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ABSTRACT

This study examined whether first-generation community college students (those whose parents did not attend college) differed from others on background, enrollment, and outcome variables and whether first-generation status alone added a unique contribution to predicting academic success. Subjects were 653 first-year students at a large, urban two-year California college, 44 percent of whom were identified as first-generation. Data came from two sources: the annual student survey and the student records database. As expected, first-generation students were more likely to be older and Hispanic, and to report both lower incomes and lower high school grade point averages (GPA) than other students. Contrary to past research, this study found no significant differences in gender, hours of employment, enrollment status (full- or part-time), withdrawal from all classes, first-term GPA, or persistence between first-generation and other students. Although first-generation students were more likely to enroll in basic skills courses and less likely to enroll in transfer-level courses, further analysis indicated that income, high school GPA, and age, not first-generation status, were the unique predictors of these enrollments. The most surprising finding was the negligible relationship between first-generation status and first-term GPA. Results suggest that first-generation status has an indirect rather than a direct impact on student success. (Contains 13 references.) (DB)

Running head: IMPACT OF PARENTAL EDUCATION ON STUDENT SUCCESS

Predicting Student Success: The Relative Impact of Ethnicity, Income, and Parental Education

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Predicting Student Success: The Relative Impact of Ethnicity, Income, and Parental Education

Abstract

This study used a sample of community college students to examine whether first-generation college students (those for whom neither parent attended college) differed from others on background, enrollment, and outcome variables, and more importantly, whether first-generation status added any unique contribution over and beyond confounding variables in predicting academic success. Results showed that first-generation and other students differed on age, ethnicity, income, primary language, citizenship, high school GPA, enrollment in basic skills courses, and enrollment in transfer-level courses, but did not differ on any of the outcome variables assessed (viz., GPA, probation, retention, persistence, or withdrawal from all courses). Subsequent analyses showed that first-generation status did not add unique variance. The results of this study indicate that parental education level per se is not strongly related to student success; rather, factors typically associated with first-generation status (e.g., income, college knowledge, social integration) may play a more vital role.

Predicting Student Success: The Relative Impact of Ethnicity, Income, and Parental Education

The notion that first-generation college students perform worse than students whose parents attended college is widely accepted by professionals in higher education. Certainly, research has demonstrated that first-generation students are more likely to exhibit risk factors which may be associated with poor academic performance (e.g., Billson & Brooks-Terry, 1982; York-Anderson & Bowman, 1991). However, relatively little is known about the ways in which key presumed risk factors (including first-generation status) overlap, or interact, in affecting student performance. The main purpose of the present study was to place parental education level within the context of other predictor variables and examine the unique impact of first-generation status on academic performance.

Nationally, about 45% of first-time freshmen are identified as first-generation college students (i.e., neither parent attended college[1]), although the proportion of first-generation students varies widely by type of institution (Nunez, Cuccaro-Alamin, & Carroll, 1998). The highest proportion of first-generation students is found at private, for-profit institutions (67%), followed by public two-year institutions (51%), public four-year institutions (30%), and private, nonprofit four-year institutions (25%). Over the past three decades researchers have examined the differences between first-generation and other[2] students in terms of their demographics, academic preparation, and other variables. The following sections summarize major findings in each of these areas.

Demographic Characteristics

The most frequently examined demographic characteristics have been ethnicity, gender, age, income, marital status, and employment. Compared to others, first-generation students were more likely to be Hispanic, female, older, and married, and to have lower incomes and more

dependent children (Maack, 1998; Nunez et al., 1998; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996). Results on student employment were mixed. Pascarella et al. (1995) found first-generation students were more likely to be employed than other students. Other research found that there was no difference in whether students worked, but that first-generation students were more likely to work full-time (Billson & Brooks-Terry, 1982).

Academic Preparation

Few studies of first-generation students included indicators of academic preparation prior to college. Those which did (Grayson, 1997; Riehl, 1994; Terenzini et al., 1996) found that in comparison with other students, first-generation students had lower high school GPAs and entering skill levels on standardized tests (e.g., ACT, CAAP, and SAT). Studies which examined students' perceptions of their academic preparation found that first-generation students expressed more doubt that they were well-prepared for college and perceived a greater need for remediation (Edamatsu, 1998; Maack, 1998; Pratt & Skaggs, 1989).

