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THE RELATIONSHIP OF FINANCIAL AID AND FINANCIAL AID PACKAGE
COMPOSITION TO PERSISTENCE AT A PRIVATE COLLEGE

A Dissertation Presented

By

LEE C. SIROIS

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

May 1986

Education

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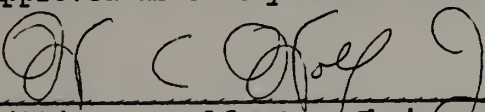
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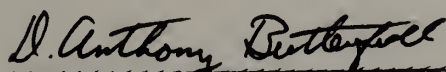
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ABSTRACT

THE RELATIONSHIP OF FINANCIAL AID AND FINANCIAL AID PACKAGE

COMPOSITION TO PERSISTENCE AT A PRIVATE COLLEGE

MAY 1986

LEE C. SIROIS, B.A., AMERICAN INTERNATIONAL COLLEGE

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A five-year longitudinal study of attrition was done using as subjects 303 first-time, traditional-age freshmen at a small private college in Western Massachusetts. The relationships of grant aid, preferential aid (provided on the basis of talent or merit), work aid, and loan aid to persistence were examined in a multivariate study which included the variables of socioeconomic status, major field of study, ability measures, high school rank, sex, state of residence, participation in high school athletics or activities, religious preference, date of registration, grade point average, and resident or commuter status. Persisters had higher high school rank, registered earlier, had higher grade point averages, tended to be women, had specific majors at the time of enrollment, and had stated religious preferences. The hypotheses that work assistance and preferential aid are positively related to persistence were supported in a series of discriminant function analyses. The hypothesis that loan aid is negatively related to persistence was partially supported by the multivariate analyses, but this finding may be confounded by changes

in Guaranteed Student Loan regulations which occurred 3 years into the study. The hypothesis that grant aid is positively related to persistence was not supported in the multivariate analyses. The consistent finding of other studies is that grant assistance is positively related to persistence, but these studies fail to separate grant assistance (based on need) from preferential aid (based on merit). The results of these other studies may be due to the confounding of need-based and merit-based aid. The results of the study are limited to first-time, traditional-age freshmen at the research site. Nevertheless, the current trend toward increasing amounts of loans and proportionately less grant and work assistance should be reexamined in light of the results. Suggestions for future research on the relationship of financial aid variables to persistence include separation of preferential aid into assistance based on academic merit from assistance based on athletic or other talent, and the addition of a variable related to quality of participation in high school activities.

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CHAPTER I

INTRODUCTION

The introduction section contains five subsections. First, the problem section describes the background for the study. Next, the significance of the study is examined with respect to the background material. Third, the terms used in the study are defined. Fourth, the limitations of the study are described, and finally, the purposes of the study are described.

THE PROBLEM

Financial aid to American college students has as long a history as that of American higher education. From the founding of the first American college in the 1630s until the mid-1950s, scholarships, loans, grants, and employment were provided to a small number of students. Involvement by the federal and state governments in providing financial assistance to students was limited to assistance to public colleges and universities and a few federal programs which provided direct assistance to students who fell into special student categories, the most important example of which is the GI Bill of 1944, which provided assistance to veterans for higher education.

The federal role in higher education, until the 1950s, tended to be hit and miss, with programs for student assistance designed to fit specific sets of circumstances created by some perceived "crisis",

much as the GI Bill of 1944 was a reaction to the crisis which was expected to be the result of millions of veterans entering the employment market at the close of the war. None of these programs was related to the establishment of a set of comprehensive national policy statements on higher education, in general, or on student aid, in particular.

President Truman's Commission on Higher Education in 1946 approved a statement which may still be the nearest thing to an official position on national educational policy and goals yet made. That report has been influential in the development of thinking about the nature of higher education, though its recommendations were not implemented until many years later, and not completely or incoherent fashion at that. The Commission stated that every citizen, regardless of age, should be encouraged to continue the educational process as far as ability permits. They urged that ethnic and racial barriers be struck down, recommended the establishment of low-cost commuter colleges, and recommended a reduction of economic barriers to education by the establishment of financial aid in the form of loans, grants, and employment.

None of this happened until another "crisis", the Russian launching of Sputnik I in 1957. Congress passed legislation which began the National Defense Student Loan Program (now the National Direct Student Loan Program). In the fifteen years from 1957 to 1972, Congress established several more grant, loan, and employment programs which still serve as the primary sources of federal financial aid to students.

These programs, though they resemble some of the recommendations made by Truman's Commission, are a patchwork quilt of programs which have often been established without clearly stated and coherent goals, and which are based on a variety of eligibility criteria and disbursement systems. Attempts at the federal level to revamp, reorganize and reauthorize the federal commitment to student aid in the past five years have yet to get off the ground.

Though clear policy was and still is lacking, goals are implicit in the current smorgasbord of federal programs. These include enhancement of economic opportunity through education, the development of human potential, the development of an informed electorate, and equality of educational opportunity without regard to income, race, ethnicity, sex, etc., and other more specific goals such as training needed professional people in such areas as health care and special education. The currents of thought in the 1980s reflect reactions to other "crises" - the need for properly trained teachers, particularly in mathematics and science, and the reduction in the number of traditional age talented college students which has produced "merit" scholarship proposals.

In spite of the incoherent and uncoordinated nature of federal (and state) financial aid programs, student aid touches all aspects of higher education in America. Aid greatly influences who get ahead in society through the enhanced economic opportunity that education often brings. Aid is one of the primary means by which the federal government supports higher education. Aid influences the viability of

large numbers of private institutions and some public institutions as well, many of which would fail if aid were terminated. The \$12 billion provided directly or indirectly by the federal government and the more than \$1 billion provided by state governments (not including appropriations for public higher education) have become an important part of the financing system of virtually every institution. Parents and students now depend on the existence of aid, and aid is an important part, perhaps even the most important part, of the decision to attend college in the first place. Also, aid is often an important part of the decision of which college to attend.

Though the Congress has not passed most of the large cuts in aid originally requested by President Reagan in 1981, the current status of these programs is one of drifting - of being in limbo. It's important to demonstrate that these programs have accomplished some of what they were meant to accomplish. In other words, inspite of the acknowledged role which aid plays in higher education, questions remain as to whether aid has had the effects implicit in the legislation which established programs and funding levels.

A substantial body of literature regarding the effects of aid on college enrollment patterns suggests that equality of educational opportunity has been one result of aid. Students who would not otherwise have been able to attend collge are now doing so in large numbers. Minority student enrollments have increased (though have remained relatively constant in the past 3 to 5 years).

Another substantial body of literature has attempted to answer two

other questions which have important policy implications for the future of financial aid. Does financial aid relate to persistence in higher education, and does the composition of a financial aid package in amounts of grants, loans, and employment relate to persistence? Though a good deal of research has been done on these questions, the quality of the research has been marred by a lack of methodological strength which has resulted in equivocal and therefore, arguable results. The methodological strength of these studies has suffered from one or more of the following flaws:

1. Failure to properly define terms, particularly the terms "persistence" and "attrition", "financial aid recipient", student status as either "part-time" or "full-time", student's class level as "freshman", etc., and such variables as apparent ability level, SES and others.
2. Failure to track students longitudinally for a sufficient period of time - 5 years from the time of entrance into college.
3. Failure to specify institutional aid awarding policy.
4. Failure to separate financial aid awarded purely on the basis of financial need from "preferential" financial aid, aid awarded primarily on the basis of merit (such as academic or athletic scholarships).
5. Failure to track financial aid status during the entire duration of the study, with one of the variables of interest being the average amount of aid per semester.
6. Failure to include both financial aid recipients and nonrecipients in the study.
7. Finally, and most important, failure to use appropriate multivariate design and statistics with a sufficient number of potentially relevant variables.

The research on aid and aid composition as they relate to persistence seems to have supported the positions that aid is not

related to persistence, but that some forms of aid (grants and scholarships) are positively related to persistence, and other forms of aid (loans) are negatively related to persistence. The effects of employment vary from study to study, sometimes positively related to persistence, sometimes unrelated to persistence at all. The fact that these studies are flawed, particularly because most of the studies have been univariate, leaves these conclusions with little solid research support. What is needed is a number of multivariate studies of the relationship of aid and package composition to persistence at a variety of institutions.

Most of today's financial aid programs have been established in hit-or-miss fashion within the last thirty years. The programs have increased access to higher education for thousands of students and have become an important source of financing for colleges and universities. If financial aid availability is unrelated to persistence, or if financial aid package composition (in terms of loans, grants, scholarships, and/or employment) relates differentially to persistence, the policy implications may potentially be substantial. If, for example, grant assistance is positively related to persistence but loans are negatively related to persistence, then perhaps our money would be better spent on grants than on loans.

SIGNIFICANCE OF THE PROBLEM

The significant aspects of the proposed research fall into two

basic categories. First, as noted earlier, research on the relationship of financial aid and financial aid package composition to attrition/persistence has often been marred by one (or more, usually more) of several methodological failures. This has resulted in equivocal results or results which indicate relationships without testing them with other predictors of academic success. The present study tracks a cohort of financial aid recipients and nonrecipients through 5 years, keeping continual track of financial aid, while separating preferential aid (aid based on talent or merit instead of need) from other forms of financial aid, and including a number of other variables which have been shown to correlate with academic success and/or persistence/attrition in other univariate studies. A clear distinction is made between preferential aid and grants in particular, a procedure which has not been previously carried out in a multivariate study.

Second, if methodologically sound research is done which shows that preferential aid, grants, loans and employment are related to persistence/attrition in different ways, and that any one or more types of aid significantly predict academic success or persistence/attrition in a multivariate study, then federal and state financial aid policy could be affected. As suggested earlier, if one form of aid predicts persistence, but another predicts attrition, then those legislative bodies which appropriate funds should be aware of that fact and act accordingly. No one study can accomplish this, but a series of methodologically sound studies might be able to do so.

(It should be noted, in this regard, that even a number of sound studies might not significantly influence legislative action. For example, College Work Study has legislative popularity due to its appeal to the work ethic, and loans might be popular due to the fact that small appropriations result in relatively large amounts of available aid. Nevertheless, a strong body of research - now lacking - might be effective in altering policy.)

TERMS AND DEFINITIONS

Several terms, particularly those associated with financial aid, are defined in the following paragraphs.

Basic Educational Opportunity Grant (BEOG) - The BEOG program (now known as the Pell Grant Program) of the federal government provides grants to students ranging from \$200 to \$2100 (1985-1986) based on financial need as determined by a standard federal formula which is different from the formula usually applied to data from the Financial Aid Form. This largest single grant program in the United States may be used at virtually every college, university and proprietary school in the country.

Campus Based Financial Aid Programs - This is the collective title for three federal financial aid programs in which most colleges and universities participate. The three programs are the College Work Study Program, the Supplemental Educational Opportunity Grant Program and the National Direct Student Loan Program.

College Work Study - The College Work Study program is federally funded financial aid which can only be awarded to students with financial need. The program allows students to work on or off campus and earn funds which can be used to help defray the cost of higher education.

Cost of Attendance - The cost of attendance at an institution includes the usual costs for tuition, fees, room, board and books, plus an estimated cost for travel to and from the campus, recreation, maintenance costs in the parents' home (for commuters), and personal expenses.

Family Contribution - Family contribution is the estimated ability of a family to contribute toward the cost of education. It is the sum of the parents' contribution and the student's contribution.

Financial Aid Form - The Financial Aid Form is a document published and processed by the College Scholarship Service of the College Entrance Examination Board which describes the financial circumstances of a family applying for financial aid. Parents' income, assets, and other family characteristics as well as student savings and expected summer earnings are analyzed, and a parents' contribution and student's contribution are estimated from the the information provided.

Financial Need - Financial Need, or Need, is the difference between the cost of education at a particular institution and the estimated ability of the student and his family to contribute to the cost of education. This represents the amount of aid a student theoretically

needs in order to complete his or her education at a particular college or university.

Guaranteed Student Loans (GSL) - The GSL program allows undergraduate students to borrow up to \$2500 per year with no interest or payments on the loans until 6 months after the student has left school.

Students whose family income is over \$30,000 per year must show need in order to qualify for the 8% loans, but students with family incomes under \$30,000 are automatically eligible. The loans are made by banks or other lending institutions, with the interest paid and the principal guaranteed (in case of default) by the federal government.

National Direct Student Loans (NDSL) - The NDSL (formerly the National Defense Student Loan) program provides loans to students with no interest or payments on the loan until 6 months after the student has left school. The loans are completely need based and are made by colleges who manage a revolving loan account with funds provided by the federal government and the college each year, as well as money repaid by students who have borrowed in the past. The 5% interest rate is among the lowest available for student loan programs.

Pell Grant Program - This is the current name for the program formerly known as the Basic Educational Opportunity Grant program.

Package - The package, or financial aid package, refers to the composition of financial aid in terms of loans, grants, employment, and/or preferential aid provided to a student.

Parents' Contribution - The Parents' Contribution is the estimated ability of a student's parents to contribute toward the cost of

education. The Parents' Contribution is calculated by means of a standard set of formulas based on financial information parents put on the Financial Aid Form.

Student's Contribution - The student's contribution is the estimated ability of the student to make a contribution from savings and/or summer employment toward the cost of his or her education. It is estimated from information included on the Financial Aid Form.

Supplemental Educational Opportunity Grant Program (SEOG) - The SEOG program is a federal grant program which awards funds to colleges which, in turn, award the SEOG funds to students who have exceptionally high financial need.

Definitions Specific To The Study

Ability Level - Ability level is defined as the student's scores on the Verbal and Quantitative sections of the Scholastic Aptitude Test of the College Entrance Examination Board. When a student has taken the test more than once, the most recent score was used.

