two with below average costs helps to illuminate which programmatic aspects drove these variations. In general, the higher cost programs devoted extra funds to program planning and preparation as well as to services for students, and the lower cost programs were able to take advantage of existing resources or arrangements that lowered their costs.

[3]Some costs may be interpreted as start-up costs, which are unlikely to be needed if the programs are run in subsequent years. Amortizing these costs over three years reduces the average cost of the programs.

Higher Cost Programs

TAMIU's program had the highest cost per student at $2,349. In fact, removing TAMIU from the calculation of cost per student decreases the average by almost 12 percent, from $1,319 to $1,163 per student. The high cost of TAMIU's program appears to be the result of a number of factors. First, the number of instructional contact hours (100) was relatively high. Second, TAMIU offered more benefits to workers than other institutions did. As a percentage of salary, TAMIU calculated benefits at 29 percent, compared with other sites that either did not offer benefits or utilized a rate of between 12 percent and 22 percent. Third, TAMIU emphasized the use of tutors; the program employed 20 tutors for 19 hours per week. Both the number of tutors and the number of hours worked per week were higher at TAMIU than at other sites. Fourth, TAMIU provided a daily lunch for all students at a cost of approximately $20,000. Although no single expenditure was uncharacteristically high, TAMIU was on the higher end of many costs, and this appears to have had an incremental, additive effect on overall program costs.

The program at Lone Star College–Kingwood had the second-highest cost per student at $1,615. Its average appears to have been driven up by costs associated with program preparation, facilities, and learning resources. Kingwood spent an unusually large number of hours preparing to offer the program. This was due to the fact that the program was run by a new coordinator and was located in a new department of the college in the summer of 2009. Furthermore, much of this work was coordinated by the Dean of Student Services, who had a higher salary than the program directors at other colleges. Kingwood also provided free lunches for all students and held catered opening and closing ceremonies for students and their families (approximately 100 people).

Lower Cost Programs

San Antonio College's cost per student was lower than the average at $840. This appears to be due to the $480 students had to pay to participate in the program, which was deducted from the final cost to the college. Although a large percentage of participants received Pell grants or other financial aid, the revenue that the institution received from students significantly decreased the costs required to run the program. San Antonio College actually had a small negative cost in the student resources category, which included the stipend of up to $400.

Lone Star College–CyFair had the lowest per-student program costs at $835. This appears to be the result of small savings in many areas. First, there were no benefits provided to personnel who helped to administer or teach in the program. Second, while institutions normally cover the cost of textbooks, CyFair was able to loan students textbooks that had been purchased in previous years. Further, students had to pay $150 to

attend the program.[4] This effectively reduced the value of the student stipend from $400 to $250, as the students' program tuition was taken directly from the stipend. This reduced the costs associated with the student resources category, though not as dramatically as at San Antonio College.

Break-Even Analysis

For the break-even analysis, the primary outcome of interest is marginal earned college credits accumulated by the program group. Other outcomes could be utilized, but they each present problems in this type of analysis. For example, academic persistence, defined here as the number of semesters enrolled, is not sufficiently distinguishable from credit accumulation. Certain other outcomes — such as passing the first college-level course in math, reading, or writing — are difficult to monetize. Secondary outcomes, such as financial aid receipt, may be valuable to the student, but they are only socially valuable insofar as they lead to credit accumulation. Therefore, although the program may have affected other outcomes, we focus on earned college credits for the break-even analysis, as this outcome is of interest to practitioners and policymakers and more easily operationalized.

Specifically, we focus on the additional number of college credits the program group would have had to earn for the program to break even in a cost-effectiveness framework. Although we only tracked students for two academic years, the logic of the break-even analysis can be extended beyond that time frame. In fact, students in the program group have an indefinite amount of time to earn the additional credits required for the program to break even. However, our discussion is limited to the two academic years following program participation. Although we conducted this analysis retroactively, it could be beneficial to conduct a break-even analysis prior to beginning a research study. After estimating the costs required to run a program, it is possible to estimate the magnitude of effect on any outcome of interest that would be required for the program to be considered cost effective.

In general, there are three approaches that could be used to determine if the program was cost effective: cost-consequences analysis, cost–benefit analysis, and cost-effectiveness analysis.[5] We chose to use cost-effectiveness analysis (CEA), which determines whether it is cheaper to obtain educational outcomes using the developmental summer bridge

[4]CyFair and Kingwood, both part of the Lone Star College System, charged students $150 to participate in the program. This is the cost of a standard summer developmental course. Students could either pay the charge up front or have it deducted from their stipend. An overwhelming majority of students chose to have it deducted from their stipend, effectively lowering the stipend amount from $400 to $250.

[5]For a review of these three methods, see Levin and McEwan (2001).

programs or via standard educational offerings, also called the "business-as-usual" condition. The additional expense of a program may be justified if it yields more of the desired outcome (i.e., college credits earned).[6] Because we are focusing on only one outcome of the program — the additional number of college credits for the program group — its cost-effectiveness can be reported straightforwardly.[7]

Program Costs

Costs for the program were calculated from the perspective of the college delivering the program. We considered this of greatest value to other institutions that may be looking to implement a developmental summer bridge program. All resources used by the colleges to implement the programs were counted, but resources required to develop the programs were not considered.

Across the eight sites, the program cost was, on average, $1,319 per student (with a standard deviation of $502). There are two critical considerations in applying this cost measure to our analysis. First, this expenditure includes a stipend paid to students. We assume that this stipend is a cost — i.e., that the student would not have enrolled unless "paid" to do so. However, a portion of the stipend might be interpreted from a societal perspective as a transfer from the funder to the student. If the stipend is a transfer, it is not a cost, so this amount should be subtracted from the cost total.

