

Correlates of Academic Achievement among College Students
in a Developmental Summer Program

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Abstract

The academic achievement of a select group of first-year college students is examined. Students participated in a Summer Bridge Program for the purpose of developing basic academic skills while also being provided with an extended orientation to college life and expectations. A total of 68 students participated in the Program. Results show that significant improvement occurred in basic Math and English abilities. Significant correlations were observed between performance in the Summer Bridge Program and performance in Fall Term coursework as measured by GPA. Interestingly, females performed better than males academically, although males had higher scores on such pre-college predictors as HSGPA or standardized test scores. The benefits of special programs as they relate to higher education attainment and to fuller participation by minorities in American life are discussed.

Correlates of Academic Achievement among College Students in a Developmental Summer Program.

The year 1995 marked the twentieth anniversary of the Summer Bridge Program offered through the Comprehensive Studies Program at The University of Michigan. The Summer Bridge Program is an affirmative action program intended to permit the enrollment of students whose academic credentials are marginal, and so would not normally be admitted to the University, but who possess the kinds of motivational or other factors that lead admissions officials to conclude that such students have the potential for academic success. Most Summer Bridge students are members of racial/ethnic minority groups that historically have been underrepresented in higher education relative to their numbers in the population at large; that is, most Bridge students are Black, Hispanic, or American Indian. Summer Bridge students are required to participate in a rigorous summer academic experience in which they work to develop their abilities in preparation for fall term coursework. Bridge students enroll in four courses during the summer: Mathematics, English, Introduction to Computers, and Academic Socialization. The latter course covers issues related to college adjustment including academic study skills and personal growth topics. Summer Bridge students typically evidence an academic weakness that is indicated either by low standardized entrance examination scores or by the student's high-school record. Approximately 50 students participate in the Summer Bridge Program each year; thus, over 1,000 students have participated in Bridge since its inception.

Few formal studies of Bridge Program students have been done. Barham (1981) found that students in the 1979 Bridge Program had a mean Scholastic Aptitude Test Composite score of about 759 which can be compared to a mean score of about 1180 for entering students overall. A mathematics "pre-test" administered to the 1979 Bridge students produced a median score of 25 out of 63 points; however, no "post-test" was administered to the group. A follow-up study of students in the 1982 Bridge Program (Fontenot, 1990) found that 78 percent of Summer Bridge Program students graduated from a four-year college; 58 percent graduated from Michigan, while the remaining 20 percent graduated from other colleges. This study found no differences in the U-M grade-point averages of those who graduated from U-M and those who did not. In fact, the graduation rate for the 1982 Bridge students equalled or exceeded the published graduation rates for other Black students at U-M, who presumably had stronger

admissions characteristics upon entry. Table 1.0 summarizes mean scores obtained by Summer Bridge and other groups of students on typical admissions selection variables and reveals that on standardized tests in particular, Summer Bridge students score decidedly lower than do other groups admitted to U-M.

Table 1.0

Average admissions profile on selected variables for Summer Bridge in comparison to other students grouped by ethnicity and database (i.e., U-M vs. National).

	Mean UM <u>SAT-C</u>	Mean UM <u>ACT-C</u>	Mean <u>HSGPA</u>	Mean Natl. <u>SAT-C</u>	Mean Natl. <u>ACT-C</u>
Bridge	800	20	2.9	na	na
Black	1,005	22	3.0	736	17
Hispanic	1,080	25	3.3	809	18
Am. Indian*	1,080	25	3.4	825	25
Asian	1,220	27	3.6	937	27
White	1,190	27	3.6	930	27

*American Indian

Reports from the University Registrar's Office (Briske, 1995) show that over an eleven-year period (1979-89) Bridge students had a mean graduation rate of 54.5% when examined at a point six years after entry. For Black students in general in the University the comparable figure was 62.8 %; for both Bridge students and Black students overall, an average of about 3% enrolled for courses in the fall of the seventh year after first matriculation. Briske's data show a general trend of increasing graduation rates for all groups over the eleven-year period. Similarly, mean grade-point averages for all U-M students have shown a dramatic increase over the last twenty years (Seltzer, 1993). Student evaluations of the Bridge Program have consistently shown that Bridge students react favorably to their summer experience and feel better prepared for the Fall Term as a result of their participation (Dorantes, 1993).