Financial Aid Recipient - A financial aid recipient is defined as any student who has received grants, loans, employment and/or preferential aid from federal programs, state sources and/or American International College. The variables of interest are first year financial aid from these sources and the average financial aid per semester of attendance from these sources, corrected for increases in the cost of attendance

at American International College during the time period covered by the study.

Grant - Grants are sources of financial aid which are awarded to students who have financial need. Grants are gifts which do not require the student to work or to repay the award at a later date. Grants may be federally funded, state funded, or funded by individual institutions.

Loans - Loans are sources of financial aid which are provided on the basis of financial need. Loans may be federally, state, or privately funded. Student loans usually defer payments and interest until after the student has completed the educational process. Repayment with interest begins at that time or after a 3 to 6 month "grace period."

Persistence/Attrition - Persistence is defined as completion of requirements for the bachelor's degree within five years, with or without dropout periods, or attendance during the final semester of the five year period, with or without dropout periods. Attrition is defined as leaving American International College, for whatever reason, before completing the requirements for the bachelor's degree and not attending American International College during the final semester of the five year period covered by the study.

Preferential Aid - Preferential financial aid is aid which is provided to a student independently of financial need considerations. Such aid would include merit (academic) scholarships, athletic grants or scholarships, and the music, cheerleading, library, etc., scholarships provided by many institutions. Sometimes need-based financial aid may be used as preferential aid. For example, a talented typist who has

financial need might be awarded a larger amount of aid under the College Work Study program instead of a large loan. Work is generally "preferred" to loans as a form of financial aid.

Scholarship - Scholarships are gift aid which is provided to students on the basis of talent or merit, not on the basis of financial need. The term "scholarship" is sometimes used incorrectly in place of "grant". A good example of the incorrect use of the term "scholarship" is the Massachusetts State Scholarship program, which provides aid purely on the basis of estimated ability of the family to pay for education, and which, therefore, would more properly be called the Massachusetts State Grant Program. In order to insure clarity of definition in the present study, all gift aid based on financial need is called grant aid, and all gift aid based on talent or merit is termed preferential aid.

Student - Students used as the subjects in this study were all first-semester full-time (12 or more academic credits during the first semester) freshmen at American International College in the fall of 1979, and were tracked through the second semester of the 1983-1984 college year, a duration of five years. The students included in the study were 1979 high school graduates who had no prior college experience, and were born after January 1, 1960, excluding foreign students and special students (those who attended on a nonmatriculated basis in the fall of 1979). All measures were gathered from records maintained in several offices on the American International College campus.

LIMITATIONS

The study and the degree to which the results can be generalized to other institutions and entering student classes are limited in a number of ways. First, the study is limited by the fact that only students in a single institution were used as subjects. The institution (American International College) is a small (1400 full-time undergraduates), private, nonsectarian college located in an urban area in Springfield, Massachusetts. About half of the students are commuters, with the other half living mostly in campus residence halls, and a few in private housing. The courses of study offered by the institution are limited to four basic areas - Arts and Sciences, Business, Psychology and Education, and Nursing. The college is moderately selective, with a substantial number of students who come from families in which neither parent has ever attended an institution of higher education.

Second, only a single entering class was used - students entering in the fall semester of 1979. Those students were continuously tracked for financial aid status, amounts of aid received, grades, and attendance at American International College.

Third, only freshmen with no prior college experience were included in the study. Only "traditional" freshmen were included - those who graduated from high school the prior spring, were born after January 1, 1960, and were matriculated students, with foreign and

self-supporting students excluded. These results would not apply, therefore, to transfers, nontraditional students, part-time or continuing education students, or foreign students.

Finally, the types of aid provided by American International Collge, and the policies for awarding grants, loans, employment, and preferential aid may be different from the types of aid and the awarding policies of other institutions. To the extent that this is true, the results may be limited to institutions with similar sources and types of financial aid and with similar aid awarding policies.

Policy for awarding aid at American International Collge includes awarding preferential financial aid from two sources: academic scholarships, based on a student's high school grades and SAT scores, and athletic grants, based on the coaches' evaluation of the student's ability to contribute to the intercollegiate athletic program of the college. Academic scholarships range from \$200 to the full cost of tuition and are renewable for 4 years if the student maintains at least a B grade point average. In a typical year, the number of academic scholarships is about 25, the average award is \$1500, and 40% of the students receiving scholarships recieving additional financial aid based on need. Athletic scholarships range from \$200 to the cost of tuition, room, and board, and they are renewable unless the student voluntarily withdraws from the athletic program of the college or the student becomes academically ineligible to participate in athletic programs. The number of athletic scholarships is typically 35, the average award is \$1600, and 85% of the students receiving scholarships

receive additional financial aid based on need. Packaging of need-based financial aid from grant, loan and work met the student's full financial need from the fall of 1979 through the 1983-1984 college year, although loan aid became a higher percentage of aid provided to students as grant and work aid became less available (relative to cost increases) during that five year period. Students who applied for aid early were provided with financial aid packages which met their need, but late applicants (both new students and returning students) received reduced amounts of aid based on the availability of funds at the time when the application became complete. Applicants who completed forms after the middle of June often received packages which were \$1000 to \$1500 less than their financial need.

Students applying for financial aid must file a Financial Aid Form, an application for financial aid (an American International College form), and a copy of their parents' U.S. income tax form 1040 or 1040A for income verification.

PURPOSE

The purpose of the present research is to investigate the relationship of financial aid to persistence, with specific focus on the relationship of financial aid package composition to persistence using a well-defined group of financial aid recipients and nonrecipients in a small private college, and using a longitudinal and

multivariate approach. The study includes a number of other variables which research has shown to predict persistence and/or success in higher education.

The research attempts to determine whether financial aid, in any form, significantly adds to the ability to predict persistence. Of primary interest is whether financial aid which is preferential (such as academic scholarships and athletic scholarships) , is positively related to persistence. Grant aid and preferential aid are examined as separate variables of interest.

Other variables in the multivariate analyses include, but are not restricted to, socio-economic status, student ability level as measured by SAT scores, sex, financial need, college major, religious preference, state of residence, participation in high school athletics and activities, high school rank and commuter/dormitory status.

CHAPTER II

REVIEW OF THE LITERATURE

The review of the literature for the present study is divided into three basic subsections. The first section deals with the question of whether the increases in financial aid which have occurred over the past twenty years have resulted in larger numbers of students seeking access to institutions of higher education. The reason for the inclusion of a section on "access" to higher education is that an understanding of current attrition studies must be seen in terms of the higher proportion of high school students attending college in the 1980s compared to 1950s or the early 1960s.

The second section of the review deals with the nature of attrition studies in general. This section includes a description of a number of variables which prior studies have shown to be related to persistence/attrition. The list of variables is extensive, and there is often less than total agreement on the nature of the relationships of some of the variables to persistence/attrition. Nevertheless, this review serves as a basis for choosing variables to be included with the financial aid variables used in the present study.

Finally, the most important for the present study, the literature relating specifically to the problem of the relationships of financial aid variables to persistence/attrition is examined.

ACCESS

Are a higher proportion of high school graduates entering college in the eighties than in the fifties or sixties? If so, can financial aid be identified as one of the reasons for the increased numbers of students entering higher education? Have more minority students entered college as a result of the availability of student aid?

Over the past 25 years, the proportion of high school graduates entering college has steadily increased, both during the times when the number of students in high school was increasing and in the recent years when the number of high school graduates has started to decrease.

Steif (1968) indicates that twice as high a proportion of high school seniors from the lowest income quartile hoped to attend college in 1966 as compared with 1959 (46 percent and 23 percent respectively). Further, the number in the second lowest income quartile who hoped to attend college rose from 40 to 56 percent at the same time. This occurred primarily (in Steif's view) because of the National Defense Education Act of 1964. The Carnegie Council on Policy Studies in Higher Education (1979) takes the argument one step further. They indicate that women and members of minority groups from families with incomes below the median have increased their enrollment rates by approximately 22 percent from the introduction of the Basic Educational Opportunity Grant (BEOG) program in 1972 to the academic

year 1976-1977. This is an increase from an absolute rate of 12.4 percent to a rate of 15.1 percent, and involves nearly a quarter of a million students. Though the Carnegie Council did not believe that all of the 22 percent enrollment rise was due to the implementation of the BEOG program, they estimated that at least 12 percent of the expenditures on BEOG in 1976-1977 contributed to the expansion of educational opportunity, with the rest of the expenditure assisting students who would probably have attended without BEOGs.

In hearings before the House Postsecondary Education Subcommittee, David R. Jones, Chairman of The National Commission on Student Financial Aid, reported that the federal commitment to aid has had a favorable impact on postsecondary attendance. He indicated that the number of postsecondary students had tripled between 1963 and 1980, primarily due to the federal financial aid programs. "The number of students attending postsecondary schools from families with incomes of \$7500 or less has more than doubled in the last six years. The encouraging trends would not have occurred without the support of federal programs which eliminate economic barriers" (Higher Education and National Affairs, 1983; p. 2).

In an extensive study of the effects of several state grant programs, Fife (1975) and Leslie and Fife (1974) concluded that state grant programs have been particularly effective in promoting access and choice. Student self-reports (which may be suspect due to self interest of the respondents) in four of the six states studied showed that almost 50 percent of the recipients responded that the state aid

had been the determining factor in their decision to attend college. In the other two states, approximately 30 percent responded positively to the same question. (These two states had particularly low grant appropriations at the time of the study.) These perceptions are supported by the fact that "85 percent of the recipients either knew they were going to receive aid before they made their selection or anticipated receiving aid when they made their selection" (Fife, 1975; p. 1). The major conclusion from the study is that "aid promotes equal educational opportunity" (p. 31, emphasis is Fife's). Wenc (1983) came to a similar conclusion, that "with the initiation and growth of student financial aid programs by both the federal and state governments, newly enfranchised students sought postsecondary educational opportunities in increasing numbers" (p. 330).

Minority participation rates in higher education have risen, but not to levels at which complete equality in rate has been achieved (Green, 1982; Astin, 1982; Higher Educational and National Affairs, 1983b). Green notes that minorities are underrepresented in four-year institutions, though participation rates for minorities are higher in two year institutions. He goes on to argue that the high minority participation in financial aid programs provides clear evidence of the significance of these programs to minority group goals and interests. Evidence of the effects of aid on minority students can be found by comparing the proportion of minority students studying at an institution to the proportion of minority students receiving aid in the same institution. At American International College, for example,

11 percent of the student body were minority students during the 1983-1984 college year, but 17 percent of the aid recipients were minority students, many of whom were of nontraditional ages and circumstances.

"Between 1970 and 1974 the enrollment of black students in college increased by 56 percent while the corresponding white enrollment increased 15 percent. By 1974, the college participation rates for blacks and whites were approximately equal within any major income class, although a much higher proportion of black families than white are low-income families" (Doermann, 1978, p. 8).

It's difficult to evaluate the exact effect of increased student aid on increased participation in higher education, in general, and by minorities specifically. It is clear, however, that aid availability has had some effect, and probably a significant one. Substantial numbers of students are attending college who would not have been able to do so if aid programs had not been started and funded. Since educational costs have risen faster than the cost of living since 1967, it may even be that students who would have had the financial resources necessary to enter college in earlier times would not have been able to do so in the later part of the 1970s or in the 1980s. This is speculative, of course, but surely those students would have shifted in some degree from attendance at relatively high-priced private institutions to attendance at relatively low-priced public institutions, making demands for public support in another form. This would have been particularly true in Massachusetts, a state which has

one of the highest proportions of students attending private institutions of any state.

There is no doubt that many private institutions (and, perhaps, some public institutions as well) owe their continued existence to the availability of student financial aid. By some estimates (Fenske, 1983), as many as 40 to 50 percent of private institutions owe their financial viability to the existence of student aid. The loss of these private institutions would produce a high demand for expansion of public institutions, at a public cost probably much higher in the long run than the cost of the indirect subsidy of private education through student aid.

ATTRITION STUDIES

The problem of attrition of students who leave institutions of higher education prior to completing degree requirements has long been of concern to higher education administrators. As enrollments have declined for periods of time due to specific sets of circumstances, such as depression or war, the problem of attrition has received more attention. In "boom times" when enrollment increased, the problem was still of concern, but not of crucial importance to colleges and universities. As the number of students reaching college age in the late 1970s and the 1980s has declined (and the predictions are for still greater decline into the mid 1990s), most institutions have conducted institutional research on the problem of attrition and have

attempted to counter the loss of students by implementing a variety of programs aimed at "saving" students.

In a review of the literature on attrition, Pantages and Creedon (1978) have summarized the problem well:

"For every ten students who enter college in the United States, only four will graduate from that college four years later. One more will eventually graduate from the college at some point after those four years. Of the five students who dropped out, three did so during the first year. Two more dropped out during the second year, and the last one dropped out at some point after the second year. Three of the ten students who originally entered college will never obtain a college degree" (p. 49).

Attrition rates vary tremendously from institution to institution. They range from a high of 80% at some community colleges (Cope and Hannah, 1975) to a low of 10% or less at some prestigious liberal arts colleges (Summerskill, 1964). The interesting point that can be made is that the general levels of attrition described above have remained relatively stable for the past forty or fifty years (Summerskill, 1964; Max, 1969; Cope and Hannah, 1975). Indeed, Spady (1970), Astin (1975), Bayer, Royer and Webb (1973), and Pantages and Creedon (1978), suggest that the overall persistence rate may be increasing at least into the 1970s, in spite of the fact that a higher proportion of high school graduates is attending college than ever before.