Enrollment Characteristics

There is evidence that first-generation students are more likely to enroll at public two-year institutions, enroll in fewer units (Nunez et al., 1998; Pascarella et al., 1995; Terenzini et al., 1996), and have lower degree aspirations than other students (Maack, 1998; Pascarella et al., 1995; Pratt & Skaggs, 1989; Riehl, 1994). First-generation and other students appear to be comparable in terms of their educational goals (e.g., intellectual growth, career preparation, personal development) (Billson & Brooks-Terry, 1982; Nunez et al., 1998) found that). The results on course-taking behavior are mixed; some studies found that first-generation students were more likely to enroll in technical and professional courses (Pascarella et al., 1995), while others found no difference (Terenzini et al., 1996). Nunez et al. (1998) found that enrollment in

remedial courses was comparable for first-generation and other students in public two-year and four-year institutions.

Non-cognitive Variables

Drawing from the work of Astin (1984) and Tinto (1975), many studies examined various non-cognitive factors (e.g., social support) known to be associated with academic success. These studies found that compared to others, first-generation students perceived less family support for their education (Nunez et al., 1998; Pratt & Skaggs, 1989; York-Anderson & Bowman, 1991), and had lower social integration (e.g., fewer friends from school) and lower academic integration (e.g., less contact with faculty) (Billson & Brooks-Terry, 1982; Grayson, 1997; Nunez et al., 1998; Pratt & Skaggs, 1989; York-Anderson & Bowman, 1991). York-Anderson and Bowman (1991) examined differences in college knowledge (e.g., knowledge about specific activities such as how and when to study, and knowledge of different services available on campus), but found no difference between first-generation students and others.

Academic Performance

Most of the studies summarized above did not examine academic performance. Nevertheless, many of the authors concluded that first-generation students must be at higher risk of poor academic performance and attrition because they had more "risk factors" than other students. In the few studies which compared the academic performance (e.g., GPA, persistence, degree attainment) of first-generation students and others, results were inconclusive at best.

Four studies compared the college GPAs of first-generation and other students. Three found small but statistically significant differences between first-generation students and others on first-year GPA (Grayson 1997; House, 1996; Riehl 1994), while the fourth did not (Billson & Brooks-Terry, 1982). Grayson (1997) and House (1996) used regression to predict GPA and

found that first-generation status (or parental education level) added only a very small contribution beyond other predictor variables (less than 0.5% of the variance in both cases).

Some research found first-generation students were more likely to drop out of college in their first term or first year (Riehl, 1994; Stanfiel as cited in Billson & Brooks-Terry, 1982), but others found mixed results on persistence and degree attainment. While Nunez et al. (1998) found that first-generation students were less likely to still be enrolled in college five years later (11% vs. 16%; see also Riehl, 1994), Maack (1998) found no difference in one-year persistence rates. Similarly, some studies found first-generation students had lower degree attainment than others (Billson & Brooks-Terry, 1982; Nunez et al., 1998), while others did not (Maack, 1998).

Summary and Critique

Research on first-generation students has found clear and consistent patterns on demographic variables, academic preparation, and non-cognitive factors. However, studies on enrollment characteristics and academic performance of first-generation students are characterized by inconsistent findings. The following sampling problems and methodological inconsistencies across studies might be partly responsible. First, researchers differ in how they define first-generation status, which creates problems when comparing results across studies. Second, some studies were based on all first-time freshmen, while others used only students participating in a special support program. Third, most studies were conducted at four-year institutions, where the proportion of first-generation students is much lower than it is at two-year schools. Fourth, much of the research was based on very homogeneous, primarily White samples even though first-generation status correlates highly with ethnic-minority status. Fifth, most studies failed to control for confounding variables (e.g., high school GPA, socioeconomic status) which might affect the relationship between first-generation status and academic success.