Second, the cost of the program should be net of the costs of business as usual. If some control group students are enrolled in other summer educational programs, the costs to society of these activities should be subtracted. However, it is hard to model the exact costs of other summer programs. Therefore, we assume that the full program resources made students choose the developmental summer bridge program rather than an alternative summer activity. This allows us to maintain the assumption that the cost per participating student is $1,319. We address these two assumptions — the nature of the stipend and the business-as-usual conditions — in our sensitivity analysis below.

---

[6] CEA also allows for comparison across individual developmental summer bridge programs to determine which yields the most positive outcomes per dollar spent; however, the sample sizes from each college are prohibitively small to determine this.

[7] Typically, cost-effectiveness analysis is less useful because it requires cost-utility analysis in order to collapse all outcomes into a single index. In this case, there is only one outcome, so cost-effectiveness analysis may be used.

Cost of a College Credit

For the cost-effectiveness analysis, we have to assign a monetary value to college credits. To determine this value, we calculate the cost of a college credit using the willingness-to-pay (WTP) method: If we had to "buy" a credit, what would we have to pay? In this case, the WTP value for credits is approximated by the amount currently spent on a credit in Texas. This includes not only what students pay in tuition and fees but also the public subsidies provided to colleges. In Texas, this amount is $338 (standard deviation $119).[8]

Cost-Effectiveness Analysis

For the cost-effectiveness analysis, we determine how many additional college credits a program student would need to earn relative to a control student in order for the program to be "worth it," i.e., effective in its ability to provide students with additional credit at the same cost as colleges typically spend per credit earned at the college. To calculate this, the average value of the stipend needs to be spread across the entire program group, not just the students who received the stipend. This lowers the average value of the stipend from $354 to $326. With this adjustment, the per-student cost of providing the program is $1,291. Based on the program costs and our WTP calculation, in order to be cost-effective (or break even), the program group would have to earn an additional 3.8 college-level credits (3.8 = $1,291/$338) on average.

Sensitivity Analysis: Alternative Assumptions

In our sensitivity analysis, we test two key assumptions about costs: how to interpret the stipend and how to calculate the cost of the business-as-usual condition. It may be appropriate to interpret the stipend as a transfer from one group (the funders of developmental summer bridge program) to another group (the students). If so, then the stipend should not be counted as a cost of the program. The average value of the stipend across the entire program group was $326, so removing it reduces the cost of the program from $1,291 to $965 per program group member.

In terms of defining the cost of the business-as-usual condition, we know that 16 percent of the control group (Wathington et al., 2011, Table 4.1) enrolled in a standard developmental course during the summer. The costs of these courses are unknown.

[8]This is the average expenditure per credit across seven of the eight colleges, based on data from the Integrated Postsecondary Education Data System (IPEDS) on expenditures per full-time equivalent (FTE) (2008 data uprated to 2011 dollars). Expenditures per FTE are adjusted to capture expenditures per credit attempted. One college does not have available IPEDS data.

Assuming that these courses are valued at three credits, the net cost of the program falls from $1,291 to $1,129, a reduction of $162.

Combining these two assumptions (reducing the cost by a total of $488), a lower bound estimate of the per-student cost of the program is $803. If we use this value, which is slightly lower than the lowest cost program, the program group students needed to earn 2.4 ($803/$338) college-level credits more than the control group earned for the program to break even as measured by the ability to provide program students with additional credit at the typical cost to the college.

Chapter 6

Conclusions and Implications

This study sought to assess whether developmental summer bridge programs reduce students' need for developmental coursework upon fall matriculation and improve their outcomes in college. Recent research suggests that too few students advance from traditional developmental courses to college-level courses, which increases the pressure on colleges to identify and scale up successful developmental education initiatives. This study offers additional evidence on the effectiveness of one intervention designed to help developmental students succeed in college. This chapter summarizes the study's key findings at the end of a two-year follow-up period discusses the implications and raises questions for further consideration.

Review of Findings

The following are the most important findings from the study:

- The programs had no discernible effect on the average number of credits attempted or earned. Program group and control group students attempted the same number of credits (30.3). Students in the program group earned an average of 19.4 credits, and students in the control group earned an average of 19.9; the difference in their outcomes is not statistically significant.

- The programs had an impact on first college-level course completion in math and writing that was evident in the year and a half following the program but no impact on first college-level course completion in reading during the same period. On average, students in the program group passed their first college-level math and writing courses at higher rates than students in the control group during this period. By the end of the two-year follow-up period, however, the differences between the two groups are no longer statistically significant.

- There is no evidence that the programs impacted persistence. Over the course of the two-year follow-up period, students in the program group enrolled in an average of 3.3 semesters, and students in the control group enrolled in an average of 3.4 semesters; the difference in their outcomes is not statistically significant.

The Meaning of the Findings in Context

The developmental summer bridge programs were effective in reducing the need for developmental education in college for the first year and a half following the program, as indicated by the greater number of program group students who passed their first college-level math and writing courses during the fall 2009, spring 2010, and fall 2010 semesters. This is a significant achievement and shows that the programs accomplished much of what they were intended to do. Yet the lack of detectable impacts on these same outcomes by the end of the spring 2011 semester suggests that the effects of the programs diminished in later years.

The developmental bridge programs had no significant influence on two other important indicators of college student success — accumulation of credits and persistence. A careful review of the implementation research suggests that this finding is not due to poor or impartial program implementation by the colleges in this study. It is possible that the contrast between program and control group outcomes was reduced because 16 percent of the control group enrolled in summer courses during the summer of 2009, and these courses may have provided some of the same benefits as the developmental summer bridge program. However, this explanation probably does not fully explain the program's lack of positive impacts on credit accumulation and persistence or its modest but transitory positive impacts on college-level course completion.