Studies which have resulted in the information described above have been described by Knoell (1960) as census studies - that is, studies which have attempted to establish attrition/persistence rates for all of postsecondary education. She identifies four types:

1. Autopsy studies as those which ask students to describe their reasons for leaving school.

2. Prediction studies as those which attempt to produce prediction equations for college success/failure measures.
3. Case studies as those which involve long term follow-up studies of students after they have left school.
4. Census studies as those which attempt to measure persistence/attrition for all of postsecondary education.

The literature describing studies of all four kinds abounds with descriptions of factors reported to be related to attrition/persistence. A brief description of the most important factors follows, along with a description of the effect of the factor. Some of the variables are readily definable (such as sex, age, high school grades and marriage), while others are less consistently defined from study to study (such as socio-economic status, major, or influence of the student's peer group). The relationships of each of the variables to persistence/attrition are often not the same in all studies, and exceptions are noted where appropriate. Further, most of the relationships described come from studies which are univariate in nature, with exceptions noted. The relationship of any of the factors to persistence may, therefore, be spurious - the result of complex intercorrelations with other factors, as well as correlation with attrition/persistence. There are relatively few multivariate studies, and even those differ in the variables chosen for examination, the multivariate technique chosen, and on other dimensions. Multivariate studies will be designated as "MV" after the year of publication of the study. It's important to emphasize the fact that these studies these studies have been done at different colleges and universities,

and that given the tremendous differences among institutions, contradictory findings are not surprising. Further, the design of the studies varies from cross-sectional to longitudinal, with study length varying from one semester to five or more years. Finally, (though this list of caveats is not intended to be exhaustive) definitions for the terms attrition and persistence and for other variables may vary substantially from study to study.

Age

Generally speaking, students who enter college at an older age than the "traditional" student age of 17, 18, or 19 are at greater risk (Sexton, 1965; Greer, 1980), although Sexton (1965) and Summerskill (1962) have suggested that age is not a crucial factor in attrition. It may be that students who delay attending college do so for specific reasons, and that those same reasons may cause the same student to drop out (Summerskill, 1962). Indeed, Lenning and his co-workers' (1980) review of attrition literature could detect no consistent relationship across the studies in their review.

Sex

A number of studies (Rice and Scofield, 1969; Blair, 1972; Brigman and Stager, 1980; Peng and Fетters, 1977; Hochstein and Butler, 1983; Trent and Ruyle, 1965) have shown that women are at greater risk of attrition than men. This has been the conclusion of most writers on the problem of attrition, but at least two studies (Demos, 1968; Nelson, 1966) have demonstrated the reverse. Still other studies have found no difference in attrition rates for men and women (Ealls, 1956; Hilton, 1982 MV; Martin, 1974). It may be that the relationship of

sex to attrition is complicated by interactions with other variables. (Kester (1970) found that sex interacted with ability, and Astin (1972a, b) demonstrated that four-year graduation rates favored women, but that once women left college they were less likely to return than men, so that long range graduation rates ultimately favor men.

Socioeconomic Status

Large numbers of studies have been done in an attempt to relate socioeconomic status (SES) to attrition. Many (Bryant, 1950; Elton, 1969; Besson and Burnet, 1970; Macmillan 1970; Kester, 1970; Lenning et al, 1980; Peng and Fетters, 1977) have found significant relationships in which higher SES is associated with persistence. This relationship is not consistent across the literature, as demonstrated by several studies (Ealls, 1956; Vogt, 1977; Hilton, 1982 MV) in which no significant relationships were found. SES is a particularly troublesome factor from the standpoint of definition. SES has been defined in terms of parental income, father's occupation, parent educational level, and in other ways. Varying definitions may be responsible for the differing results in studies. In a meta-analysis of the relationship between SES and academic achievement, White (1980) found only a median correlation of +.25 across 100 studies and 636 correlation coefficients. This is lower than is generally assumed among educators, and it may be that SES as a predictor of persistence is mediated by other factors such as achievement or ability.

Ability Level

Ability level or aptitude for college work is typically defined

in terms of scores on standardized tests, usually the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board (CEEB) or the scores on the aptitude test of American College Testing (ACT). Most studies concur in the finding that students with higher aptitude are at less risk of attrition than students of lower ability (Taylor and Hecker, 1967; Macmillan, 1970; Devecchio, 1972; Rowell, 1974; Pantages and Creedon, 1978). Three multivariate studies (Pascarella, 1979 MV; Greenberg, 1972 MV; Herndon, 1984 MV) have also found the same relationship. Though most research has demonstrated that aptitude and persistence are related, at least one study (Rouche, 1967) found no such relationship.

High School Rank or Achievement

Of all of the factors which have been extensively studied, the most consistent relationship has been found between high school achievement and persistence in college. It seems that the best predictor of future performance is past performance (Rice and Scofield, 1969; Devecchio, 1972; Blair, 1972; Lenning et al, 1980; Rowell, 1974). Four multivariate studies have confirmed this finding (Blanchfield, 1971 MV; Greenberg, 1972 MV; Hilton, 1982 MV; Herndon, 1984 MV), and no study has been found in which there was no significant relationship.

Reason for Attending College

Many students who enter college have definite career, educational, or vocational goals in mind, such as a B.A. in accounting. Other students have less specific career goals, such as, simply, business.

Still others have no vocational goals at all and may only be attending college in order to please a parent or to play a sport. A number of studies have shown that students who have clear goals and/or definite majors are more likely to persist than those who haven't or those who have undecided majors (Bryant, 1950; Elton, 1969; Macmillan, 1970; Blari, 1972; Pantages and Creedon, 1978; Lenning et al, 1980; Flynn, 1980 MV). Though not as extensively studied as high school achievement, no contradictory findings have been found.

Dormitory/Commuter Status

Most studies have found that dormitory students are more likely to persist than students who commute from home (Astin, 1975 MV; Kuznik, 1975; Chickering, 1974; Nasatir, 1969; Craft and Howard, 1979; Herndon, 1984 MV). Brown (1968) found the reverse, that commuters persisted to a significantly greater degree than dormitory residents.

Part-time/Full-time Status

The finding in this area is consistent from study to study. Part-time students are at a greater risk of attrition than full-time students (Bosson and Burnet, 1970; Blair, 1972; Martin, 1974; Rowell, 1974; Hochstein and Butler, 1983; Greenberg, 1972 MV).

Support from Family

Several studies have shown that students who come from families who support or encourage the efforts of the student to attend or complete a college education are more likely to persist than students with little or no family support (Kester, 1970; Blair, 1972; Brawer, 1973; Rowell, 1974; Pantages and Creedon, 1978; Trent and Ruyle, 1965

MV). At least one study (Morrisey, 1971) reported that students who are more dependent on parents tend to persist, perhaps because dependency indicates close family ties. Pantages and Creedon (1978) suggest, therefore, that the relationship between family support and persistence is mediated by the quality of student-parent relationships, with better relationships resulting in more parental influence.

Date of Application or Enrollment

Students who apply or enroll earlier tend to persist to a greater extent than those who apply or enroll later (Ragan, 1973; Craft and Howard, 1979; Hochstein and Butler, 1983). It's likely that students who apply or enroll earlier may have made the college commitment earlier, that their goals are clearer, or that the college is more likely to be a first choice.

Race/Ethnicity

Many studies have used race or ethnicity as a variable of interest. Several studies (Macmillan, 1970; Greenberg, 1972 MV; Kester, 1970) have reported attrition rates to be higher among black students. Kester (1970) also reported higher attrition among Hispanic students, as has Leon (1975). Lenning et al (1980) reported higher attrition for black, American Indian and Hispanic students, but greater persistence for Asian students. Martin (1974) and Hilton (1982 MV) have reported no ethnic or racial differences. Astin (1975 MV) reported higher attrition for black students, but the attrition rate for black students in black colleges did not differ from the overall attrition rate for white students. Astin also reported

greater persistence for Asian students.

College Grades.

Most studies of the relationship between attrition and college grades have shown that low grades are associated with attrition (Bryant, 1950; Blair, 1972; Brawer, 1973; Knowles, 1973; Rowell, 1974; Lenning et al 1980; Peng and Fетters, 1977; Craft and Howard 1979; Demos, 1968). However, when nonvoluntary attrition (academic dismissal) is controlled, Hilton (1982 MV) and Gell and Bleal (1973) found no differences in attrition rates. Further, Pascarella and Terenzini (1979) have reported that men indicate academic difficulty as a reason for withdrawal more frequently than women, a sex by academic difficulty interaction.

Other Factors

In addition to the factors individually discussed above, a number of other factors have been identified by one or more studies as being related to attrition/persistence. Each of these is briefly described below.

Blair (1972) noted that students who reported no religious affiliation were less likely to persist than those who were affiliated with a religion. Less attrition among Jewish students has been reported by several authors (Lenning et al 1980, Peng and Fетters, 1977, Ramist, 1981), findings which could be mediated by close family ties and greater family support for education.

Married students (particularly women) are less likely to persist (Blair, 1972). Smokers are also less likely to persist (Blair, 1972;

Astin, 1975 MV). Athletes persist to a greater degree than non-athletes (AACRAO, 1985), but this may be the result of financial support and/or academic support accorded athletes. Students with peer support and peers who are also in college tend to persist (Pantages and Creedon 1978).

Students who are motivated (Brawer, 1973), more mature in autonomy (Trent and Ruyle, 1965), more mature in socialization and personality (Pantages and Creedon, 1978), or who do not have emotional problems (Demos, 1968) are more likely to persist. Good study habits and more hours of study are also associated with persistence (Trent and Ruyle, 1965; Demitroff, 1974).

The use of a car while in college is associated with greater attrition (Panos and Astin, 1968; Astin, 1975 MV). Fraternity membership has been associated with persistence (Astin, 1975 MV; Kuznik, 1975; Nasatir, 1969), and participation in cocurricular activities in high school is associated with persistence (Willingham, 1985).

Students who enroll in remedial courses early in the semester are at greater risk of attrition (Brightman, 1974; Rowell, 1974), as are students who have had high school curricula which were not college preparatory (Jaffe and Alkans, 1970; Devecchio, 1972; Anderson, 1974). Private school graduates are more likely to persist (Pantages and Creedon, 1978).

Finally, a variety of learning and academic support programs have been reported to increase persistence. These support programs have

included skills courses and form-filing assistance for financial aid (West et al, 1975), tutoring, counseling, and "red tape" handling (Lee, 1974; Appel, 1977), and staff development, in-service training, and housing assistance (Heath et al, 1973; McDermott, 1975).

SUMMARY

A brief summary of the factors related to attrition/persistence is given below. "Plus" indicates a factor generally related positively to persistence and a "minus" indicates a factor generally related negatively to persistence. "Mixed" indicates a factor which is known to interact with other factors or which may inconsistently relate to persistence.

Age - Nontraditional minus but mixed.

Sex - Female minus but mixed.

Socioeconomic Status - Higher SES plus but mixed.

Ability - Higher ability (higher SAT or ACT scores) plus.

High School Rank - Higher rank plus.

Dormitory/Commuter Status - Dormitory resident plus.

Reason for attending college - Specific career goals plus.

Part-time/Full-time status - Part-time status minus.

Parental Support - Parental support for education plus.

Date of application/enrollment - Earlier date plus.

Race/Ethnicity - Black minus but mixed, Hispanic minus, Asian plus.

College Grades - Poor grades minus but mixed.

Religion - No religious affiliation minus, Jewish plus.

Marriage - Married minus but mixed.

Athletes - Participation in college athletics plus.

Support from peers - Support for education plus.

Motivation - Higher motivation plus.

Maturity - Greater maturity plus.

Emotional problems - Having emotional problems minus.

Use of car - Use of car in college minus.

Fraternity Membership - Fraternity membership plus.

Remedial Course - Enrollment in remedial courses minus.

Early course drops - Dropping of single courses early in semester minus.

High School Curriculum - Non-college preparatory curriculum minus.

Private School - Graduation from a private high school plus.

The range of factors is clearly broad, covering background factors, academic factors, personality factors and participation in college activities as well. The problem with the list is the fact that so many of these factors are interrelated. This complicates attempts to find the unique contribution of each factor and those factors of the most fundamental importance. Clearly, multivariate approaches to the study of factors related to persistence/attrition are required, since these techniques are the only methods which take intercorrelations among variables into consideration in the statistical process.

FINANCIAL AID VARIABLES AND PERSISTENCE/ATTRITION

This section of the review will describe those studies which have attempted to establish relationships between persistence/attrition and financial aid. Every attempt has been made to find as many relevant studies as are available for this section of the literature review. Two electronic literature searches were done, as well as a search of the financial aid literature through the use of two particularly helpful publications - A Guide To The Literature Of Student Financial Aid (Davis and VanDusen, 1978), and nearly all of the issues of the Journal of Student Financial Aid published since 1979, which have listed at one time or another nearly all of the doctoral dissertations written on topics dealing with financial aid since the 1930s. Further articles were found through careful reading of the reference sections of articles and documents found by other means. Though the search was careful and exhaustive, one cannot be sure that all of the literature relating financial variables to persistence/attrition has been found.

Since most of the federal impact in financial aid has come in the past 20 years, most of the research in financial aid is relatively recent. As noted earlier, financial aid has been fairly successful in promoting equal access to higher education, though increased participation by low income students has fallen off in recent years. Blacks, in particular, continue to be somewhat underenrolled (American

Council on Education, 1985).

Forty-four studies have been found in which hypotheses about the relationships between financial aid and persistence have been tested. In many studies, financial aid variables were the primary variables of interest (see, for example, Wenc, 1977; Hochstein and Butler, 1983; Bergen and Zielke, 1979), and in others, financial aid variables were included with various other variables in larger studies (such as Blanchfield, 1971 MV; Jensen, 1978, 1981 MV; Herndon, 1984 MV).