The only study to date which specifically controlled for the impact of such confounding factors was conducted for the National Center for Education Statistics (NCES) by Nunez et al. (1998). Hierarchical regression analyses revealed that first-generation students persisted at lower rates than other students (62% vs. 69%), even after controlling for variables such as enrollment status, gender, ethnicity, socioeconomic status, and social integration. Such statistical analyses provided crucial information about the relative impact of parental education on measures of academic performance, and were based on a very large sample representative of national demographics. However, the NCES sample (e.g., predominantly White, 18 years old or less) was not particularly representative of the two-year institutions where most first-generation students begin their pursuit of higher education.

Specific Aims of the Present Study

The purpose of this study was to address as many of the above shortcomings as possible. To do so, we used the more common, relatively strict definition of first-generation students, drew participants from randomly sampled student cohorts at a two-year college with an ethnically diverse population, and conducted statistical analyses which allowed us to control for the impact of confounding factors. We set out to answer two research questions:

1. What are the differences between first-generation and other students on demographic, enrollment, and outcome variables?
2. What is the unique contribution of first-generation status in predicting enrollment behavior and academic success?

Method

Participants and Sampling

A total of 653 first-year[3] students from a large, urban two-year college in southern California participated in this study. Participants were a subset of all respondents to a random survey of students conducted during the 1996, 1997, and 1998 Fall terms (N=1,233).

Of the 653 participants, 61% were female. Students ranged in age from 14 to 92 (Mdn = 20 years). The sample was ethnically diverse: 33% Asian/Pacific Islander, 25% Hispanic, 18% White, 7% African American, 4% Filipino, 1% American Indian/Eskimo, 7% other, and 5% declined/unknown. Almost half (44%) were identified as first-generation (i.e., neither parent ever attended college); 18% of parents had some college; 10% had an Associate degree; 17% had a bachelor's degree; and 12% had a professional or graduate degree.

Instruments and Procedure

Data for this study came from two sources: the annual student survey and the student records database. Each year, the student survey was mailed to the homes of 1,000 credit and noncredit students randomly selected from the entire student population. The first mailing included the survey, cover letter, and postage-paid return envelope. The initial mailing was followed approximately three days later by a reminder letter, and approximately three weeks later by a second mailing to students who had not yet responded. Students were eligible to win a cash prize if they returned their survey by the deadline ($100 for the first deadline and $50 for the second). This procedure yielded respectable response rates each time (40%-45%).

The purpose of survey was to assess students' level of use and satisfaction with support services on campus, satisfaction with instruction, and to gain information on income and parental education level which are not collected on the application for admission. The student survey was

confidential but not anonymous. Each survey included the student's personal identification number – used to link to the student database for demographic, enrollment and outcome data.

Demographic Variables. Ten demographic variables were used in this study. Parents' highest level of education[4], annual family income, family size, employment status, and weekly hours of employment were obtained from the student survey. Gender, ethnicity, age, primary language, and high school GPA were obtained from the student records database. Age reflects each student's age as of their first term at the college. High school GPA was self-reported in one of five categories (mostly As, Bs, Cs, Ds, or Fs).

Enrollment Variables. Unit load, educational goal, and type of course enrollment were drawn from the student records database. Educational goal reflects each student's primary reason for attending college (indicated on students' application for admission). The college recognizes 12 distinct educational goals. For the purpose of this study, we collapsed the 12 original categories into 4: transfer to a four-year college with or without AA or AS degree, AA or AS degree, vocational degree or certificate, or other. Student enrollment was examined for four course types: transfer-level, non-transfer degree-applicable, certificate-applicable, and basic skills.[5] Each variable is dichotomous, and reflects whether a student was enrolled in at least one course in any of the areas.

Outcome Variables. Five measures of academic performance were used; three were "positive" (GPA, retention, persistence), and two reflected "negative" outcomes (probation, withdrawal from all courses). GPA is the first-term GPA for all students who completed at least one course. Retention is the ratio of the number of units completed divided by the total number of units enrolled within one term.[6] Persistence reflects continued enrollment across terms. To be counted as persisting from one term to the next, a student had to be enrolled in at least one course

beyond the third week of classes during both terms. Probation status indicates whether students were placed on any type of probation as a result of their performance during their first term. The second negative outcome measure reflects whether students withdrew from all their courses. Persistence, probation, and withdrawal are dichotomous, and GPA and retention are continuous.