The Summer Bridge Program represents an effort to improve the preparation of a select group of students for college-level work at The University of Michigan. The Summer Bridge Program is designed to improve basic skills in Math and writing as well as to provide an extended orientation experience to the academic community for its participants. Students selected for the program have high potential for success in college, but uneven performance on key predictors used by college admissions staff. Typically admissions staff will review students' grades in high-school courses as well as performance on standardized tests such as the Scholastic Aptitude Test (SAT) or the American College Testing Service test (ACT). Uneven performance would be represented by a student with impressive high-school grades, but modest test scores; or vice versa, high test scores and modest high-school grades. The former situation might be characteristic of a student who excelled in a non-competitive high school, but who does not test well on standardized examinations. The latter situation might occur in the case of a student who attended a private selective high school and whose performance would not place him in the top tier of the school, but whose standardized test scores suggest the ability to succeed with college-level work.

The Summer Bridge Program is one of a much broader set of programs and initiatives that reflect institutional commitment to the idea that there is a positive relationship between higher educational attainment and employment, income, and even longevity of life itself. Yet, minority populations lag behind the nation as a whole in almost every measure of quality of life. Moreover, as expressed by the Commission on Minority Participation in Education and American Life (1988) in its influential report *One-Third of a Nation*, promoting education attainment among minority populations benefits the nation as a whole:

The plain and simple fact is that the full participation of minority citizens is vital to our survival as a free and prosperous nation.

One -third of a Nation, 1988

The Summer Bridge Program seeks to provide the opportunity for students with high motivation and potential for college success to participate in a program designed to improve their basic skills and provide an extended orientation to the University community. Bridge Program students are placed in courses in Mathematics, Writing, Introduction to Computer Science, and study skills.

Purpose of study

The Summer Bridge Program has been offered since 1975, but few studies have rigorously examined the effects of the program or the correlates of achievement among students who participated in it. Thus, the purpose of this study is to report on the progress made by students in the 1995 Bridge Program and to assess their academic achievement upon fall enrollment.

Variables

A number of variables are examined for their effect on student performance, both during the Summer Bridge Program itself and the subsequent Fall term.

Among the variables examined were:

ACT - C	composite score obtained by students on the standardized test administered by the American College Testing Program (in some cases students took the Scholastic Aptitude test and not the ACT; in such cases a standard conversion table was used to convert SAT scores to comparable ACT scores)
AAI	an Academic Achievement Index (AAI) was established for each Summer Bridge student; selection to the Bridge program is sometimes based on the assessment by an admissions officer that a given student is weak in one of the standard predictors of college success, either High-School Grade-Point Average (HSGPA) or standardized test scores; the AAI was created by combining the HSGPA with the standardized test score in order to balance the influence of these variables.
Math Test 1	Score obtained on Summer Bridge Mathematics Pre-test
Math test 2	Score obtained on Summer Bridge Mathematics Post-test
Engl Test 1	Score obtained on Summer Bridge English Skills Pre-test
Engl Test 2	Score obtained on Summer Bridge English Skills Post-test
SB Math	Grade obtained in Summer Bridge Mathematics course
SB GPA	Grade-Point Average earned at end of Summer Bridge Program
GPA 1	Grade-Point Average earned at the end of the first full Fall term

Subjects

A total of 68 students participated in the 1995 Summer Bridge Program. Of this total, 22 were male and 46 were female. Sixty-two of the participants were black students, and six were Hispanic. The students came from all over the State of Michigan, although the largest concentration of students were from southeastern Michigan and in particular the Detroit area. Students were required to attend the Summer Bridge Program as a condition of admission to the University of Michigan in the Fall Term. Students were selected for the Bridge Program by staff members of the University Admissions Office after a review of standard application materials. Such action by the Admissions Office means that the student is not normally admissible to the University, but that the Admissions staff recognizes the potential for success in the student's record and believes that the developmental preparation offered through the Bridge Program will allow the student to compete successfully among other students during the regular academic year. Upon enrollment in the Bridge Program, students have no further contact with the Admissions Office on a formal basis and the lack of success in the Summer Bridge Program does not trigger automatic action to revoke admissions. Instead, students who do not meet academic expectations during the summer are advised by Summer Bridge staff to consider seriously withdrawing from Michigan. In practice, about 90% of Bridge Students typically perform satisfactorily in the summer warranting continued confidence in their ability to succeed in the fall term. The cost of attending the Summer Bridge Program was approximately \$3,200 for 1995 and this cost was met by family resources or financial assistance as appropriate. Participants were from a wide range of socioeconomic backgrounds. About a third of Summer Bridge Program participants were "full-need" students; that is, their financial circumstances required no contribution from parents. About 28% of the group received no financial aid or received only direct loan assistance to meet the cost of attendance. The remaining students received a financial aid package consisting of some combination of grant, loan, and parental contribution.