Differences among studies occur in a number of ways. First, the financial aid as a single variable with no distinction between the types of aid (Gell and Bleil, 1973; Beal and Noel, 1980). Other studies might focus on one particular form of aid such as grants (Selby, 1973), scholarships (AACRAO, 1985), or work (McKenzie, 1981). Still other studies look at various contributions of scholarships, grants, loans and/or work (Astin, 1975 MV; Wenc, 1977; Krieger, 1980).

Second, studies differ in the student populations examined. Many studies (Fields and LeMay, 1973; Bergen and Zielke, 1979; Baber and Caple, 1970; Jensen, 1978, 1981 MV) use student populations from single institutions, while others (Astin, 1975 MV; Herndon, 1984 MV; Fife, 1975; Wenc, 1977) use samples which include students at many institutions. One such sample is the National Longitudinal Study, the members of which were first surveyed as high school seniors in 1968 (Astin, 1975 MV; Herndon, 1984 MV).

A third set of variations concerns the source of data. Some studies use questionnaire data (Herndon, 1984 MV; Astin, 1975 MV) and

others make direct use of information available from institutional sources (Selby, 1973; Fields and LeMay, 1973; Davis, 1979).

Fourth, and an important source of differences among studies, is that definitions of terms frequently vary, particularly the terms persistence and attrition. One study might define attrition as the failure of a student to complete degree requirements in four years, regardless of the reason for failure to complete (see, for example, Bergen and Zielke, 1979). Another study might include as persisters students who transferred to another institution (Shedden, 1979). Some studies vary in length of time studied - from one semester of the freshman year (Hochstein and Butler, 1983), to 5 semesters (Flynn, 1980), to 5 years (Jensen, 1978, 1981 MV), to 7 years (Max, 1969), to even a time span of more than 12 years (Jex and Merrill, 1962). Longer time periods for attrition studies are generally better than short ones, primarily because attrition will be overestimated in studies using shorter time periods. This occurs because most of the attrition in 4-year institutions takes place in the first 2 years of attendance. Studies of five years should be sufficient, since the great majority of students entering with a particular class, and who will graduate, will have graduated in five years (Pantages and Creedon, 1978; Lenning et al, 1980; Max, 1969; Spady, 1970; Jex and Merrill, 1962), with only a small proportion remaining in college full time after five years.

In addition to various definitions for persistence/attrition and study length, studies may or may not include financially independent

and financially dependent students, freshmen as well as transfers, traditional age freshmen as well as nontraditional students, or part-time as well as full-time students.

Finally, most studies are univariate and look primarily at zero order correlations between pairs of variables. A few (Blanchfield, 1971; Astin, 1975; Trent and Ruyle, 1965; Jensen, 1978, 1980; Herndon, 1984; Krieger, 1980; Russ 1974; Shedden, 1976; Flynn, 1981; Voorhees, 1985) are multivariate, using multiple regression, discriminant analysis, or path analysis.

All of these differences among studies make direct comparisons difficult. Nevertheless, summarizing the results of different studies is possible, with the understanding that studies vary on a variety of dimensions. Table 1 summarizes the results of the 44 studies which had results relating to the relationship of financial aid variables to persistence/attrition. The table contains two sections, one for univariate studies and one for multivariate studies. The "vote" for each aid category, preferential aid (including academic, athletic, and other scholarships), grants, work, loans, and aid (which includes any and all possible combinations of the other four categories), is indicated by the table entry. A plus sign means that the factor was positively related to persistence in that study. A minus sign indicates a negative relationship to persistence, and a zero indicates that the study did attempt to find a relationship between that type of aid and persistence but that the relationship was not significant. Blanks, or no entry, indicate that the study did not examine that

TABLE 1

This table shows the authors and years for studies found which relate one or more financial aid variables to persistence/attrition. A "blank" indicates that the study did not look at the relationship of that variable to persistence/attrition, a "+" indicates that the variable was positively related to persistence, and "-" indicates that the variable was negatively related to persistence, and "O" indicates that the variable was unrelated to persistence. The number on the right indicates that a note will be found at the end of the table. "Pref" indicates preferential aid - merit scholarships of some sort.

Univariate Studies

<u>Author(s) & Year</u>	<u>Pref</u>	<u>Grant</u>	<u>Work</u>	<u>Loan</u>	<u>"Aid"</u>	
AACRAO, 1985	+					1
Anderson, 1974			+			
Astin, 1975		+				
Astin & Cross, 1979				-		2
Baber & Caple, 1970		+				
Beal & Noel, 1980					+	
Bergen & Zielke, 1979	+					
Brooks, 1981			+	-		3
Brown, 1980				-		4
Carney & Tilton, 1979					+	
Craft & Howard, 1979				0	0	
Davis, 1979					0	
Eckland, 1964		+				
Fields & LeMay, 1973					+	
Fife, 1975		+				
Gell & Bleil, 1973					0	
Harris, 1976					0	
Heath et al, 1973		+		-		
Henry, 1967			0			
Hirschorn, 1980					0	
Hochstein & Butler, 1983	+	+		-		5
Iffert, 1957			0			
Jex & Merrill, 1962	+					
Kinney, 1970	0					
Kohen et al, 1978		0	-			
McKenzie, 1981			+			
Nelson, 1966		+				
Odutola, 1983		+		-	+	6
Pedriani & Pedriani, N.D.		+		-		
Peng & Fetzters, 1977	0			0		
Selby, 1973		+				7
Troutman, 1970			+			
Wenc, 1977		+	+	-		8
Winder, 1973					+	

TABLE 1 (CONTINUED)Summary of univariate studies

Preferential aid: 4 positive, 2 neutral
 Grants: 11 positive, 1 neutral
 Work: 5 positive, 2 neutral, 1 negative
 Loans: 2 neutral, 8 negative
 Aid: 5 positive, 5 neutral

MULTIVARIATE STUDIES

Author(s) & Year	Pref	Grant	Work	Loan	"Aid"
Astin, 1975*		+	+	-	9
Blanchfield, 1971*		+		-	
Flynn, 1980**	+	+		+	
Herndon, 1984**	0	0	+	0	
Krieger, 1980*		+	+	-	0
Jensen, 1978, 1981***					0
Russ, 1974*					+
Shedden, 1976**		+			+
Trent & Ruyle, 1965*			0		
Voorhees, 1985***		+	+	+	+

*Multiple Regression

**Discriminant Analysis

***Path Analysis

Summary of Multivariate Studies

Preferential aid: 1 positive, 1 neutral
 Grants: 6 positive, 1 neutral
 Work: 4 positive, 1 neutral
 Loans: 2 positive, 1 neutral, 3 negative
 Aid: 3 positive, 2 neutral

Summary of All Studies

Preferential aid: 5 positive, 3 neutral
 Grants: 17 positive, 2 neutral
 Work: 9 positive, 3 neutral, 1 negative
 Loan: 2 positive, 3 neutral, 1 negative
 Aid: 8 positive, 7 neutral

Notes

1. Loans negative for low SES students. Large grant overcomes negative loan effect.
2. Loan only negative, but grant positive, with or without loans.
3. Especially positive for Black students.
4. Loan and grant in combination is positive, but loan plus work is negative.

TABLE 1 (CONTINUED)

5. Loans especially negative for women. Direct comparison of NDSL and work study.
6. Financial aid negative for Black females in particular.
7. Preferential aid in the form of athletic scholarships.
8. Loans negative, especially for minority students. Large grants overcome negative effects of loans.
9. Large grant has neutral effect. Combinations of aid neutral. Work especially positive for minorities.

source of aid with respect to persistence.

In the preferential aid category, only 6 of the univariate studies examine its relationship to persistence. Four of the 6 studies showed positive relationships between preferential aid and persistence, and 2 studies showed no relationship. Only one of the studies (AACRAO, 1985) was limited to athletic scholarships, and the relationship was positive.

Of the 14 studies which had conclusions regarding grant aid, 11 showed positive relationships with persistence, and 1 showed no effects. It should be noted that this form of aid is most likely to be confused in definition. Writers often use the terms grant and scholarship interchangeably, and further, may refer to any gift aid as grant whether provided to students on the basis of need or merit. It is possible, therefore, that the high positive vote is partially a function of confusion of terms. In the work category, 5 studies were positively related to persistence, 2 were neutral, and 1 showed a negative relationship to persistence. Loans were most clearly negative, with 8 studies, and only 2 with neutral results. In the aid category, which includes studies which did not differentiate among different types of aid or which considered different types of aid both individually and in combination, 5 studies showed positive relationships with persistence, and 5 were neutral, showing no significant relationships.

The votes of the multivariate studies aren't much different from those of the univariate studies. Among the multivariate studies, 1

showed positive effects for preferential aid and another was neutral. For grants, 6 were positive and 1 neutral. In the work category, 4 showed positive relationships with persistence and 1 was neutral. For loans, 2 were positive, 1 neutral, and 3 were negatively related. Finally, in the aid category, 2 were positive and 2 were neutral. If there were unique findings among the studies, they were the positive relationships between loans and persistence found by Voorhees (1985) and Flynn (1980), and the negative relationship of work to persistence found by Flynn.

Overall, grants appear to have the most positive relationship to persistence, with preferential and work aid also showing smaller, or less consistent positive relationships to persistence. Loans have a consistently negative effect. The overall effects of aid are positive, but mixed, with 8 studies showing positive relationships to persistence, and 7 studies showing no significant relationship. If one combines the findings for preferential aid, grants, work and loans, the total number of positive relationships is 33 across the 44 studies, the number of neutral effects is 11, and the number of negative effects is 12. Given these combined values for the four different types of aid, the overall aid finding of positive but mixed might make sense.

Among the multivariate studies, the techniques used included multiple regression, discriminant analysis, and path analysis or similar techniques. The use of multiple regression, often considered a multivariate technique, could be questioned in studies of

persistence/attrition, since the dependent variable in these studies is nominal, and the usual assumption of multiple regression is that the predicted variable be continuous. Five of the multivariate studies used either discriminant analysis or path analysis (Voorhees, 1985; Jensen, 1978, 1981; Herndon, 1984; Shedden, 1977; Flynn, 1980), and these will be discussed in some detail below. One of the studies which used multiple regression (Astin, 1975) will be discussed also, primarily because it is perhaps the best known persistence/attrition study and because it is probably cited in the literature more than any other.

The results of Astin's well-known study have been published in book form (Astin, 1975), and other specific aspects of the study have been published in a variety of sources appropriate to the topic(s) of the articles (Astin, 1972a; 1972b; 1973). The subjects for Astin's research were selected from the entering freshman class of 1968, and they were followed up four years later in the summer and fall of 1972. There were over 100,000 subjects who had attended 358 two and four year colleges, and the data were gathered by questionnaire. The variables in the study included age, sex, major, family background variables, educational progress, information about financial aid, jobs held, etc. Only their graduation status and SAT or ACT scores were confirmed by data from the colleges.

Astin carefully defined most of the terms used, and particularly the terms attrition and persistence. For example, persisters were defined as students who had completed a B.A. degree, or who had

completed four years of college, were still enrolled full time, and were still pursuing at least the bachelor's degree. The main purpose of the study was to develop a set of data which could be used to predict what Astin called "dropout-proneness". He did this by developing a prediction formula based on the assessment of the contribution of each factor to the probability of persisting (or, conversely, dropping-out). Each of the 110 factors was entered into the prediction formula in stepwise fashion.

Astin's analysis of financial aid factors included employment, loans and "scholarship, grant, or other gift" (p. 59). He reported a slight advantage in persistence among students who had grants, although an interesting interaction was reported in that students who received large grants seemed to be at the same dropout risk as students with no grant, and students with smaller support in the form of grants were less likely to drop out. His interpretation of this fact was that those with major grant support have the greatest financial need, and these students may have been more dropout-prone to begin with. Another interesting interaction was that major grant support was associated with persistence for black students. The amount of assistance may be a more crucial factor for these students.

Loans had a generally negative effect on freshman persistence, but the effect of loans interacted with sex, with men who had loans at higher risk of dropping out than women who had loans. The effect of loans on four-year persisters tended to be positive, but this could have been due to the fact that persisters for four years had several

opportunities for obtaining them.

The effects of employment were positive for both freshmen and four year persisters, and were greater for both groups than the effects of grants, especially for women. This was particularly true of middle income students, and the positive effect of College Work Study was also particularly striking among black students.

Astin's study included more subjects than any other study encountered, although it does have limitations from the standpoint of the present study. It encompassed only 4 years, though his definition of persister does counteract for this to some degree. (It should be noted, however, that some of the colleges in the sample were two year schools, and many of the students in those institutions may have had no desire to go on for a B.A. degree.) The study failed to distinguish between grants (based on need) and scholarships (based on merit), and, of course, the self-report approach could be limiting.

Voorhees (1985) used LISREL (Linear Structural Relations) to examine relationships among 14 variables. (LISREL is similar to path analysis in that it allows a set of relationships among variables in an a priori model to be tested while controlling for the effects of other variables in the model.) Voorhees used LISREL to improve the model with which he began. The variables used in the study were housing (dormitory or commuter), grants, loans, need, minority status, residency status (resident of the state in which the university was located or not a resident of the same state), sex, ACT composite score, high school rank, Supplemental Educational Opportunity Grant,

National Direct Student Loan, College Work Study and cumulative grade point average, and their relationships to persistence as measured by the completion of three full semesters at a "large urban university" (p. 24). The subjects were all of "high need" (p. 24), and all had received funds from one or more of the campus based federal financial aid programs (National Direct Student Loans, Supplemental Educational Opportunity Grants, and/or College Work Study). No students who had not received financial aid were included in the study. Though the percentage of minority students entering the university that fall was 10.8%, the group of subjects included 26.5% minority students, probably because of the selection of only high-need students.