It is also important to consider these findings in context. The students in this study were not selected to be a random sample of a larger population, and the impact estimates may not be generalizable to a larger population of colleges or students. While the students in our sample all started below college level in at least one subject, they were all highly motivated to take summer courses in preparation for college. Both program group and control group students enrolled in college at relatively high rates during the fall semester following the program. Since both groups of students were highly motivated, it may be that we should not expect to see large, long-term differences in their rates of college enrollment and persistence.

Implications for Theory and Practice

The findings in this report suggest that the developmental summer bridge program model contributed to positive outcomes in college-level course completion that were evident during the first year and a half following program completion. But it is important to note that these impacts faded over time. What is more, the programs do not appear to have encouraged persistence or credit completion. It may be the case that it was too ambitious to expect that the program model would produce significant impacts on these

outcomes. Perhaps the modest positive outcomes observed are as much as can be expected from a short, intensive summer program.

First-year developmental education students may need additional transitional support beyond the developmental summer bridge program for greater impacts to be achieved. Unfortunately, we do not know exactly how much support developmental students require to advance to college-level work and continue to progress toward degree completion. A longer term intervention that continues to offer support to students after fall matriculation might increase the impact of developmental summer bridge programs; however, this implication is speculative at best.

In addition, our research suggests that the completion of students' first college-level courses in math or writing might not readily translate into the accumulation of more college credits. Thus, if the ultimate goal is college credential attainment, and credit accumulation is the indication of progress toward attaining a credential, then improving basic academic competencies through intensive remedial instruction and guidance about the college experience may not be the most effective way to promote attainment of this goal. Policymakers and practitioners may want to consider approaches that have a more direct link to credit accumulation and credential attainment.

While college preparation is certainly associated with credential attainment, our study may imply that it is not possible to fully address students' academic shortcomings during the relatively short timeframe of the summer bridge programs. Ideally, educators would be able to help students become more academically prepared while still in high school. Summer bridge programs could then attempt to remediate those educational deficits that remained, which could be fewer and milder. First-year experience programs might then assist students as they begin college, and ongoing supports in college-level courses could be offered. Alternatively, early interventions could span students' time in both high school and college, or high schools and colleges could work in closer partnership to increase the number of students who graduate from high school college-ready.[1]

Finally, our break-even cost analysis suggests that students in developmental summer bridge programs would need to earn almost four additional college credits — or complete a little more than one additional college course (typically worth three credits) —

[1] For example, Virginia's Capstone Courses in math and English, offered to students in their senior year of high school, were developed in partnership with several universities to better prepare students for college. The Getting Ready for Success program in Tacoma, Washington, seeks to boost low-income students' college matriculation and success by offering students an array of services, including academics, mentoring, and monetary incentives. The program runs from the summer before students' senior year of high school through their first year of postsecondary education.

for the program to provide students with credits at the typical cost per credit in Texas. The developmental bridge program model is relatively expensive and requires the availability of funds from outside of regular K-12 (average daily attendance) and higher education (FTE) public funding mechanisms. Educators may want to consider ways to reduce costs by embedding support programs such as these into the regular high school or college schedule.

Implications for Research

In addition to implications for theory and practice, there are additional considerations for future research. The results of this study suggest that, after the first year and a half, students were more likely to have passed introductory math and writing. Other quasi-experimental summer bridge studies demonstrate positive findings (Santa Rita & Bacote, 1997; Strayhorn, 2011), but program students are seldom followed for as long as two years as they were in the current study. It is possible that an even longer follow-up is required to fully assess the effectiveness of these programs, which may ultimately turn out to influence longer term outcomes such as credential completion or career success.

Further, because the program features were tested together as a bundle, it is impossible to know if any of the four program components contributed more than others to the program's impacts on student outcomes. Research could be conducted that permits a more fine-grained analysis of the separate features of the program. Similarly, we might collect more information on whether these programs are likely to be more effective in math, English, or another subject area.

Researchers may also wish to consider whether other strategies could be used in college to improve students' skills in math and English. Would these strategies complement traditional developmental education or summer bridges, or would they replace them? Additional research could be undertaken to cast light on the specific design features and strategies that could influence outcomes, whether implemented separately or as a pieces of a coordinated effort.

Finally, more information is needed on whether there are groups of students who are more likely to benefit from a developmental summer bridge program. For example, are there levels of developmental need that can be addressed effectively by a developmental summer bridge program? Are these relatively short programs best suited for students who are almost college ready or for those with more serious deficits? Further research would be required to answer these questions.

Concluding Thoughts

The developmental summer bridge programs studied here were found to have modest positive impacts in the short-term. What is clear from this study and other developmental education research is that simple, short-term interventions yielding strong, long-term effects are difficult to find. We offer two suggestions for action in advancing the work of supporting underprepared students: (1) introducing new partnerships between high schools and colleges that reduce the need for remediation in college and (2) providing more support and transitional experiences to help students reach and sustain attainment goals. Because educational attainment is the result of a long process influenced by many factors, providing supports to students that span their years in high school and college may help them to develop the skills and knowledge required for postsecondary success.