RESULTS

Student Progress in Summer Bridge

All participants in the Summer Bridge Program were administered diagnostic tests to assess skill ability in mathematics and grammar. Table 2.0 shows pre- and post-test data for the Summer Bridge students who took diagnostic tests in Mathematics and English usage skills. The results of paired sample t-tests for both Mathematics and

English test scores indicate that students improved their knowledge in each area as demonstrated by significantly higher scores on the post-tests.

Table 2.0

Scores obtained by Summer Bridge students on pre- and post-tests for Mathematics and English.

	Math Pre-test	Math Post-test	English Pre-test	English Post-test
N of cases	68	66	63	58
Minimum	5.0	20.0	45	50
Maximum	38.0	91.0	88	95
Mean	52.6	64.2	68.2	76.4
Standard Deviation	16.6	16.2	9.3	9.5

Results for Math t-test

Mean Difference = -11.79

SD difference = 11.12

degrees of freedom = 65

T = -8.61; $p < .001$

Results for English t-test

Mean Difference = -8.22

SD difference = 7.59

degrees of freedom = 57

T = -8.25; $p < .001$

Correlates of Achievement

Pearson correlation coefficients were calculated to determine the relationship between key variables. Table 3.0 shows the correlation coefficients for selected variables. No correlations were calculated for English grades because during the Summer Bridge program over two-thirds of students were enrolled in an English course graded as

Pass/Fail and all but one student passed, resulting in virtually no variation on this variable.

Table 3.0 Correlations between selected variables

	ACT-C	AAI	SB Math	SBGPA	GPA1
ACT-C	1.0				
AAI	.372**	1.0			
SB Math	.371**	.273*	1.0		
SB GPA	.397**	.300*	.454**	1.0	
GPA 1	0.0	.176	.112	.272*	1.0

(n=68; df = 66) ** p . < .01 ; * p . < .5

Not all students who were enrolled in a Math course during the Summer Bridge program elected a Mathematics course during the Fall term. Thus, a separate correlation coefficient was computed for the 43 students who enrolled in Mathematics both during the Summer Bridge Program and during the Fall term. The correlation between grade earned in Mathematics during the Bridge Program and the grade earned in Mathematics during the Fall term yielded an $r = .489$; $df = 41$; $p . < .01$.

Fall Term Academic Achievement

Table 4.0 summarizes Summer Bridge student academic achievement across a number of variables. Summer Bridge students earned a mean GPA of 2.33 during their first full-time enrollment in the Fall semester, with 75% earning a GPA above 2.0; 18% had a

GPA of 3.0 or higher; while 25% had a GPA below 2.0, the standard for good academic standing in the College. Closer examinations of these results show that female students outnumber males by a ratio of almost two-to-one and that although males had consistently higher, though not significant, scores on pre-college predictor variables (such as HSGPA or SAT and ACT scores), females out-performed males on college academic achievement variables such as SBGPA, CTP, and GPA. Analysis of Variance results indicated a significant gender effect for GPA 1 ($F=5.37$; $p < .05$), with females earning a GPA 1 of 2.48 while males earned a GPA 1 of 2.03. Females also earned slightly more credits than males during the first semester.

Table 4.0 Means and Standard Deviations for Male and Female Summer Bridge Students on Academic Achievement Variables.