Significant effects on persistence (in order of importance) were found for cumulative grade point average, National Direct Student Loans, College Work Study, grants, high school rank, loans, housing Supplemental Educational Opportunity Grants, and residency status. The only negative effect on persistence was for residency status (nonresidents at higher risk of attrition). The effects for need, minority status, ACT composite score, and sex were not significant. R squared for predicting persistence from the model was .417. (The word "effect" is used in the context of the study. The study is correlational in nature, and therefore conclusions about effects must be extremely cautious. A model to be tested by LISREL or path analysis may be based on the presumption of causal relationships among a set of variables which are then tested by either technique, but the presumptions of causality are not necessarily proven by significant

relationships in the predicted directions.)

Although the study used a multivariate approach, it is limited in that it covered only 3 semesters, and it included only high need financial aid recipients. It does not, therefore allow a comparison of relative rates of persistence or the effects of a variety of factors on the persistence rates of financial aid recipients and of nonrecipients. Further, age and full-time/part-time status were uncontrolled, and there was no attempt to look at preferential aid as separated from grants or other gift aid.

Herndon (1984) used discriminant analysis to study 226 financial aid recipients who entered California State College at Bakersfield as freshmen during the fall term of 1975. The age of the students ranged from 17 to 31. The students were tracked for two full years, and their status at the start of the third year was also determined. Persistence was defined as at least half-time attendance for the two years under study and enrollment for the fall of the third year. This group included students who transferred to other institutions with the intention of completing at the new institution. Stopouts were defined as students who had left the university voluntarily and had returned by the fall of the third year. Dropouts (nonpersisters) were defined as students who left the university and had not returned. The variables used in the analysis included an admissions eligibility index (aptitude test scores combined with high school record), degree objective (undefined in the study), sex, age, ethnicity, Pell Grant eligibility index (used as a measure of SES), residence (dormitory or

commuter), scholarships, grants, loans, College Work Study, financial need, marital status, and number of children in the family.

Only one function was significant, and only three variables contributed significantly to it. The admissions eligibility index was the strongest predictor, with College Work Study and residence also significant. Participation in the College Work Study program was positively associated with persistence, and dormitory residence was also positively related to persistence.

This study is limited by the fact that it only included financial aid recipients, the fact that part time students were included with full time students, and the fact that students were only tracked for 5 semesters. The function derived from the discriminant analysis may have limited usefulness even at California State College at Bakersfield, since the persisters group included students who transferred to other institutions. It would be interesting to know how many of the students classified as persisters were persisting at other institutions.

Jensen (1978, 1981) studied three groups from the entering class at Washington State University in 1970: all of the financial aid recipients, all of the students who had applied for financial aid but who had been denied aid, and a sample of nonapplicants for financial aid. Students who transferred to other institutions were eliminated from the study, thus only persisters and students who definitely dropped out were included. Data from the nonapplicants was obtained from families by questionnaires, with an 85% return rate on the

questionnaire.

The dependent variable used was the number of semesters of attendance, with independent variables of SES, the Washington Precollege Test Score (similar to the SAT or ACT), high school grade point average, cumulative grade point average at the end of the student's first year in college, and mean amount of financial aid per semester (without distinction among types of aid). Jensen tracked the group of students for 5 years - 10 semesters.

A path model was tested in which SES was presumed to affect the average aid per semester and semesters of attendance, and average aid per semester was presumed to predict the semesters of attendance as well. A second set of variables was also presumed to affect semesters of attendance, high school grade point average and freshman grade point average, with high school grade point average also a predictor of freshman grade point average (see Figure 1).

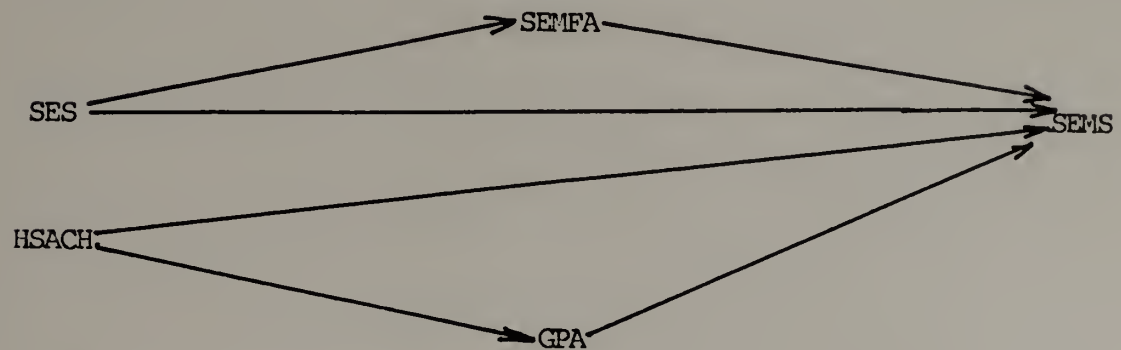
The amount of financial aid was negatively, but not significantly, related to the number of semesters of attendance. High school grade point average and freshman grade point average were both significantly related to persistence, but only 28% of the variance in semesters of attendance was explained by the combinations of all variables.

The limitations of this study are that no distinctions were made among the different types of aid, and that only four other variables were used in the model. A strength of the study is that it includes both financial aid recipients and nonrecipients.

Shedden (1977) used five multiple discriminant function analyses

FIGURE 1

Jensen's (1978, 1981) model for use with path analysis in order to predict the number of semesters of attendance.



SES is Socioeconomic Status

HSACH is high school achievement

SEMFA is the number of semesters during which the student received financial aid

GPA is the student's GPA at the end of the first year of attendance

SEMS is the number of semesters of attendance

to identify variables that predict whether college freshmen receiving federal financial aid will be persisters, transfers, or dropouts. The subjects for the study were 340 freshman students entering over an 8 year period (1966 through 1973) at a small liberal arts college located in Tennessee. Married and independent students were not included in the study. Cross validation of the discriminant function's ability to classify students into the three groups was confirmed in the entering freshman class of 1974.

Students were tracked through 5 semesters. Fifty variables were used, including personal and family variables, personality variables, academic variables, and financial aid variables. The financial aid variables included parents' contribution, "scholarships or grants from the institution" (p. 24), federal grants, other grants, National Direct Student Loans, institutional loans, Guaranteed Student Loans, work (of any kind or source of funding, on or off campus), percent of aid in grants, percent of aid in work, percent of need met by aid, percent of aid request met by aid, and percent of budget met by aid. The five analyses included the whole group, males with averages above B, males with averages below B, females with averages above B, and females with averages below B.

The function derived for the whole group was able to correctly classify into the three groups (persisters, transfers, and dropouts) from 50% to 75% of the time in the cross validation group. Persisters were higher than dropouts in ACT and other ability measures. Persisters had definite majors in mind when they entered, were advised

by tenured faculty, had a higher percentage of aid in grants, had more federal aid than those who transferred out, had a higher percentage of total budget in aid than dropouts, had higher high school grade point averages, were more willing to experiment, and were more self sufficient.

Unfortunately, the study was limited to 5 semesters and was limited to only financial aid recipients. Further, no separation of scholarships and grants was made, and work included all forms of work, not just College Work Study or on-campus work.

Flynn's (1980) study is very similar to that of Shedden. Her study included 473 freshmen at Dominican College from 1968 through 1976, with the 1977 freshmen used as a cross validation group for the functions derived from the prior nine years of classes. She used the same five discriminant analyses, with the same subdivisions of the total group, the same study length, and the same three groups, persisters, transfers (defined only on the basis of a transcript having been sent by the registrar's office to another college), and dropouts. The financial aid variables used were also similar.

Persisters were significantly higher in SAT. Persisters were also lower in grants, higher in loans, and lower in work, all of which are reversals of the usual findings. Correct classification in the cross validation group was only 34.3%. One is hard pressed to explain the seeming contradictions in the above conclusions from the study. That is, different forms of aid seem to produce very different effects in this study than in any other. This study, because of its close

similarity to that of Shedden, shares the same limitations.

These studies share a number of characteristics. Most important from the standpoint of the present study is the fact that only one of these studies (Herndon, 1984) separates grants (based solely on need) from scholarships (based on merit), and the nature of scholarship aid in that study was undefined. For the most part, grants and scholarships are lumped together, potentially confounding the results obtained from the grant category of aid. Further, only Jensen tracked the students through a full five years, but his study is weakened by the fact that only a small number of variables was included in his model (and therefore in the study), and his study made no distinctions among the different forms of aid. Finally, only 2 of the studies (Astin, 1975; Jensen, 1978, 1981) included both aid recipients and nonrecipients in their samples.

In summary, no persistence study has been found which separates grants from scholarships, tracks students for five full years or 10 full semesters, is multivariate, includes a variety of predictor variables as well as financial aid variables, and includes both aid recipients and nonrecipients. The present study was conceived as an attempt to include all of these elements using data available and obtained unobtrusively from a variety of college sources. (Students were aware, of course, that "data" were being obtained at the time they filled out applications for admissions or financial aid, or biographical questionnaires prior to admission, and in that sense data were not obtained unobtrusively.)

CHAPTER III

PROCEDURE

The procedure section is divided into three subsections. The first of these describes the sample of students used for the research. The second section describes the variables used in the study and the rationale for their inclusion. The final section describes the hypotheses to be tested and the data analysis techniques applied to the data.

THE SAMPLE

The first step in conducting the study was to select a sample of students. The entire entering class at American International College in the fall of 1979 was used as the initial sample. Since the definition of student in the study includes only traditional freshmen - those with no prior college experience, dependent upon parents for support, of traditional college age, and not foreign students - each of the non-complying groups of students was eliminated sequentially from the sample. Table 2 shows the original sample, with the numbers of students eliminated as a result of each criterion. (Note that many students might have been eliminated from the sample for more than one reason.)

The students who were in the sample were then labeled as persisters or nonpersisters. Persisters were students who continued

TABLE 2

Description of the Sample of Students

<u>Description</u>	<u>Number</u>
Original Sample of Students	496
Transfers (Prior College Experience)	133
Date of Birth before 1960	29
Not full time (fewer than 12 academic credits)	9
Non Matriculated students	4
Self Supporting Students	7
Foreign Students	<u>11</u>
Final Sample of Students	303

until they obtained a baccalaureate degree or who continued to enroll on a full-time basis through the ten semesters encompassed by the study, with or without stopouts. Nonpersisters were students who had left school, for whatever reason, and who were not enrolled at the end of the tenth semester and who had not received a 4-year degree. The group of persisters included 149 students, 148 of whom had graduated by the end of the tenth semester, and one who was still enrolled at the end of the tenth semester and who graduated at the end of the eleventh semester in December of 1984 (see Table 3). The nonpersisters were 154 students who had dropped out at various times during the five years (see Table 4).

VARIABLES SELECTED FOR STUDY

The next procedural consideration was the compilation of a list of variables from prior research which had been shown to correlate with persistence/attrition or other related indicators of academic success. The list of variables compiled is shown in the summary beginning on page 17. Three of the variables were controlled - age, part-time/full-time status, and marriage. Age was controlled by excluding from the study all transfers and by including in the study only those students who were born after 1960. Only full-time students were included in the study, and no independent (self supporting and/or married) students were included in the study.

In selecting a set of variables for the present research, a major

TABLE 3

Persisters who received bachelor's degrees or who were enrolled during each of the ten semesters of the study

<u>Number of Semesters</u>	<u>Number of Graduates</u>	<u>Number Still Enrolled</u>
1-6	0	149
7	3	146
8	132	14
9	4	10
10	9	1

The last student enrolled at the end of ten semesters graduated at the end of the eleventh semester.

TABLE 4

The distribution of nonpersisters and how many left school, by year

<u>Time</u>	<u>Number Lost</u>	<u>Cumulative Number</u>	<u>Cumulative % of Total</u>
Start of Year Two	79	79	51.3
Start of Year Three	48	127	82.5
Start of Year Four	13	140	90.9
Start of Year Five	11	151	98.1
During Fifth Year	3	154	100.0
Total Number of Nonpersisters		154	

consideration was to gather information about students in the sample from college records rather than from questionnaires. This was a consideration because several studies (see, for example, Marsh, 1966; Demos, 1968; Sherrer, Demitroff, and Cooper, 1974) have shown that questionnaire data used in attrition studies are often unreliable. It was decided, therefore, to use only data which were available in some form from college files and records. This decision eliminated several of the variables from consideration. Those variables included support from family, support from peers, motivation and maturity (since these would have required administering a psychological instrument at the time of first enrollment), and emotional problems. Use of a car while on campus was dropped from consideration because students often have cars on campus without registering them with campus police (and many students park on the streets surrounding the college instead of in college parking lots), thus the data would have been unreliable. Fraternity membership was also eliminated because of unreliable records and because the fraternity system at American International College is relatively small.

Records maintained in several offices on the American International College campus were examined in order to determine those variables which could be coded for use in the study. Those offices included the Registrar's Office, the Financial Aid Office, the Dean of Student's Office, the Comptroller's Office, the Admissions Office, the Computer Center and the Afro-American Cultural Center. Those

variables which could be encoded from information available were selected for inclusion in the study. The list of variables, the source(s) for the information, the transformation or modification of information, and the method of coding information for analysis follow below. In those instances in which several campus offices had information which conflicted with other college records, the rationale for selection is indicated.