Appendix A

Supplementary Tables

Texas Developmental Summer Bridge Programs

Appendix Table A.1

Progression Through Developmental Education Sequences in Math, Reading, and Writing Two Years After Random Assignment

Outcome	Program Group	Control Group	Difference (Impact)	*p*	Standard Error
Attempted any course (%)					
Math	84.3	83.2	1.1	.61	2.0
Reading	86.3	85.7	0.6	.77	1.9
Writing	86.4	83.4	3.0	.13	2.0
Sample size (total = 1,318)	793	525			
		Math			
Progression index	0.8	1.0	-0.1		
Sample size (total = 1,105)	668	437			
		Reading			
Progression index	0.2	0.3	0.0		
Sample size (total = 1,134)	684	450			
		Writing			
Progression index	0.2	0.2	0.0		
Sample size (total = 1,123)	685	438			

SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

Texas Developmental Summer Bridge Programs

Appendix Table A.2

Cumulative Percentage of Students Passing College-Level Courses in Math, Reading, and Writing by Semester

Outcome	Program Group	Control Group	Difference (Impact)	*p*	Standard Error
Passed first college-level math course (%)					
Fall 2009	10.7	4.8	5.9***	.00	1.5
Spring 2010	32.3	22.8	9.4***	.00	2.4
Summer 2010	35.6	28.2	7.4***	.00	2.5
Fall 2010	42.6	36.9	5.7**	.03	2.6
Spring 2011	46.5	43.0	3.5	.19	2.7
Passed first college-level reading course (%)					
Fall 2009	32.1	28.8	3.3	.17	2.4
Spring 2010	62.8	57.9	4.9*	.06	2.6
Summer 2010	65.1	61.3	3.7	.14	2.5
Fall 2010	70.1	66.5	3.6	.14	2.5
Spring 2011	72.6	71.6	1.0	.68	2.4
Passed first college-level writing course (%)					
Fall 2009	32.9	28.8	4.1*	.10	2.5
Spring 2010	63.2	58.2	5.0*	.06	2.6
Summer 2010	64.8	59.6	5.3**	.04	2.6
Fall 2010	69.0	64.5	4.5*	.08	2.5
Spring 2011	71.7	68.3	3.3	.18	2.5
Sample size (total = 1,318)	793	525			

SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

Texas Developmental Summer Bridge Programs

Appendix Table A.3

Financial Aid Outcomes in the 2010–11 Academic Year

Outcome	Program Group	Control Group	Difference (Impact)	*p*	Standard Error
Spring 2010					
Registered at summer bridge school (%)	66.7	64.6	2.1	.41	2.6
Received financial aid (%)	58.4	55.0	3.4	.22	2.7
Pell grant	46.8	45.2	1.6	.57	2.7
Other aid	50.5	49.5	1.0	.73	2.8
Average aid received ($)	1,014	1,002	12.5	.84	62.5
Pell grant	918	897	21.0	.74	62.3
Other aid	404	416	-11.3	.73	32.8
Fall 2010					
Registered at summer bridge school (%)	54.1	51.4	2.6	.33	2.7
Received financial aid (%)	33.4	32.5	0.9	.73	2.6
Pell grant	26.7	25.1	1.6	.49	2.3
Other aid	24.1	21.7	2.4	.32	2.4
Average aid received ($)	699	692	7.0	.92	65.7
Pell grant	614	610	4.2	.95	63.7
Other aid	219	210	9.4	.77	32.3
Spring 2011					
Registered at summer bridge school (%)	48.4	50.5	-2.1	.44	2.7
Received financial aid (%)	34.0	34.5	-0.5	.84	2.6
Pell grant	25.5	25.6	-0.1	.96	2.3
Other aid	23.5	22.7	0.8	.74	2.4
Average aid received ($)	749	760	-11.7	.87	69.6
Pell grant	602	637	-34.5	.59	64.7
Other aid	271	251	20.5	.59	37.6
Sample size (total = 1,318)	793	525			

SOURCE: NCPR calculations from college transcript and financial aid data.

NOTES: Rounding may cause slight discrepancies in sums and differences. Aid amounts are rounded to the nearest dollar. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

Texas Developmental Summer Bridge Programs

Appendix Table A.4

Financial Aid Outcomes at Alamo Colleges and Non-Alamo Colleges in the 2009–10 Academic Year

Outcome	Non-Alamo Colleges					Alamo Colleges					Difference Between Subgroups
	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	
Fall 2009											
Registered at summer bridge school (%)	74.7	72.5	2.2	.47	3.1	66.3	66.2	0.2	.97	4.4	
Received financial aid (%)	57.4	56.0	1.4	.70	3.5	62.2	50.8	11.5**	.01	4.5	†
Pell grant	42.0	42.5	-0.4	.90	3.4	55.4	45.7	9.8**	.03	4.6	†
Other aid	51.3	51.4	-0.1	.98	3.5	46.9	38.5	8.4*	.07	4.6	
Average aid received ($)	1,068	1,134	-66.2	.43	82.9	1,029	795	234.3**	.02	99.1	††
Pell grant	930	975	-44.5	.59	82.5	996	772	223.4**	.03	99.8	††
Other aid	418	487	-68.9	.14	46.7	249	174	75.3**	.03	34.2	††
Spring 2010											
Registered at summer bridge school (%)	72.5	70.3	2.2	.48	3.1	56.8	54.8	2.0	.66	4.6	
Received financial aid (%)	55.7	56.3	-0.6	.87	3.5	62.9	52.8	10.1**	.03	4.5	†
Pell grant	41.2	43.4	-2.2	.53	3.4	56.1	48.2	7.9*	.09	4.6	†
Other aid	50.5	52.4	-1.8	.60	3.5	50.3	44.6	5.7	.22	4.6	
Average aid received ($)	1,025	1,124	-98.8	.23	81.9	996	795	201.0**	.04	95.1	††
Pell grant	890	970	-79.8	.33	81.1	964	773	191.7**	.05	96.3	††
Other aid	443	515	-72.1	.13	47.4	340	248	91.7**	.01	36.4	†††