Results

Data Management

We examined the frequency distributions of all variables. Income was positively skewed. Upon further scrutiny of the data, we discovered that many F-1 Visa students had reported very low, or zero income (they must do so to maintain their student visa status). Rather than have the artificially low income for such students skew the entire distribution, we reassigned income for all 45 participants on student visas (less than 7% of the entire sample) to a missing value. Subsequently, income approximated a normal distribution. Age ranged from 14 to 92. To minimize the impact of outliers, we created an ordinal variable (age-category) with seven categories (under 20, 20-24, 25-29, 30-34, 35-39, 40-49, 50+)[7]. For all analyses examining ethnicity, we included only the largest major ethnic groups at the college: African American, Asian/Pacific Islander, Hispanic, and White.

Differences Between First-Generation and Other Students

Chi-square analyses and t-tests were conducted to identify significant differences between first-generation and other students on background, enrollment, and outcome variables.

Background Variables. First-generation students were *more* likely than other students to be older, Hispanic, have lower incomes, and report a high school GPA of "C." First-generation students were *less* likely than others to speak English as their primary language, and be US

citizens (see Table 1). There were no significant differences between the two groups on gender, number of family members in the household, employment status, or hours worked.

Enrollment Variables. We found few differences between first-generation and other students on enrollment measures. Compared to other students, first-generation students were significantly more likely to enroll in at least one basic skills course during their first term (30.2% versus 15.2%; χ^2 (1) = 21.00, $p < .001$), and significantly less likely to enroll in at least one transfer-level course (79.3% versus 86.7%; χ^2 (1) = 6.40, $p < .05$). The two groups were comparable in terms of their educational goals, unit load, enrollment in non-transfer degree-applicable courses, and enrollment in certificate-applicable courses.

Outcome Variables. There were no significant differences between first-generation and other students on any of the outcome variables assessed in this study. The two groups were comparable in terms of their retention in classes, first-term GPA, probation status, withdrawal from all courses, and persistence to the following term.

While the analyses reported so far provide some insight into the nature of differences between first-generation students and their peers, the picture they paint is incomplete because they do not control for factors associated with first-generation status. For instance, the significant results reported for the enrollment variables may be due not to first-generation status per se, but to other variables associated with first-generation status. The next step in the analysis was to examine the unique, independent contribution of first-generation status in predicting both enrollment and outcome variables.

Table 1. Significant Differences Between First-Generation and Other Students on Background Variables

Variables	First-Generation Students (n = 285)	Other Students (n = 362)	Significance Test	p value
Age Category			$\chi^2(6) = 22.87$	p = .001
Under 20	41.1%	55.5%		
20-24 years old	22.8%	20.7%		
25-29 years old	11.6%	8.6%		
30-34 years old	6.7%	7.2%		
35-39 years old	6.7%	2.2%		
40-49 years old	7.4%	3.0%		
50 and over	3.9%	2.8%		
Primary Language			$\chi^2(1) = 14.99$	p < .001
English	55.3%	70.5%		
Other	44.7%	29.5%		
Ethnicity			$\chi^2(3) = 63.30$	p < .001
Asian/Pacific Islander	36.3%	41.0%		
African American	8.5%	8.8%		
Hispanic	44.8%	17.7%		
White	10.4%	32.5%		
Citizenship			$\chi^2(1) = 10.87$	p = .001
US Citizen	56.5%	69.1%		
Other	43.5%	30.9%		
Income*	M = $24,149	M = $36,714	t (537.5) = 5.77	p < .001
High School GPA			$\chi^2(3) = 14.29$	p < .01
A	13.6%	17.8%		
B	33.0%	45.3%		
C	49.8%	34.3%		
D	3.6%	2.6%		

* n = 237 for first-generation students and n = 303 for other students.