Variable 1. Parents' 1978 income The application for financial aid for the 1979-1980 college year included a Financial Aid Form for aid applicants. The base-year financial information on the Financial Aid Form for the 1979-1980 college year was parents' 1978 income. The parents' 1978 U.S. income tax form 1040 or 1040A was used to verify the income (and other information) which had been entered by the family on the Financial Aid Form. This information was directly available for 182 students. For an additional 45 students, later-year financial information for parents was available. For these students, the later year information was used, but reduced by a factor directly related to the increase in the Cost Price Index from mid-1978 to the middle of the year for which information was available. For an additional 19 students, parents' income was estimated from parent's job title (or titles if both parents worked). For example, if a parent's job title was postal carrier, teacher, or nurse, the average incomes known for these job titles were entered based on information in other students' files. For an additional 24 students, those whose parents had job titles such as physician, lawyer, president, or

vice-president, a "default" income of \$50,000 was used. This figure was not arbitrary - it is based on the fact that in the 1979-1980 college year, an income of \$50,450 would, all other factors neutralized, be required in order to produce a "no need" result from the Financial Aid Form, and thus no eligibility for financial aid. (Note that this is a conservative procedure, since many of the incomes were probably significantly higher than the \$50,000 figure used.) For the remaining 33 students, the average of all of the incomes was used.

Variable 2. Parents' Contribution The estimated parents' contribution toward the cost of education was taken from the FAF, or was estimated from parental income using tables provided by the College Scholarship Service (College Scholarship Service, 1979).

Variable 3. Financial Need This information was taken from the Financial Aid Form, or was estimated from the family contribution and the student's cost of education (based on knowledge of dormitory or commuter status).

Variable 4. First Year Grant Aid The total amount of financial aid for the student's first year from the Supplemental Educational Opportunity Grant, state scholarship (when based solely on need), State Grant, Nursing Scholarship, Basic Educational Opportunity Grant (now called the Pell Grant) and/or American International College Grant programs was used for this variable.

Variable 5. First Year Preferential Aid The total amount of financial aid for the student's first year from the American International College Academic Scholarship and/or Athletic

Scholarship programs was used for this variable. Nine students were included in this category on the basis of having been awarded American International College Grants preferentially - that is, to children of alumni or of staff members. An additional 12 students were included in this category because College Work Study awards were made in lieu of loans because of unusual skills possessed by the students (mostly typing skills).

Variable 6. First Year Employment Aid The total amount of College Work Study funds awarded to students during the first year was used for this variable.

Variable 7. First Year Loan Aid The total amount of financial aid for the student's first year from the National Direct Student Loan, Guaranteed Student Loan, and Nursing Loan Programs was used for this variable.

Variable 8. Number of Semesters During Which the Student Received Financial Aid. The financial aid history of all students in the sample was tracked until they graduated or withdrew from the college. Students who stopped out, but returned to the college in a later semester, were considered persisters, and later semesters during which aid was received were included in this item.

Variable 9. Average Grant Aid Per Semester The total amount of aid from the Supplemental Educational Opportunity Grant, state scholarship (when based on need), state grant, Nursing Scholarship, Basic Educational Opportunity Grant or Pell Grant, and American International College Grant programs for the entire period of

attendance was obtained. Since total grant aid over a period of 8 or 10 semesters was influenced by the increased cost of education which occurred during the five years of the study, the amount of grant aid for each year after the first year was reduced by a factor directly related to the increased cost of education for that year as compared to the base college year of 1979-1980. The average grant aid is therefore based on the same cost assumption as the first year of attendance. This reduces the possible bias which could result from a fourth or fifth year student suddenly becoming eligible for large grants. The total aid obtained in this manner was then divided by the number of semesters during which the student attended American International College.

Variable 10. Average Preferential Aid Per Semester The total amount of aid for each year was summed from the American International College Academic Scholarship and Athletic Scholarship programs and was corrected for increased costs in the same way as Variable 9. The amounts of money provided to those students who had been given American International College Grants and/or College Work Study preferentially were treated in the same way. The total aid preferentially awarded was then divided by the number of semesters during which the student attended American International College.

Variable 11. Average Employment Aid Per Semester The total College Work Study awarded to students over the period of enrollment was corrected for increased costs in the same manner as Variable 9, and added. The total employment assistance was divided by the number

of semesters during which the student attended American International College.

Variable 12. Average Loan Aid For each year of attendance, the total amount of aid from the National Direct Student Loan, Guaranteed Student Loan, and Nursing Student Loan Programs were obtained and corrected for increased costs in the same manner as Variable 9. The total loan aid for all years was then divided by the number of semesters during which the student attended American International College.

Variable 13. Socioeconomic Status By Parent's Occupation Parent's occupation was obtained from at least two, and sometimes three sources - the student's application for admission to American International College, the student's biographical data card maintained by the Dean of Student's Office, and for financial aid applicants this information was provided by students (or their parents) for a third time on the Financial Aid Form. In cases in which job titles differed meaningfully, the information on the student's biographical card was used because this information was considered least likely to be biased. Job titles on the Financial Aid Form could be "downgraded" so as to diminish the potential effect on financial aid offers, and the job title on the application for admission could be "upgraded" in an attempt to increase the probability of being accepted. The information on the biographical card is obtained when the student actually enrolls in the fall, a time when there is less likely to be a perceived gain or loss by upgrading or downgrading job titles.

Numerical values for socioeconomic status were derived by using a scale described by Warner, Low, Lunt and Srole (1963). They described six levels of "occupational class" (p. 387), and assigned numerical weights to each of the classes. The classes and numerical weights are as follows: Unskilled labor - 1; Skilled factory - 2; Skilled craft - 2.5; Management aide - 3; Management - 4; Professions - 6. Warner and his coworkers (1963, p. 386) note that "the correlations of these occupational strata with the six levels of the Yankee City social-class system are broad and general rather than narrow and specific...it is necessary to speak in terms of the range of social classes covered by each of the six occupational levels." Thus, for example, the management occupational class may "range from upper-lower through the upper-middle class, but primary identification (is) with the lower-middle and upper-middle classes" (p. 386). In general, then, higher numbers are associated with higher social class, and lower numbers are associated with lower social class status.

Variables 14 - 18. Planned Major The major which the student planned to pursue at the time he or she first entered American International College was coded in five variables based on information obtained from the course registration card the student filled out. Students who had not yet decided on a specific major were coded as 1 in Variable 14, and zeroes in Variables 15 - 18. Included in this category were students who indicated a nonspecific major such as "business" or "liberal arts". Students who had decided on a specific School of Arts and Sciences major (such as Political Science, History,

or Biology) were coded as 1 in Variable 15, and zeroes in Variables 14 and 16 - 18. Students who planned to major in a School of Business area (such as Accounting, Management or Marketing) were coded as 1 in Variable 16, and zeroes in Variables 14, 15, 17, and 18. Students who planned to major in School of Psychology and Education majors (such as Psychology, Elementary Education, or Criminal Justice) were coded as 1 in Variable 17, and zeroes in Variables 14 - 16 and 18. Students who planned to major in Nursing (a separate school from the other three schools) were coded as 1 in Variable 18, and zeroes in Variables 14 - 17.

Variable 19. Scholastic Aptitude Verbal Score SAT scores are required for all applicants for admission. The verbal score, ranging from 10 to 80, was used for this variable. For those cases in which students had more than one score, the score from the last test taken was used.

Variable 20. Scholastic Aptitude Quantitative Score The quantitative SAT score, ranging from 10 - 80 was used for this variable. As with the Verbal score, the last score was used if the student had taken the test more than once.

Variable 21. Number of Semester Hours of Credit Completed. The total number of semester hours of credit for which passing grades had been received was used for Variable 21. This total did not include credits earned (such as for physical education) which do not count toward the graduation requirement of 120 semester hours of academic credit. For persisters, of course, the number of earned credits was

120 or more (except for the one persister who had not graduated and who had 102 credits at the end of the 10th semester), but for nonpersisters, the total number was less than 120.

Variable 22. Number of Semesters Completed This variable consisted of the number of semesters of work completed. Values range from zero for students who withdrew prior to the end of the first semester of attendance to 10 for students who required the full five years of the study duration to complete a degree or who attended during all 10 semesters encompassed by the study.

Variable 23. Persistence/Nonpersistence Students who graduated during the five years were coded as a 1 for this item. There was only one student who attended American International College during the last semester of the five year period who did not graduate at the end of that semester. (That student registered for the 11th semester and graduated in December of 1985.) Persistence/Nonpersistence is, therefore, in the present study very nearly the equivalent of Graduation/Nongraduation. It should be noted, however, that students who first entered in 1979 might not have attended the college during the final semester of the fifth year (and were coded as 0, a nonpersister), but might return to complete degree requirements during a later semester.

Variable 24. High School Rank in Class Past academic performance is often considered the best predictor of future academic success. As a measure of past achievement, high school rank in class was chosen, primarily because it is least sensitive to differences among high

schools in the strength of their academic programs. It should be noted that no measure of achievement in high school is completely free of such bias. In some inner city schools, for example, students might rank high in their classes because they have received good grades (compared to suburban high schools) only because they have not been problems from a disciplinary standpoint. For this variable the student's rank in class was divided by the number of students in the graduating class. The values for Variable 24, thus have a potential range from .01 for students who graduated at or near the top of the class to 1.00 for students who graduated last in the class. Coding rank in class in this manner may produce problems of interpretation, since high rank is associated with lower numerical values, and lower rank is associated with higher numerical values.

Variable 25. Sex The student's sex was coded as 1 for females and zero for males.

Variable 26 - 29. State of Residence The vast majority of students at American International College come from one of 8 states - the New England states plus New York and New Jersey, with about 60% from Massachusetts. Variable 26 was coded as a 1, and Variables 27 - 29 coded as zeroes for students who came from Massachusetts. Variable 27 was coded as a 1 and the other three variables coded as zeroes for students from Connecticut and Rhode Island. Variable 28 was coded as a 1 and the other three variables were coded as zeroes for students from the three northern New England states. Variables 26 - 28 were coded as zeroes and Variable 29 coded as a 1 for students from other states.

Variable 30. High School Athletics The student biographical card asks students to list the varsity sports in which they participated while they were in high school. The number of such sports listed on the card was used as the value for this variable.

Variable 31. High School Activities The student biographical card also asks students to list the high school activities (such as theater, band, yearbook, key club, newspaper, etc.) in which they participated. The number of such activities listed on the card was used as the value for this variable.

Variable 32. Change of Major The major listed at the time of graduation (or at the time when the student withdrew from the college) was compared to the major listed at the time the student entered in 1979. Students who had changed majors (including all of the students with "undecided" programs and most of those with unspecified arts and sciences or business majors at the time of entrance) were coded with a 1 for this variable. For those who did not alter their majors, a zero was used.

Variable 33. Part Time Jobs The student biographical card asks students to list the jobs and employers they had had up to the time they entered the college. The number of jobs held in the past was used for this variable.

Variables 34 - 36. Race Three variables were used to code race. Whites were coded as 1 in Variable 34, and zeroes in variables 35 and 36. Black students were coded as 1 in Variable 35, and zeroes in Variables 34 and 36. All other groups were coded as 1 in Variable 36,

and zeroes in the others. No attempt was made to specifically code those of Hispanic descent, American Indians, or Orientals because very few students fell into those categories in the entering class of 1979.

Variables 37 - 40. Religious Preference A 1 in Variable 37, with zeroes in 38 - 40 was coded for Roman Catholics. Protestant denominations were coded as a 1 in Variable 38, and zeroes in Variables 37, 39, and 40. Jewish students were coded with a 1 in Variable 39 and zeroes in the other three. Those who indicated no preference or who left the item on the student biographical card blank were coded as a 1 for Variable 40, and zeroes in Variables 37 - 39.

Variables 41 - 43. Reason for Choosing to Attend the College As an attempt to gather information about the degree to which students had specific academic and/or professional goals at the time they entered the college, these variables were coded from two questions on the biographical card which ask why the students chose to attend American International College and what their future vocational or professional objectives were. These two items were used to place students into one of three categories - those with definite academic and/or professional goals, those with nonspecific academic goals, and those who had no identifiable academic goals. Since reliability of categorization was a consideration in coding this information, two people - a faculty member in the Department of Psychology and the Director of Financial Aid - separately placed students into one of the three categories. Differences in categorization were discussed until agreement was reached. For Variable 42, a 1 was coded and zeroes

coded for Variables 43 and 44 for students who indicated specific goals. Such responses would include the following: for objectives, such responses as "teacher of the mentally handicapped", "career in the transportation industry", or "research biologist"; for reason for attending the college, such responses as "because of the good personnel management course", "for its outstanding courses in special education", or "because it has a good math and computer information systems course". For Variable 43, a 1 was coded, with zeroes in the other two variables if the student indicated some academic interest which was relatively nonspecific. Examples of such responses would include the following: for professional goals, "business", "government", or "work in criminal justice system"; for reason for attending, such responses as "I hoped to get a good education here", "because of good business courses", or "because my guidance counselor recommended AIC for my major". For Variable 44, a 1 was coded, with zeroes for Variables 42 and 43 for students who indicated no specific or general educational goals. These responses would include examples such as the following: for professional goals, "undecided", or blank; for reason for attending, "football and ice hockey", "close to home", "because was granted most money", or "small college".

Variable 44. Resident/Commuter For this item, dormitory residents were coded as 1, and commuting students were coded as zero. Student residence status during the first semester of attendance was used for coding this variable.

Variable 45. Date of Registration From records maintained in

the Comptroller's Office, the date was obtained when the student's tuition deposit was received by the college. The month when the tuition deposit was received was coded as follows: deposits received by January 31, 1979 - 1; deposits received in February - 2; those received in March - 3; April - 4; May - 5; June - 6; July - 7; and August - 8.

Variable 46. Final Grade Point Average For Variable 46, the cumulative grade point average at the end of the final semester of attendance (or final cumulative grade point average for graduates) was used. The college uses a 12 point system for calculating grade point averages - 12 for an A, 11 for an A-, 10 for a B+, etc. In order to have data in a more standard system, the AIC 12 point average was divided by 3, a procedure which results in an average on a 4 point system with plusses and minuses.