Texas Developmental Summer Bridge Programs

Appendix Table A.4 (continued)

Financial Aid Outcomes at Alamo Colleges and Non-Alamo Colleges in the 2009–10 Academic Year

Outcome	Non-Alamo Colleges					Alamo Colleges					Difference Between Subgroups
	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	
Fall 2010											
Registered at summer bridge school (%)	58.9	57.0	1.9	.57	3.4	45.9	42.0	3.9	.40	4.6	
Received financial aid (%)	33.8	33.4	0.4	.91	3.3	32.6	30.8	1.8	.66	4.2	
Pell grant	23.9	23.8	0.2	.95	2.8	31.3	27.2	4.1	.33	4.1	
Other aid	23.4	21.8	1.6	.59	3.0	25.2	21.6	3.6	.35	3.9	
Average aid received ($)	757	785	-27.9	.76	90.7	601	535	66.1	.45	88.1	
Pell grant	633	667	-34.8	.69	87.0	583	513	70.2	.43	88.2	
Other aid	256	258	-1.4	.98	48.3	157	129	27.5	.36	30.2	
Spring 2011											
Registered at summer bridge school (%)	53.5	56.1	-2.6	.44	3.4	39.8	41.0	-1.2	.79	4.5	
Received financial aid (%)	33.6	32.8	0.8	.82	3.3	34.7	37.4	-2.8	.54	4.4	
Pell grant	24.1	23.5	0.6	.82	2.8	27.9	29.3	-1.4	.73	4.1	
Other aid	22.4	21.5	0.9	.76	2.9	25.2	24.6	0.6	.88	4.0	
Average aid received ($)	762	782	-19.4	.83	90.3	726	725	1.2	.99	108.5	
Pell grant	638	664	-26.0	.76	86.7	542	591	-49.0	.60	93.8	
Other aid	252	259	-6.6	.89	47.8	303	237	66.4	.27	60.7	
Sample size (total = 1,318)	499	330				294	195				

SOURCE: NCPR calculations from college transcript and financial aid data.

NOTES: The Alamo Community College System consists of Palo Alto College, San Antonio College, and St. Phillip's Academy. Rounding may cause slight discrepancies in sums and differences. Aid amounts are rounded to the nearest dollar. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.

*$p < .10$. **$p < .05$. ***$p < .01$.

Significant differences between subgroups denoted as follows: $^{\dagger\dagger\dagger}p < .01$; $^{\dagger\dagger}p < .05$; $^{\dagger}p < .10$.

Texas Developmental Summer Bridge Programs

Appendix Table A.5

Key Academic Outcomes by Gender Two Years After Random Assignment

Outcome	Males					Females					Difference Between Subgroups
	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	
Semesters registered at any college[a]	3.3	3.5	-0.2	.18	0.1	3.3	3.3	0.0	.96	0.1	
Total credits attempted[b]	31.1	31.5	-0.3	.86	1.9	29.9	29.4	0.5	.74	1.5	
College-level	25.1	25.2	0.0	.98	1.8	23.7	22.4	1.3	.35	1.4	
Developmental	6.0	6.3	-0.3	.63	0.6	6.2	7.0	-0.8	.11	0.5	
Total credits earned	19.9	20.4	-0.5	.74	1.6	19.3	19.4	-0.1	.93	1.3	
College-level	16.6	16.7	-0.1	.92	1.5	15.7	15.2	0.5	.67	1.2	
Developmental	3.3	3.7	-0.4	.35	0.4	3.6	4.2	-0.6*	.08	0.3	
Passed first college-level math course (%)	45.9	42.6	3.3	.46	4.5	47.2	43.4	3.7	.28	3.4	
Passed first college-level reading course (%)	73.2	70.1	3.1	.43	3.9	72.6	73.2	-0.5	.86	3.1	
Passed first college-level writing course (%)	70.9	67.5	3.4	.41	4.1	72.5	69.3	3.2	.32	3.2	
Sample size (total = 1,299)	293	196				489	321				

SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data, unless otherwise noted.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site.
*$p < .10$. **$p < .05$. ***$p < .01$.
Significant differences between subgroups denoted as follows: $^{\dagger\dagger\dagger}p < .01$; $^{\dagger\dagger}p < .05$; $^{\dagger}p < .10$.
[a]The number of semesters registered at any college is based on NCPR calculations from Texas Higher Education Coordinating Board data, college transcript data, National Student Clearinghouse data, and student survey data.
[b]Credits attempted and earned are based on NCPR calculations from college transcript data and include summer 2009 and summer 2010 terms.

Texas Developmental Summer Bridge Programs

Appendix Table A.6

Key Academic Outcomes by Mother's Educational Attainment Two Years After Random Assignment

Outcome	No College					At Least Some College					Difference Between Subgroups
	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	
Semesters registered at any college[a]	3.2	3.4	-0.2	.11	0.1	3.6	3.6	0.0	.93	0.1	
Total credits attempted[b]	29.1	29.6	-0.5	.76	1.6	32.5	33.1	-0.6	.76	2.0	
College-level	22.8	22.7	0.2	.91	1.5	26.8	26.6	0.2	.91	1.8	
Developmental	6.2	6.9	-0.7	.20	0.5	5.7	6.5	-0.8	.17	0.6	
Total credits earned	17.9	18.7	-0.8	.56	1.3	21.4	23.1	-1.7	.32	1.7	
College-level	14.4	14.5	0.0	.98	1.2	18.3	19.2	-1.0	.55	1.6	
Developmental	3.5	4.2	-0.7**	.05	0.4	3.1	3.9	-0.7*	.08	0.4	
Passed first college-level math course (%)	43.3	37.1	6.2*	.09	3.6	53.2	51.2	2.0	.67	4.7	
Passed first college-level reading course (%)	67.7	68.4	-0.7	.83	3.4	81.6	79.5	2.1	.57	3.7	
Passed first college-level writing course (%)	69.0	65.3	3.7	.28	3.5	76.4	73.8	2.6	.52	4.1	
Sample size (total = 1,181)	464	291				251	175				

SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data, unless otherwise noted.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site. *$p < .10$. **$p < .05$. ***$p < .01$.