Unique Contribution of First-Generation Status in Predicting Course Enrollment

Two sequential logistic regression analyses were conducted to predict enrollment in basic skills and transfer-level courses.[8] Background variables which showed significant differences between the two groups of students (income [which was scaled in $10,000 increments for ease in interpretation of the regression coefficients], age, high school GPA, primary language, citizenship, and ethnicity [dummy-coded for this analysis with White as the reference group]) were entered on the first step. First-generation status was entered alone on the second step so we could ascertain the unique contribution of that variable above and beyond other demographic variables in the equation.

Only income and high school GPA reliably predicted enrollment in basic skills courses. Students who enrolled in at least one basic skills course during their first term were significantly more likely to have lower incomes and report a lower high school GPA (see Table 2). Age was marginally significant ($p = .05$), indicating that younger students were slightly more likely to enroll in basic skills courses. First-generation status was not a significant unique predictor of enrollment in basic skills (indicated by the Wald statistic), nor did it significantly add to the overall prediction model. The overall logistic regression equation was significant (χ^2 (9) = 44.74, $p < .001$) indicating that as a set, the variables entered distinguished between students who enrolled in basic skills courses and those who did not.

Age and citizenship were the only significant predictors of enrollment in transfer-level courses; students who enrolled in these courses were more likely to be younger and to be US citizens. African American students were also slightly less likely to enroll in transfer-level courses ($p = .05$). The eight variables as a set reliably predicted enrollment in transfer-level courses (χ^2 (9) = 31.48, $p < .001$). Note that as in the previous analysis, first-generation status

did not contribute significant unique variance in predicting enrollment in transfer-level courses, nor did it add to the prediction model. Instead, other variables, which were shown to covary with first-generation status in earlier analyses, were more important in predicting course enrollment.

Table 2. Relative Impact of Background Variables on Course Enrollment Behaviors

	Basic Skill Enrollment (n = 367)			Transfer-level Enrollment (n = 367)		
Variable	B	Wald Statistic	pr	B	Wald Statistic	pr
Step 1:						
Income	-.167	6.413*	-.113	.002	.001	.000
Asian/Pacific Islander	.454	.831	.000	.456	.731	.000
African American	.467	.630	.000	-1.065	3.661	-.076
Hispanic	.660	1.977	.000	-.065	.016	.000
Age	-.190	3.741	-.071	-.257	9.395**	-.160
High School GPA	-.588	9.422**	-.146	.169	.654	.000
English as Primary Language	-.547	2.179	-.023	.240	.312	.000
US Citizenship	-.267	.519	.000	1.219	7.862**	.142
Step 2:						
First-generation status	.298	1.006	.000	-.321	.866	.000

Note: * p < .05; ** p < .01; *** p < .001. pr represents the partial correlation between each independent variable and the dependent variable, controlling for the other variables in the equation. All ethnic categories, English as a primary language, US Citizenship, and First-generation status were dichotomous variables (1 = yes, 0 = no). Higher values on income, age and high school GPA reflect higher scores on those variables.

Unique Contribution of First-Generation Status in Predicting Student Success

Although there were no significant differences between first-generation students and others on the outcome measures assessed in this study, we were still interested in exploring the independent contribution of first-generation status in predicting student success. To that end, we conducted a hierarchical multiple regression analysis to predict first-term GPA. Background variables were entered as a set on the first step (ethnicity was dummy-coded with White as the reference group). On the second step, we entered enrollment in basic skills and transfer-level courses; the two enrollments variables on which there was a significant difference between the groups. In order to assess the unique contribution of first-generation status, we entered it on the final step. Together, the variables entered on the first step significantly contributed to the prediction of first-term GPA ($R = .326$, $F(8,389) = 5.777$, $p < .001$), but neither the enrollment variables nor first-generation status added additional variance (R^2-change = .002, n.s. and R^2-change = .000, n.s., respectively). Of the variables in the equation, only age and high school GPA contributed a significant amount of unique variance in predicting first-term GPA, such that older students and those with higher high school GPAs had significantly higher first-term GPAs (see Table 3).