Variable 47. First Year Grade Point Average For this variable, the grade point average obtained by the end of the first year, modified as in Variable 46, was used. For students who left prior to the end of the first year, the grade point average earned by the time of withdrawal was used for Variable 47.

Table 5 shows a summary of the variables used in the study and the coding for each.

TABLE 5

Summary Table of Variables Included In the Study

Variable	Title	Coding
1	Parents' 1978 Income	1978 income in dollars
2	Parents' Contribution	Calculated contribution from FAF
3	Financial Need	Calculated need based on FAF and Cost
4	First Year Grant	Dollars of grant - 1st year
5	First Year Preferential	Dollars of preferential aid-1st year
6	First Year Employment	Dollars of employment aid-1st year
7	First Year Loan	Dollars of loan aid - 1st year
8	Semesters of Aid	Number of semesters aid was provided
9	Average Grant	Average dollars of grant aid
10	Average Preferential	Average dollars of preferential aid
11	Average Employment	Average dollars of employment aid
12	Average Loan	Average dollars of loan aid
13	SES	1-6 scale based on employment
14	Major 1	1 for undecided - 0 otherwise
15	Major 2	1 for Arts & Sciences-0 otherwise
16	Major 3	1 for business - 0 otherwise
17	Major 4	1 for Psych and Educ-0 otherwise
18	Major 5	1 for Nursing - 0 otherwise
19	SAT Verbal	Verbal SAT Score
20	SAT Quantitative	Quantitative SAT Score
21	Semester Hours Completed	Number of credits completed

TABLE 5 (CONTINUED)

Variable	Title	Coding
22	Semesters Completed	Number of semesters completed
23	Persistence/Nonpersistence	1 for persisters, 0 for nonpersisters
24	High School Rank	Rank/number in class
25	Sex	1 for females, 0 for males
26	State of Residence 1	1 for MA - otherwise 0
27	State of Residence 2	1 for CT & RI - otherwise 0
28	State of Residence 3	1 for VT, NH, & ME - otherwise 0
29	State of Residence 4	1 for all others - New England 0
30	High School Athletics	Number of sports played in HS
31	High School Activities	Number of activities in HS
32	Change of Major	1 if changed major - 0 otherwise
33	Part Time Jobs	Number of jobs while in HS
34	Race 1	1 if White - 0 otherwise
35	Race 2	1 if Black - 0 otherwise
36	Race 3	1 for other - 0 for Black or White
37	Religious Preference 1	1 for Roman Catholic - 0 otherwise
38	Religious Preference 2	1 for Protestant - 0 otherwise
39	Religious Preference 3	1 for Jewish - 0 otherwise
40	Religious Preference 4	1 for no preference - 0 otherwise
41	Reason for Attending 1	1 for definite purpose - 0 otherwise
42	Reason for Attending 2	1 for indefinite goals - 0 otherwise
43	Reason for Attending 3	1 for no goals - 0 otherwise

TABLE 5 (CONTINUED)

Variable	Title	Coding
44	Resident/Commuter	1 for resident - 0 for commuter
45	Date of Registration	1 for Jan, for Feb, etc.
46	Final Grade Point Average	GPA at end of last sem. of attendance
47	First Yr. Grade Point Aver.	GPA at end of first year

HYPOTHESES AND DATA ANALYSIS

The purpose of this study is to determine whether financial aid in any form significantly adds to the ability to predict persistence after other variables which have been shown in other studies to correlate with persistence have been accounted for in a multivariate study. The specific hypotheses to be tested in the analysis of data are based on the most typical findings in other studies and are four in number. Hypothesis 1 is that first year and average grant aid will be positively related to persistence. Hypothesis 2 is that first year and average preferential aid will be positively related to persistence. Hypothesis 3 is that first year and average work aid will be positively related to persistence. Hypotheses 4 is that first year and average loan aid will be negatively related to persistence.

The statistical analyses for the variables in the study fell into three basic categories of analysis. First, descriptive measures and univariate tests of significance were calculated. These included variable means for continuous variables, numbers within categories for nominal measures, measures of variation, and intercorrelations. Univariate tests for significance of difference between persisters and nonpersisters were done on all variables. For continuous variables, *t* tests were calculated, and for nominal data, chi square tests of independence were calculated.

The second, and primary set of analyses, consisted of two sets of

three discriminant function analyses. The first set of 3 analyses was used to develop discriminant functions from those variables which could be ascertained before enrollment or at the time of original enrollment as predictors of group membership as either persisters or nonpersisters. The variables included in these analyses were the first year financial, financial aid, and family variables, planned major, SAT scores, high school rank, sex, state of residence, high school athletics, activities and part time jobs, race, religious preference, dormitory/commuter status, reason for choice, and date of registration. The same set of variables was used for all three of the first set of analyses. The first of the discriminant functions was done in stepwise fashion, allowing variables to enter the function according to program criteria in order to determine which variables contributed significantly to the function, and particularly to see whether financial aid variables entered the function, and if so, the nature of the contribution made by the financial aid variables. The second of the discriminant function analyses was done in stepwise fashion, but the four first year financial aid variables were not allowed to enter the function, although criteria for entry in the function were printed. This analysis allows a determination of whether or not first year financial aid variables contribute significantly to the function after all other variables are allowed to enter. The final discriminant function was done in stepwise fashion with the four first year financial aid variables not allowed to enter

the function until all others had entered. This analysis was done in order to determine which financial aid variables enter the function after all other variables had entered. Classification accuracy for the first two functions was compared as a way of estimating the contribution to the functions made by first year financial aid variables. The second set of three discriminant function analyses was done using the same variables as the first set, but six additional variables were included, change of major while at the college, freshman grade point average, and average loan, grant, work and preferential aid. The primary purpose of these analyses was to determine whether or not first year and average financial aid variables aided in classifying students as persisters or nonpersisters. The structure of the three analyses in the second set was the same as for the first set, but with the added six variables. These analyses were done in order to determine whether any of the 8 financial aid variables (four first year aid variables and four average aid variables) would contribute significantly to the function, and if so, to determine the nature of the contribution made.

The third form of statistical analysis employed was stepwise multiple regression. The first analysis was done in order to determine whether the dependent variable of freshman cumulative grade point average can be predicted from knowledge of the same set of variables used in the first set of discriminant function analyses - the set of variables which are known at the time when a student first enrolls at the college. The second regression analysis was done in

order to determine whether the dependent variable of number of credits completed can be predicted from knowledge of the same set of variables used in the first regression analysis.

CHAPTER IV

DATA ANALYSIS AND DISCUSSION

The data analysis and discussion section is divided into three subsections. The first of these includes descriptive statistics gathered for each of the variables chosen for study and univariate statistics which examine differences between the group of graduates and the group of nongraduates. The second subsection describes multivariate statistics performed on the sample. The final section is a synthesis and interpretation of the results of the study and contains recommendations for future research. Note that the terms graduate and persister are used synonymously. Similarly, the terms nonpersister and nongraduate are also used synonymously.

RESULTS OF DESCRIPTIVE AND UNIVARIATE STATISTICS

Statistics for variables which are continuous or discrete, and for which central tendency measures are meaningful, are presented in the form of means and standard deviations both for the entire sample and for the graduate and nongraduate groups. Nominal data are presented in the form of numbers and percentages of students falling within categories for the total group and for the two subgroups.

Table 6 presents the means, standard deviations, minimums and maximums for 26 variables for all 303 students in the study. Table 7 includes the means and standard deviations for the same 26 variables

TABLE 6

Means, Standard Deviations, Minimums, and Maximums
for all 303 Students

Variable	Mean	Standard Deviation	Minimum	Maximum
Parents' Income for 1978	24,048.55	13,561.89	1872	50,000
Family Size	4.72	1.39	0	9
Parents' Contribution	1,779.84	2,038.64	-750	9,999
Student Savings	272.54	460.33	0	5,301
Financial Need	2,911.75	1,827.86	0	5,300
First Year Grant Aid	1,102.38	1,180.55	0	3,926
First Year Preferential Aid	241.42	626.90	0	5,300
First Year Work Aid	333.00	394.88	0	1,100
First Year Loan Aid	849.23	1,035.14	0	5,000
Semesters of Aid	4.50	3.07	0	9
Socioeconomic Status	3.41	1.38	1	6
Verbal SAT	39.66	8.02	20	66
Quantitative SAT	43.24	9.23	20	70
Credits Completed	77.85	46.51	0	138
Semesters Completed	5.64	2.98	0	10
High School Rank	.45	.24	.01	.96
High School Athletics	1.25	1.13	0	4
High School Activities	1.28	1.49	0	8
Part Time Jobs	1.50	1.29	0	6
Registration Date	4.43	1.89	1	9
Terminal GPA	2.30	.95	0	4
Freshman GPA	2.22	.95	0	4
Average Grant Aid	422.16	497.65	0	1,972
Average Preferential Aid	161.71	353.35	0	2,426
Average Work Aid	140.69	179.91	0	752
Average Loan Aid	434.35	432.88	0	2,000

TABLE 7

Means And Standard Deviations for 149 Graduate
and 154 Nongraduate Students

Variable	<u>Graduates</u>		<u>Nongraduates</u>	
	Mean	Standard Deviation	Mean	Standard Deviation
Parents Income	23,090.47	12,135.41	24,975.51	14,792.81
Family Size	4.69	1.43	4.75	1.35
Parents Contribution	1,748.87	2,026.07	1,309.79	2,056.89
Student Savings	334.66	569.55	212.42	311.59
Financial Need	2,922.15	1,731.72	2,901.68	1,921.91
First Year Grant Aid	1,160.05	1,199.23	1,046.57	1,163.38
First Year Preferential Aid	303.62	562.84	181.23	679.62
First Year Work Aid	394.63	401.99	273.38	379.72
First Year Loan Aid	868.79	1,059.04	830.30	1,014.58
Semesters of Aid	6.65	2.36	2.42	2.09
Socioeconomic Status	3.19	1.33	3.63	1.40
Verbal SAT	39.71	7.82	39.61	8.23
Quantitative SAT	43.36	8.94	43.12	9.53
Credits Completed	120.32	7.10	36.77	30.42
Semesters Completed	8.16	.67	3.20	2.22
High School Rank	.40	.24	.50	.24
High School Athletics	1.28	1.15	1.23	1.12
High School Activities	1.37	1.56	1.20	1.41
Part Time Jobs	1.61	1.28	1.39	1.30
Registration Date	4.08	1.20	4.76	2.01
Terminal GPA	2.76	.58	1.87	1.03
Freshman GPA	2.57	.70	1.89	1.05
Average Grant Aid	418.61	427.40	425.59	553.60
Average Preferential Aid	220.24	334.62	105.07	362.73
Average Work Aid	140.88	150.19	140.50	205.10
Average Loan Aid	398.15	349.03	469.36	499.52

for the nongraduate and graduate subgroups.

Table 8 presents frequencies of occurrence and percentages for the 8 categorical variables in the study. Frequencies and percentages are shown for the total group, as well as for the graduates and nongraduates.

The results of t tests for significance of differences between the pairs of means depicted in Table 7 and the results of tests for homogeneity of variance in the graduate and nongraduate groups are reported in Table 9. Eleven of the differences were statistically significant at the .05 level or better, though three of the significant differences (between number of semesters of aid, number of semesters completed, and the number of good credits) are not very useful because of the way in which the groups were defined. Graduates reported having significantly greater savings than nongraduates. Graduates also received significantly more financial aid through work programs, but came from lower socioeconomic status families (as well as lower income families, but not significantly so). Graduates also ranked significantly higher in their high school graduating classes and had higher grade point averages, both at the end of the freshman year and at the time that the nonpersisters left American International College or at the time of graduation for the persisters. Graduates also made a commitment to attend the college on a significantly earlier date (by .68 months, or about 3 weeks). Graduates received significantly greater average preferential

financial aid than nongraduates. One other variable approached statistical significance, first year preferential aid (with a probability of .08), with graduates higher than nongraduates in the amount of preferential aid received during the first year of attendance. Separate t tests were calculated for the combined amounts of first year loans, work, grants and preferential aid. This combined variable - total first year financial aid - compared for the persisters and the nonpersisters resulted in a t of 1.99, significant at the .05 level for 301 degrees of freedom, with persisters receiving significantly greater aid than nonpersisters. A similar analysis for the combined values of average grants, preferential aid, work and loans resulted in a t of .25, a nonsignificant value with 301 degrees of freedom, with the mean difference slightly favoring the persisters.

Significant heterogeneity of variance existed on a number of variables, with the nongraduate group showing greater variability on credits completed, semesters completed (again, not surprising, given the composition of the groups), registration date, both grade point average variables, average grant, average work, and average loan aid. On two variables, student savings and first year preferential aid, the graduates had significantly greater variance. However, none of the t test results was meaningfully altered by using separate variance or pooled variance estimates when homogeneity of variance was present.

Several crosstabs were calculated in order to examine patterns among categorical variables described in Table 8. The first test was for the students' chosen major field of study. The 2 x 5 crosstab

resulted in a chi square of 19.59. With 4 degrees of freedom, this significant at $p < .001$. Several 2×2 crosstabs were calculated in order to examine each major separately. Two of these, Psychology and Education majors and those with no chosen major were significant (chi squares of 5.26, $p < .05$, and 17.20 $p < .001$, respectively, each with 1 degree of freedom). Those with no major appear to graduate in significantly fewer numbers than those with specific majors, and students with majors in Psychology and Education seem to graduate in significantly greater numbers than majors in other schools or those with no major.

The 2×2 crosstab for sex was significant at the .05 level with a chi square of 5.56 and 1 degree of freedom. Women graduate in proportionately greater numbers than men.