Significant differences between subgroups denoted as follows: $^{\dagger\dagger\dagger}p < .01$; $^{\dagger\dagger}p < .05$; $^{\dagger}p < .10$.

[a]The number of semesters registered at any college is based on NCPR calculations from Texas Higher Education Coordinating Board data, college transcript data, National Student Clearinghouse data, and student survey data.

[b]Credits attempted and earned are based on NCPR calculations from college transcript data and include summer 2009 and summer 2010 terms.

Texas Developmental Summer Bridge Programs

Appendix Table A.7

Key Academic Outcomes by Program Type Two Years After Random Assignment

Outcome	Freestanding					Course Based					Difference Between Subgroups
	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	Program Group	Control Group	Difference (Impact)	*p*	Standard Error	
Semesters registered at any college[a]	3.3	3.4	-0.1	.25	0.1	3.3	3.3	0.0	.94	0.2	
Total credits attempted[b]	29.6	30.5	-0.9	.52	1.4	31.7	29.7	1.9	.36	2.1	
College-level	23.9	23.7	0.2	.87	1.3	24.7	23.2	1.5	.42	1.9	
Developmental	5.7	6.8	-1.2**	.01	0.5	7.0	6.6	0.4	.55	0.7	†
Total credits earned	18.7	20.4	-1.7	.17	1.2	20.7	19.0	1.8	.30	1.7	†
College-level	15.5	16.2	-0.7	.54	1.1	16.8	15.3	1.5	.34	1.6	
Developmental	3.2	4.2	-1.0***	.00	0.3	4.0	3.7	0.3	.53	0.5	††
Passed first college-level math course (%)	44.0	40.9	3.1	.36	3.3	51.5	47.1	4.4	.33	4.5	
Passed first college-level reading course (%)	72.5	71.1	1.4	.65	3.0	73.0	72.7	0.3	.94	4.1	
Passed first college-level writing course (%)	70.1	67.8	2.2	.48	3.1	74.8	69.3	5.6	.18	4.2	
Sample size (total = 1,181)	527	349				266	176				

SOURCE: NCPR calculations from Texas Higher Education Coordinating Board data and college transcript data, unless otherwise noted.

NOTES: Rounding may cause slight discrepancies in sums and differences. A two-tailed *t*-test was applied to differences between research groups. Estimates are adjusted by site. *$p < .10$. **$p < .05$. ***$p < .01$.

Significant differences between subgroups denoted as follows: $^{\dagger\dagger\dagger}p < .01$; $^{\dagger\dagger}p < .05$; $^{\dagger}p < .10$.

[a]The number of semesters registered at any college is based on NCPR calculations from Texas Higher Education Coordinating Board data, college transcript data, National Student Clearinghouse data, and student survey data.

[b]Credits attempted and earned are based on NCPR calculations from college transcript data and include summer 2009 and summer 2010 terms.

Appendix B

Individual Program Descriptions

The Developmental Summer Bridge Colleges

The eight institutions selected for inclusion in the study are El Paso Community College, Lone Star College–CyFair, Lone Star College–Kingwood, South Texas College, Texas A&M International University, Palo Alto College, San Antonio College, and St. Philip's College. Of their developmental summer bridge programs, four were course-based, while another four were freestanding. Course-based programs were based on standard developmental courses, modified or condensed to create a shorter, more intensive experience. Students enrolled in course-based programs also received additional academic supports, guidance in college knowledge, and a $400 stipend to supplement their summer course work. Students were typically awarded developmental education credit[1] (below the college level) for completion of these courses. Freestanding programs were designed to provide students the opportunity to advance multiple skill levels by offering basic skills instruction and were not based on a specific course. These programs did not require enrollment in a summer course and did not award any form of credit. A brief description of each college and its developmental summer bridge program is provided in the pages that follow.

El Paso Community College

El Paso Community College (EPCC) is an urban institution that was established in 1969. El Paso County Community College District includes five campuses; its developmental summer bridge program, Project Dream, was operated at four of the campuses. In fall 2008, EPCC had a full-time-equivalent enrollment of 15,201 students. The student population was about 85 percent Hispanic, 8 percent White non-Hispanic, and 2 percent African American. These percentages closely reflect the demographics of El Paso County.

Project Dream has operated since 2006 and runs for five weeks each summer. The program was one of three in the study to receive funding through a grant from the THECB for 2009–11. Project Dream, a freestanding program, enrolled students in coursework in math and reading, as well as a Dream Class that incorporated writing, cultural awareness, and college knowledge. Program instructors, trained in pedagogy, worked to offer contextualized instruction. Program students were mentored by older college students.

[1]Developmental education credits are awarded for financial aid eligibility purposes but cannot be applied toward a degree.

Lone Star College–CyFair

Lone Star College–CyFair, established in 2003, is the newest of five campuses of the Lone Star College System (LSCS), which serves the suburbs of Houston. In fall 2008, Lone Star College–CyFair had a full-time-equivalent enrollment of 6,709 students. The student population in 2008 was about 40 percent White non-Hispanic, 30 percent Hispanic, 10 percent African American, and 10 percent Asian American.