The simple correlations and partial correlations presented in Table 3 further demonstrate the importance of looking at the unique contribution of individual variables when predicting academic success. For example, the simple correlation for income is .149 ($p < .001$), but when we control for the other variables, it drops to .076, n.s. Although the difference is most pronounced for income, the same pattern holds for English as a primary language and enrollment in basic skills courses. Note that first-generation status has a negligible relationship with first-term GPA both before and after controlling for other variables in the equation.

Table 3. Relative Impact of Demographic and Enrollment Variables on First-Term GPA

Variable	r	pr	β	R^2
Step 1:				.106***
Income	.149***	.076	.078	
US Citizenship	.067	.029	.040	
Asian/Pacific Islander	.021	.015	.018	
Hispanic	-.090*	-.042	-.051	
African American	-.096*	-.110*	-.114*	
Age	.166***	.160**	.162**	
High School GPA	.201***	.175**	.179**	
English as Primary Language	.086*	.068	.092	
Step 2:				.109***
Basic Skills Enrollment	-.129**	-.045	-.046	
Transfer-level Enrollment	-.019	-.035	-.035	
Step 3:				.109***
First-Generation status	-.073	-.013	-.015	

Note: * $p < .05$; ** $p < .01$; *** $p < .001$. N = 398. Cumulative R = .330, Cumulative R^2 = .109, $F(11, 386)$ = 4.285, $p < .001$. Adjusted R^2 = .083. As in prior analyses, US citizenship, all ethnic categories, English as a primary language, first-generation status, and the two enrollment variables were dichotomous (1 = yes, 0 = no). Higher values on income, age and high school GPA reflect higher scores on those variables.

Discussion

Our first objective was to examine differences between first-generation students and others. In line with past research, we found that first-generation students were more likely to be older and Hispanic, and to report a lower income and high school GPA than other students. Contrary to past research, we found no significant differences in gender, hours of employment, enrollment status (full or part-time), withdrawal from all classes, first-term GPA, or persistence.

We found that first-generation students were more likely than others to enroll in basic skills courses, and less likely to be US citizens and speak English as their primary language, unlike Terenzini et al. (1996) who found no differences on these variables. Terenzini et al. (1996) reported that their sample approximated the national population of undergraduates by ethnicity (i.e., it was predominately White). Because our sample included nearly one-quarter Hispanic and one-third Asian/Pacific Islander students, our findings of significant differences on citizenship and primary language are likely due to the greater ethnic diversity of our participants.

We also examined several enrollment and outcome variables that have not been examined in past research. We found that first-generation students were less likely to enroll in transfer-level courses, but found no differences for enrollment in either non-transfer degree-applicable or certificate-applicable courses. There were no differences between first-generation students and others on probation status at the end of their first term, or retention in courses.

Our second, and primary, objective was not to optimize predictions of enrollment behaviors or student success, but rather to determine whether first-generation status added any unique contribution to such predictions. Initial chi-square analyses revealed that first-generation students were more likely than other students to enroll in basic skills courses. Had we ceased analyses at that point, we would have erroneously concluded that first-generation status was a

key variable for predicting enrollment in basic skills courses. Yet a subsequent regression analysis indicated that income, high-school GPA and age, *not first-generation status,* were the only significant unique predictors of basic skills enrollment. We found similar results for enrollment in transfer-level courses. Our experience demonstrates that controlling for related factors is crucial in determining whether results reflect real differences between the two groups or whether apparent differences are due to a spurious relationship (e.g., another variable related to first-generation status and the outcome variable).

Because of the prevailing notion in higher education that students whose parents attended college perform better than first-generation students, one of the most surprising findings of this research was the negligible relationship between first-generation status and first-term GPA. Although past research found significant results, the reported effect size from those studies was very small (on average less than 1% of the variance in GPA is associated with first-generation status), and likely reached significance due to very large sample sizes. The effect size found in our study was similar to that in past research, but with only 650 students, it did not reach statistical significance. Perhaps the most important methodological implication of this study is that researchers should consider practical, as well as statistical, significance in reporting their findings on student performance and first-generation status.