	ACT-C	AAI	SBGPA	CTP1	GPA1
MALES (n=22)					
mean	20.3	50.5	2.42	9.32	2.03
s.d.	3.5	3.7	.76	4.12	.89
FEMALES (n=46)					
mean	19.4	49.6	2.55	10.72	2.48
s.d.	2.53	4.01	.79	2.61	.65

Predictors of Academic Achievement

Regression analyses were carried out to try to predict the academic achievement of Summer Bridge students. Standardized test scores, HSGPA, and SBGPA were used as predictors of first-term GPA. Neither HSGPA, nor ACT-C test score were effective predictors of first term GPA; nor was the combination of HSGPA and ACT-C as the AAI effective in predicting first-term GPA. However, ACT-C was able to predict performance in the Summer Bridge Program as measured by SBGPA. HSGPA and AAI did not predict achievement in the Summer Bridge Program. Performance in the Summer Bridge Program as measured by SBGPA was a significant predictor of first-term GPA. These findings are summarized in Table 5.0.

Table 5.0 Summary of Results of Regression Analyses for Predicting Academic Achievement as Measured by Summer Program GPA or First-Term GPA.

For SBGPA

Predictor Variables	Coefficient	Std. Error	T	p(two-tail)
HSGPA	1.931	1.197	1.613	.112n.s.
ACT-C	0.283	.124	2.278	.026 *
AAI	- 0.152	.119	- 1.283	.204n.s.

F=5.897, p. < .001

For GPA 1

Predictor Variables	Coefficient	Std. Error	T	p(two-tail)
HSGPA	- 0.269	1.289	- .209	.835n.s.
ACT-C	- 0.070	.137	- .516	.608n.s.
AAI	0.048	.127	.034	.706 n.s.
SBGPA	0.301	.132	2.281	.026 *

F= 1.737, p.= .153

DISCUSSION

The attainment of a college education historically has meant a passport to a better life. Studies show that the college-educated earn more, are healthier, and contribute more to society. Indeed, educational attainment serves as an anchor for personal stability and progress. Yet, for significant segments of the population, the attainment of a college degree can seem out of reach. These may be the poor, the disadvantaged or ethnic minorities whose numbers are underrepresented among college students in relation to their numbers in the population at large. Despite the current dissatisfaction with affirmative action, it is still a legitimate and effective means of redressing generations old grievances and preparing for the future. Fortune 500 companies have indicated that they recognize the value of taking positive steps to create a more inclusive and more educated workforce. Moreover, as the National Education Goals Report (1992) states, the United

States has a long tradition of espousing as a matter of policy "education's unique and indispensable role in ensuring personal, social, and economic well-being." In fact, the Panel notes that such policies "have contributed greatly to both our economic growth and social cohesion." Relatedly, in the fifteen years leading up to the year 2000, minority workers will make up one-third of the net additions to the U. S. labor force (Johnston, 1989). Thus, we can continue to expect a future workforce comprised of an increasing number of minorities. Where are these future workers today? They are in our schools, but many are not achieving the kind of academic success that will make them competitive in the workforce of the twenty-first century. Attainment of a college education is still a major insulator against poverty and a catalyst for upward mobility. Academic success in the first year of college is the initial gateway through which students must pass if they are to achieve the benefits of higher learning in later life. This study has shown that a Summer Bridge experience can be a useful means of preparation for longer term college attainment. In general, the 1995 Summer Bridge students were comparable to other recent Summer Bridge classes (see Table 6.0) .

The data presented by this study illustrate a number of important factors relative to understanding the impact of a Summer Bridge Program. First, the extent of the difference in preparation for college work between Bridge students and other students is illustrated (Table 1.0). A focus on SAT score may highlight the point most graphically: Bridge students average almost *four hundred points lower* on the SAT than do the typical students against whom they must compete in University of Michigan courses. This amounts to a very substantial hurdle which must be overcome before there can be a reasonable expectation that Bridge students will compete successfully against their peers who are much better prepared academically. Secondly, the data show that Bridge students do make significant improvements in their skills and abilities in the core areas of Mathematics and English. In addition, the extended orientation provided by the seven-week summer program, along with the Academic Socialization and Computer Science courses clearly serves to make the students more confident and motivated to compete in the Fall term. The data also show that those students who are successful academically in the Summer Bridge Program tend to be successful academically in the Fall Term. But rather troubling is the finding that male Bridge students as a group do not seem to be achieving the level of success expected by those admissions officers who extend to them the opportunity for a Michigan education.