The Summer Bridge Program has operated since 2006 and runs for four weeks. In this course-based program, students participated in one developmental education course in math, reading, or writing. All had placed into the highest-level developmental course in the subject area. Other important elements of the program included the presence of tutors in each class, the use of MyMathLab and MyWritingLab software, college knowledge workshops, and individually assigned mentors for every student.

Lone Star College–Kingwood

Lone Star College–Kingwood, which is also part of the five-campus LSCS, was established in 1984. In fall 2008, Lone Star College–Kingwood had a full-time-equivalent enrollment of 3,820 students. The student population at Lone Star College–Kingwood in 2008 was about 55 percent White non-Hispanic, 20 percent Hispanic, and 12 percent African American.

The college has offered the four-week Summer Bridge Program since 2006. The course-based program offered classes in math and writing, and students took only one subject. Students in the writing option had class for four hours per day, while those in math had class for three hours per day. Both options were for students whose placement test scores put them at the highest level of the developmental course sequence. Important elements of the program included tutors who were present in each class and available to provide students with extra help before and after class, four one-hour workshops on study skills and college knowledge, and College Connection mentors with structured time to interact with students.

South Texas College

South Texas College, founded in 1993, recently was designated a four-year college as it began to offer baccalaureate degrees. It is located in McAllen, Texas, near the border of Mexico. In fall 2008, South Texas had a full-time-equivalent enrollment of 12,644 students. The student population at South Texas is primarily Hispanic (about 95 percent). Interestingly, the Hispanic student population of South Texas College is higher than the proportion of Hispanics in the city of McAllen.

The summer bridge program, called Jumpstart, was established in 2007 (the program did not run in 2008). A freestanding program, Jumpstart runs for four weeks and focuses only on developmental math instruction. Significant elements of the program included weekly college knowledge workshops, use of MyMathLab to supplement instruction, tutors in the classrooms and labs, and daily journal writing to informally develop writing skills. Students in the math courses were grouped without regard for the level of remediation needed.

Texas A&M International University

Texas A&M International University (TAMIU) is a four-year institution that first started to accept students in 1970 and became a campus of the Texas A&M University System in 1989. It is the only university in the NCPR study and one of three institutions in the study to receive funding through a grant from the THECB. Located in Laredo on the border of Mexico, TAMIU has a heavily Hispanic student population (over 90 percent). In fall 2008, TAMIU had a full-time-equivalent enrollment of 4,222 students.

The freestanding summer bridge program at TAMIU started in 2007. In previous summers, the program offered English and math, but for the summer 2009 program, the staff decided to focus solely on developmental math instruction with all levels mixed together in each section. The program was called Intensive College Math Prep. In addition to the intensive, accelerated math instruction, other important elements of the program were tutor-administered math lab hours, weekly meetings with older-student mentors, and weekly college knowledge presentations. The program ran for five weeks.

Palo Alto College

Palo Alto College, a member of the Alamo Community College District (ACCD) in San Antonio, was established in 1983. In fall 2008, the college had a full-time-equivalent enrollment of 4,486 students. The student population in 2008 was about 66 percent Hispanic, 30 percent White non-Hispanic, and 2 percent African American. The demographics of Palo Alto College closely resemble those of greater San Antonio, where 59 percent of the population are Hispanic or Latino of any race.

In the past, Palo Alto College ran summer bridge programs that focused on SAT/ACT preparation. In the summer of 2009, Palo Alto College started the Early Start program, which offered only developmental math in a course-based format. Students attended class for four weeks. Distinctive features of the program included tutors in each class, provision of breakfast and lunch to all students, a cohort model, and a student development course.

San Antonio College

San Antonio College, also a member of ACCD, was established in 1925 and in fall 2008 had a full-time-equivalent enrollment of 12,226 students. The student population is about 48 percent Hispanic, 42 percent White non-Hispanic, and 5 percent African American. The summer bridge program at San Antonio College, established in 1999, is called Senior Summer.

Senior Summer allows students to enroll in developmental math, reading, and writing as well as college-level courses. Participating students chose two courses from the regular college summer offerings. The program ran three and a half hours per day for five weeks, with an additional hour two days each week. The program staff emphasized that they recruit students who are often overlooked as "college material." Important elements of Senior Summer included enrollment in actual developmental-level courses, a pared-down version of a student development course, assistance with financial aid forms, and fostering college-going attitudes among students.

San Antonio College had difficulty recruiting students for the 2009 summer program. In previous years, program staff had worked closely with individual students during the recruitment process to provide assistance in completing financial aid forms, which is a key part of this course-based program because students pay tuition. Because of the random assignment design, it became more complicated to work effectively with individual students.

St. Philip's College

St. Philip's College, another ACCD member in San Antonio, is a historically Black college and Hispanic-serving institution that was founded in 1898 and became a public two-year institution in 1942. In fall 2008, St. Philip's College had a full-time-equivalent enrollment of 5,533 students. The student population is about 47 percent Hispanic, 34 percent White non-Hispanic, and 16 percent African American. The freestanding summer bridge program is called the Fresh X Summer Program.

The Fresh X program provides developmental education instruction in math, reading, and writing. Students took courses in one, two, or all three developmental subject areas based on remediation needs as indicated by ACCUPLACER[2] test scores. The contact hours of the program varied depending on the number of courses taken. The program ran five days per week for four weeks. Fresh X was marketed as an ACCUPLACER refresher course, and the goal of the program was to improve students' scores on the test. The

[2]ACCUPLACER is an adaptive placement test developed by the College Board.

instruction was heavily focused on passing the test as a result. Other important elements of the Fresh X program included support from the math, writing, and reading labs; a credit-bearing student development course; and use of adaptive learning software to supplement math instruction.