Limitations

While our sample reflects greater diversity than many of the samples used by other researchers, we have identified two important caveats concerning the generalizability of our results. First, although our sample is representative of the gender, age, and ethnicity distributions at our college, some evidence suggests that the performance of the survey respondents was somewhat higher than that of the overall student population. When interpreting our data, it is

important to consider that survey respondents may have differed systematically from non-respondents. Second, because the entrance requirements at community colleges are much less stringent than most four-year colleges, our students are likely to enter with greater variability in academic preparation, and therefore exhibit greater variability in course-taking behavior (e.g., basic skills, vocational, and transfer-level courses) than students at four-year institutions, so our data may not be comparable.

Conclusions and Recommendations for Future Research

To date, much of the research in this area has been descriptive – focused on efforts to identify differences between first-generation and other students. Faculty, counselors, and administrators may find it practically useful to know how many first-generation students exist at a college, their course-taking behavior, and their success rates. However, general descriptive statistics do not offer insight into the underlying *causal* factors associated with differences between first-generation students and others. While research has demonstrated that first-generation students differ somewhat from other students on various academic success, it is often erroneously inferred that first-generation status caused such differences.

Academic success depends on a number of complex factors. Our study demonstrated the importance of contextual information when examining student performance. By assessing the relative impact of our predictor variables on student success, we avoided over-simplifying the relationship between background and outcome measures. Indeed, close analysis of the results reported in both previous research and our own study strongly suggest that first-generation status per se does not have much of a direct impact on student success. It appears more likely that first-generation status indirectly impacts student success via an array of mitigating factors. Research which identifies factors that have more immediate impact on the academic performance of first-

generation students stands to make important contributions to the field. Possible factors to explore include: parents' value of education, family goals and priorities, social support, and other resources (e.g., finances, books, access to learning environments such as libraries, the Internet, tutors, etc.). Note that while each of these factors may correlate with parental education, each probably has a more direct effect on students' academic performance.

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Endnotes

[1] This is the strict definition of first-generation and will be used throughout this study. Other researchers use a more liberal definition which defines students as first-generation if neither parent received a college degree (derived from TRIO program guidelines). See Billson and Brooks-Terry (1982) for an overview of first-generation definitions.

[2] By "other" students we refer to those for whom either parent attended college; in other words, other students are in this context not first-generation college students.

[3] The student survey was not restricted to first-year students. For better comparability with past research commonly conducted on first-year students, we included in this study only students whose first term at the college was no more than two years prior to the term they completed the survey were included. We chose the cut-off to minimize any differences among students which might exist as a result of changing institutional policies or practices.

[4] The survey item which asked students to report their parents' level of education did not distinguish between the education level of the mother or father. The item read as follows: "Mark the statement which best describes the HIGHEST education level EITHER OF YOUR PARENTS EVER reached." Students selected from seven options: less than 9th grade; 9th to 12th grade, but did NOT receive a high school diploma; high school diploma or equivalent (such as GED or California High School Proficiency Certificate); attended some college, but did NOT receive a degree; Associate degree (such as AA or AS), Bachelor's degree (such as BA or BS); Graduate or professional degree (such as MA, MS, JD, Ph.D., MD, or Ed.D.).

[5] "Transfer-level" courses are accepted by the state university system as essentially equivalent to their own. "Non-transfer degree-applicable" courses apply toward general education-associate degree requirements. "Certificate-applicable" courses fulfill vocational certificate and some degree requirements. "Basic Skills," or remedial, courses are designed to teach the basic skills and knowledge necessary for entry into higher-level courses; they are concentrated in the English, ESL, and mathematics areas.

[6] Note that in the context of our research, retention concerns enrollment within a single term, whereas persistence examines term-to-term enrollment. Although these operational definitions of retention and persistence are consistent among many community colleges, they are distinct from the ways in which many four-year colleges and universities define retention and persistence. As always, it is crucial to consider differences in operational definitions when reviewing data from various sources.

[7] These categories are commonly used by the Chancellor's Office of the California Community Colleges for reporting purposes.

[8] Logistic regression is appropriate to use when the dependent variable is dichotomous and the researcher is interested in predicting the occurrence of some event (in this case, student enrollment in a certain type of course).

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