These research findings support the adage that the best predictor of future academic success is past academic success. In particular, students with marginal credentials who participate in the Bridge Program with seriousness of purpose tend to perform well during the summer months and, as these findings show, such success seems to transfer to achievement during the fall semester as well. Interestingly, there was no correlation between standardized test scores and success in terms of first-term academic achievement. One is left with the conclusion that more important to college success than standardized tests is what students actually do. Those who attend class regularly, are conscientious in completing coursework and who consult and heed the advice of knowledgeable counselors do well. This latter point may be of particular interest with respect to male students. The analysis of standardized test data showed that males scored slightly higher than females on admissions variables; males performed about the same as females in the coursework during the Bridge Program; but males performed significantly worse than females in terms of academic achievement during the standard Fall Term. One factor contributing to this difference is the effect of two "outlier" cases among the male students. These two students performed worse than all others during the fall term, effectively failing all of their classes. Their high school record gave no hint that they would perform so poorly, and in fact, their high school profiles would place them among the top twenty percent of Bridge students.

So, what accounts for the lack of good academic performance by two students who would have been expected to do better? An answer emerges not from quantitative data, rather from an examination of their behavior in the fall term. The first performance outlier was a student who received no financial aid, but who had difficulty meeting college expenses. Consequently, he took a *full-time* job during the fall while trying to be a full-time student at a competitive institution. It is no surprise that full-time work and full-time study are incompatible in this setting. The other case is somewhat more inspiring, even if just as ill-advised as the first case. Case two involved a student who was "in love" with a girlfriend who attended another college in a distant part of the state. This student spent considerable time at the other college during the fall term and ultimately transferred to that college for the Winter Term. Interestingly, when these two outliers are removed from the analysis, the mean GPA1 for male students increases from 2.03 to 2.23 and the regression analysis results in significant predictive equations for both SBGPA and for GPA1 (see Table 6.0). Differences in behavior between male and female students may have a lot to say about differences in their achievement. Thus, what male students actually do, in contrast to what female students do, is likely to be a major factor in their academic success or lack thereof. Our program notes that female students, for example,

are far more willing than male students to seek advice from counseling staff, or tutoring assistance from faculty. Counselors report that males seldom simply check in to touch bases or to make connections with advising staff, a behavior that is rather common among female students. In fact, male students tend to see their advisors only for required meetings or in crisis situations, such as required consultations following poor academic achievement in a given semester. Yet, these male students are far from invisible on the campus. They tend to be active in social fraternities, intramural sports, political action and other student organizations. The male students may feel a need for such involvement and some of it may have an altruistic motive, but it is hard to escape the conclusion that for many of them such activity amounts to a distraction from what should be their primary focus, which is academic achievement.

Performance in the Summer Bridge Program courses was significantly correlated with performance in fall term courses. Moreover, pre- and post-test results showed that students improved their skills in key quantitative and verbal ability areas. Thus, we may conclude that participation in the Bridge Program, in general, has a *positive effect* in terms of leveling the playing field. Student evaluations also indicate that participants, in general, feel better prepared to handle the expected courseload of the fall semester. Taken together, these findings suggest that through participation in a developmental summer program, marginally prepared students can improve their preparation for college-level work and go on to fulfill the potential for success recognized by admissions officers. Such programs represent one way we can improve the flow of minority students through the educational pipeline and in the process promote the full participation of minority citizens in American society.

Table 6.0 Summary of Regression Analysis for Predicting Academic Achievement with Two Outlier Cases Deleted from the Analysis.

For SBGPA

Predictor Variables	Coefficient	Std. Error	T	p(two tail)
HSGPA	.343	.244	1.407	.164
ACT-C	.129	.033	3.88	.000 ***

F = 7.528, p. < .002

For GPA1

Predictor Variables	Coefficient	Std. Error	T	p(two tail)
HSGPA	.337	.216	1.56	.124
ACT-C	.015	.032	.454	.651
SBGPA	.245	.110	2.23	.029 *

F = 3.247, p < .05

Table 7.0

Means scores obtained by Summer Bridge Program students on selected academic achievement variables for years 1992 - 1995.

	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>Overall</u>
HSGPA	2.8	3.01	2.99	3.02	2.94
ACT-C	19.8	19.2	18.9	19.7	19.3
1st Term GPA	2.42	2.76	2.27	2.33	2.49
n	52	51	47	68	218

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