Program Updates: Summer 2010

In 2010, five of the eight colleges ran developmental summer bridge programs similar to those they offered in 2009. At each of these sites, program size was considerably smaller, in large part because the colleges lacked NCPR funding and because institutional budget cuts constrained program capacity. Recruitment also presented challenges for the colleges, since none of the programs was able to offer the $400 stipend provided in 2009. Two colleges offered a stipend of up to $200, one college offered tuition reimbursement, and another college provided books and calculators for regular attendance, but the financial incentive to students was in no way comparable to that of 2009.

Colleges did learn a variety of recruitment techniques by way of their participation in the 2009 study. In particular, administrators remarked that direct contact with the high schools is integral to any college recruitment effort. As a result, College Connection advisors played a key role in recruiting 2010 summer program participants. One program administrator believed that the reputational success of the 2009 program aided in recruiting participants for the 2010 program.

While most of the colleges did not change their instructional offerings in significant ways, there were some notable changes. One college added a developmental reading course to its program, while another institution revised all reading and writing curricula within its freestanding program. A few colleges changed their math software programs or provided more training for mentors and tutors. One college also provided faculty development in 2010 for the first time.

The three colleges that did not offer programs in 2010 cited diminished resources as the primary reason for eliminating them. Each of the colleges decided to devote their limited resources and primary attention to strengthening other college readiness or developmental student success programs (e.g., career academies, success courses for students in developmental math, success courses for students on academic probation, etc.).

References

Ackermann, S. P. (1990, April). *The benefits of summer bridge programs for underrepresented and low-income students*. Paper presented at the annual meeting of the American Education Research Association, Boston, MA.

Adelman, C. (1998). The kiss of death? An alternative view of college remediation. *National Crosstalk, 6*(3). Retrieved from http://www.highereducation.org/crosstalk/ct0798/voices0798-adelman.shtml

Attewell, P. A., Lavin, D. E., Domina, T., & Levey, T. (2006). New evidence on college remediation. *Journal of Higher Education, 77*(5), 886–924.

Bengis, L., et al. (1991). *SEEK and college discovery programs: Prefreshman, English-as-a second language, postfreshman, and science, mathematics & technology institutes* (1990 evaluation report). New York, NY: Project SEEK, City University of New York.

Cooper, A. (1972). School's out. On *School's out* [CD]. Burbank, CA: Warner Bros.

Deil-Amen, R., & Rosenbaum, J. E. (2003). The social prerequisites of success: Can college structure reduce the need for social know-how? *The ANNALS of the American Academy of Political and Social Science, 586*(1), 120–143.

Edgecombe, N. (2011). *Accelerating the academic achievement of students referred to developmental education* (CCRC Brief No. 55). New York, NY: Community College Research Center, Teachers College, Columbia University.

Ensminger, M. E., Forrest, C. B., Riley, A. W., Kang, M., Green, B. F., Starfield, B., & Ryan, S. A. (2000). The validity of measures of socioeconomic status of adolescents. *Journal of Adolescent Research, 15*(3), 392–419.

Garcia, P. (1991). Summer bridge: Improving retention rates for underprepared students. *Journal of the Freshman Year Experience, 3*(2), 91–105.

Kallison, J. M., Jr., & Stader, D. L. (2012). Effectiveness of summer bridge programs in enhancing college readiness. *Community College Journal of Research and Practice, 36*(5), 340–357.

Karp, M. M. (2011). *Toward a new understanding of non-academic student support: Four mechanisms encouraging positive student outcomes in the community college* (CCRC Working Paper No. 28). New York, NY: Community College Research Center, Teachers College, Columbia University.

Levin, H. M., & McEwan, P. J. (2001). *Cost-effectiveness analysis.* Thousand Oaks, CA: Sage Publications.

Myers, C., & Drevlow, S. (1982, March). *Summer bridge program: A dropout intervention program for minority and low-income students at the University of California, San Diego*. Paper presented at the annual meeting of the American Education Research Association, New York, NY.

Rosenbaum, J. E., Deil-Amen, R., & Person, A. E. (2006). *After admission: From college access to college success.* New York, NY: Russell Sage Foundation.

Rutschow, E. Z., & Schneider, E. (2011). *Unlocking the gate: What we know about improving developmental education*. New York, NY: MDRC.

Santa Rita, E., & Bacote, J. B. (1997). The benefits of college discovery prefreshman summer program for minority and low-income students. *College Student Journal, 31*(2), 161–173.

Strayhorn, T. L. (2011). Bridging the pipeline: Increasing underrepresented students' preparation for college through a summer bridge program. *American Behavioral Scientist, 55*(2), 142–159.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago, IL: University of Chicago Press.

Visher, M. G., Weiss, M. J., Weissman, E., Rudd, T., & Wathington, H. D. (with Teres, J., & Fong, K.). (2012). *The effects of learning communities for students in developmental education: A synthesis of findings from six colleges*. New York, NY: National Center for Postsecondary Research.

Wathington, H. D., Barnett, E. A., Weissman, E., Teres, J., Pretlow, J., & Nakanishi, A. (with Zeidenberg, M., Weiss, M. J., Black, A., Mitchell, C., & Watchen, J.). (2011). *Getting ready for college: An implementation and early impacts study of eight Texas developmental summer bridge programs.* New York, NY: National Center for Postsecondary Research.