A 2×4 crosstab was done for state of residence. This resulted in a chi square of 9.10 which is significant at the .05 level with 3 degrees of freedom. State of residence is related to group membership, with Massachusetts, Connecticut and Rhode Island students more likely to persist, and students from other states less likely to persist.

The 2×2 crosstab for change of major while in college resulted in a chi square of 22.91, a value significant at the .001 level with 1 degree of freedom. Graduates changed their majors to a significantly greater degree than nongraduates.

In the crosstab for race, very few students fell into the "other" category. The frequencies for that category and for the "black"

TABLE 8

The frequencies of occurrence and percentages for categorical variables for all subjects and for Graduates and Nongraduates

<u>Variable</u>	Total Group N=303		Graduates N=149		Nongraduates N=154	
	N	% of Total	N	% of Total	N	% of Total
<u>MAJOR</u>						
No Major	104	34.3	34	22.8	70	45.5
Arts & Sciences	71	23.4	37	24.8	34	22.1
Business	57	18.8	32	21.5	25	16.2
Psychology & Education	50	16.5	32	21.5	18	11.7
Nursing	21	6.9	14	4.6	7	4.5
<u>STATE OF RESIDENCE</u>						
MA	192	63.4	98	65.8	94	61.0
CT/RI	67	22.1	38	25.5	29	18.8
NH/VT/ME	14	4.6	3	2.0	11	7.1
Other	30	9.9	10	6.7	20	13.0
<u>CHANGE OF MAJOR</u>						
No Change	176	58.1	66	44.3	110	71.4
Change	127	41.9	83	55.7	44	28.6
<u>RACE</u>						
White	267	88.1	134	89.9	133	86.4
Black	33	10.9	13	8.7	20	13.0
Other	3	1.0	2	1.3	1	0.6

TABLE 8 (CONTINUED)

<u>Variable</u>	Total Group N=303		Graduates N=149		Nongraduates N=154	
	N	% of Total	N	% of Total	N	% of Total
<u>RELIGION</u>						
Catholic	141	46.5	86	57.7	55	35.7
Protestant	39	12.9	16	10.7	23	14.9
Jewish	5	1.7	3	2.0	2	1.3
None/Other	118	38.9	44	29.5	74	48.1
<u>ACADEMIC PURPOSE</u>						
Academic Purpose	95	31.4	55	36.9	40	26.0
General Purpose	20	6.6	8	5.4	12	7.8
No Stated Purpose	188	62.0	86	57.7	102	66.2
<u>RESIDENCE</u>						
Dormitory	194	64.0	95	63.8	99	64.3
Commuter	109	36.0	54	36.2	55	35.7
<u>SEX</u>						
Male	189	62.4	83	55.7	106	68.8
Female	114	37.6	66	44.3	48	31.2

TABLE 9

The t Test result for univariate tests of significance of difference between means, and F test results for tests for homogeneity of variance between graduates and nongraduates for 26 variables

<u>Variable</u>	<u>t Value</u>	<u>F Value</u>
Parents Income for 1978	1.21	1.49*
Family Size	.40	1.13
Parents Contribution	.26	1.03
Student Savings	2.33*	3.34***
Financial Need	.10	1.23
First Year Grant Aid	.84	1.06
First Year Preferential Aid	1.70	1.46*
First Year Work Aid	2.70**	1.12
First Year Loan Aid	.32	1.09
Semesters of Aid	16.56***	1.23
Socioeconomic Status	2.82**	1.10
Verbal SAT	.11	1.11
Quantitative SAT	.23	1.14
Credits Completed	31.91***	18.37***
Semesters Completed	26.10***	11.07***
High School Rank	3.66***	1.01
High School Athletics	.42	1.04
High School Activities	.98	1.22
Part Time Jobs	1.49	1.02
Registration Date	3.17**	1.40*
Terminal GPA	9.22***	3.13***
Freshman GPA	6.61***	2.21***
Average Grant Aid	.12	1.68**
Average Preferential Aid	2.87**	1.18
Average Work Aid	.02	1.86***
Average Loan Aid	1.43	2.05***

*p < .05

**p < .01

***p < .001

category were, therefore combined. The resulting 2×2 chi square was less than 2, a nonsignificant value with 1 degree of freedom.

For the variable of religion, very few fell in the "Jewish" category, so these were combined with those in the "none/other" category. The chi square for the resulting 2×3 crosstab was 15.83, significant at the .01 level with 2 degrees of freedom. Catholics appear to graduate in greater numbers, while those in the combined "Jewish" and "none/other" category graduate in fewer numbers. Since Jewish students represented only a small proportion of the combined category and were approximately evenly distributed between the groups of graduates and nongraduates, this result strongly suggests that students who indicated no religious affiliation graduate in significantly fewer numbers than those with an expressed religious affiliation. This is borne out in the results of a 2×2 crosstab in which Jewish, Protestant, and Catholic students were combined into a single category and compared to those in the "none/other" category. The resulting chi square of 10.93 was significant at the .001 level with 1 degree of freedom. It should be noted that very few students responded with "other" religious preferences, but rather indicated no religious preference.

A 2×3 crosstab was done for the academic purpose variable which resulted in a nonsignificant chi square value of 4.44 with 2 degrees of freedom.

A 2×2 crosstab was calculated for the resident/commuter variable. The resulting value of chi square was less than 1, a

clearly nonsignificant value.

Two crosstabs were calculated for no designated major by major change, one each for the persisters and nonpersisters. Of the 83 nongraduates who indicated specific major at the time of first enrollment, only 12 changed major, while 52 of the 114 graduates who indicated a specific major changed their major. Of the 35 graduates who had no major at the time of first enrollment, 31 changed to a specific major, but of the 71 nonpersisters who had no major only 32 had changed before they withdrew. The chi square for the graduates was 18.32 and for the nongraduates was 16.10, both significant at the .001 level with 1 degree of freedom.

The final set of statistics to be presented in this section is the intercorrelations between the variables used in the study. Appendix A includes the complete correlation matrix for all of the variables. Table 10 summarizes correlations greater than .32, those for which r square is .10 or greater, that is, variables for which at least 10% of the variation in each variable is systematic, or predictable, from knowledge of the other variable. These correlations are presented as two matrices of sets of variables which tended to correlate relatively highly among one another, and a number of isolated correlations above .32 are included as well.

RESULTS OF MULTIVARIATE STATISTICS

Although univariate and descriptive statistics are useful from a

TABLE 10

Correlations of .32 and above

	VSAT	High School Rank	Terminal GPA	Freshman GPA	Race, Black	Credits Completed	Semesters Completed	Semesters of Aid
QSAT	.619	-.315	.351	.372	-.339			
VSAT		-.408	.433	.458				
High School Rank			-.460	-.457				
Race, White					-.968			
Terminal GPA				.939		.372		
Freshman GPA						.354		
Credits Completed							.884	.435
Semesters Completed								.391

Average Preferential	Preferential 1	.876	Major Change	No Major	.348
Average Loan	Loan 1	.797	Sex	Nursing	.343
Arts & Sciences	Income 78	-.407			
Business	Income 78	-.341			

TABLE 10 (CONTINUED)

	Income 78	Need	Grant 1	Semesters of Aid	SES	Average Grant	Work 1	Average Work
Parents Contribution	.897	-.917	-.697	-.437	.469	-.695	-.398	-.379
Income 78		-.833	-.637	-.423	.462	-.650		
Need			.736	-.447	-.457	.724	.502	.451
Grant 1				.434		.913	.504	.448
Semesters of Aid						.732	.366	
Average Grant							.457	
Work 1								.831
Connecticut/Rhode Island	Massachusetts		-.707	Protestant	Catholic		-.351	
Other State	Massachusetts		-.433	Non/Other	Catholic		-.726	
Resident/Commuter	Massachusetts		-.488	Actual Purpose	Other Purpose		.329	
Resident Commuter	Connecticut/Rhode Island		-.321	Other Purpose	No Purpose		-.345	

variety of standpoints, their limitation in a study such as this is a critical one. Since a number of variables are included in the study, many of which are interrelated (as the correlation matrix referred to above demonstrates), the use of univariate statistics will often result in overinterpretation since two or more significant differences may only represent a difference on a single dimension when the interrelationships are accounted for in multivariate procedures. The primary statistical analyses for the study were, therefore, six discriminant function analyses.

The first three of these analyses were used to determine whether graduates and nongraduates can be classified into groups using data from variables which are available at the time of a student's first enrollment at American International College, and the degree to which first year financial aid variables contribute to the ability to classify. A significant discriminant function implies that such prediction is possible. It should be noted that significant ability to predict group membership is essentially the question which MANOVA answers turned around. In MANOVA, the question is whether group membership results in significant differences on a variety of dependent variables. The discriminant function, in effect, uses dependent variable values to predict independent variable group membership. The variables in the first three analyses were parents' 1978 income, family size, parents' contribution, student's savings, financial need, first year grants, preferential aid, work, and loan,

SES, major, verbal and quantitative SAT scores, high school rank, sex, state of residence, high school athletics, high school activities, number of part time jobs, race, religion, academic purpose, resident/commuter status, and registration date. The discriminant function analyses were done using SPSSX release 1.1 on the American International College Prime 750. The stepwise method used was Wilks, which enters variables at each step which will produce the smallest value of Wilks' Lambda (and, therefore, the largest multivariate F ratio for the function). The SPSSX program default values of .001 for minimum tolerance and 1 for both F to enter and F to remove were used. The discriminant procedure assumes independent and randomly sampled scores taken from a normal population, therefore the inclusion of several categorical and non-normal variables in the analyses needs to be briefly mentioned. The procedure is considered robust with respect to failures of normality (Tabachnick and Fidell, 1983). Further, as long as the function coefficients are not directly interpreted, the procedure should be reasonably robust to violation of the assumptions.

The first of the stepwise analyses was done allowing variables to enter the function in stepwise fashion without restriction. Table 11 summarizes the results of this analysis. The 20 steps showing the variables entered or removed, the steps at which they were entered or removed, and Wilks' Lambda associated with each variable. The equivalent F for Wilks' Lambda obtained was 5.46, significant at the .0001 level with 16 and 286 degrees of freedom. Clearly, the variables are able to discriminate between members of the two groups

TABLE 11

Summary Table for Discriminant Function Analysis Number 1

<u>Step</u>	<u>Action</u>		<u>Summary of Steps</u>	<u>Wilks' Lambda</u>
	<u>Entered</u>	<u>Removed</u>	<u>Variables In the Analysis</u>	
1	No Major		1	.9438
2	Catholic		2	.9103
3	High School Rank		3	.8874
4	Work 1		4	.8715
5	New Hampshire/Vermont/Maine		5	.8600
6	Psychology and Education		6	.8498
7	Savings		7	.8399
8	Verbal SAT		8	.8325
9	State Other		9	.8240
10	Preferential Aid 1		10	.8152
11	Need		11	.8062
12	SES		12	.7964
13	Family Size		13	.7891
14	Religion Other		14	.7852
15	Protestant		15	.7749
16		Savings	14	.7776
17	Registration Date		15	.7721
18	Income 78		16	.7690
19		Family Size	15	.7717
20	Parents Contribution		16	.7659

VARIABLES NOT IN THE ANALYSIS AFTER 20TH STEP

<u>Variable</u>	<u>Enter</u>	<u>Wilks' Lambda</u>
Family Size	.5902	.7643
Savings	.0139	.7659
Grant 1	.8787	.7636
Loan 1	.0733	.7657
Arts and Sciences	.0924	.7657
Business	.1056	.7656
Quantitative SAT	.1258	.7656
Sex	.2284	.7653
Connecticut/Rhode Island	.0510	.7658
High School Athletics	.0250	.7659
High School Activities	.0078	.7659
Part Time Jobs	.0324	.7658
White	.1847	.7655
Race Other	.0811	.7658
Academic Purpose	.0871	.7657
Other Purpose	.1350	.7656
Resident/Commuter	.6237	.7643

at a highly significant level.

Table 12 presents the structure matrix for the first discriminant function analysis. The structure matrix consists of pooled within-groups correlations between the canonical discriminant function and the discriminating variables, ordered from the largest correlation to the lowest. These correlations are indicators of the degree to which each of the variables contributes to the function.

Table 13 includes the standardized and unstandardized canonical discriminant function coefficients for the variables which entered the functions, as well as the centroids for the graduate and nongraduate groups.

Table 14 contains information on the final part of the first discriminant function analysis, the classification of values into predicted group membership compared to actual group membership. Accuracy of prediction of group membership was slightly better for graduates than for nongraduates, and the overall percent of cases correctly classified is just over 70%. Two comments should be made regarding the classification process and results. First, statistical significance for the function does not necessarily imply that predictions of group membership will be highly accurate. It only implies that classification should be possible at a level which is significantly better than chance classification. In that sense, the 70% accuracy of classification indicates more about the meaningfulness of the ability to predict using the function than the level of significance does. Second, and perhaps more important, is the problem

TABLE 12

Structure Matrix for Discriminant Function Analysis Number 1

Pooled within-groups correlations between canonical discriminant function and discriminating variables are ordered by the function with largest correlation and the magnitude of that correlation

<u>Variable</u>	<u>r</u>
No Major	.441
Catholic	-.396
High School Rank	.382
Religion Other	.348
Registration Date	.330
SES	.293
Work 1	-.281
Psychology and Education	-.240
Savings	-.230
New Hampshire/Vermont/Maine	.222
Sex	-.195
State Other	.191
Preferential Aid 1	-.177
Business	-.170
Academic Purpose	-.166
Part Time Jobs	-.134
Income 78	.126
Connecticut/Rhode Island	-.120
Other Purpose	.115
Protestant	.113
High School Activities	-.112
Race Other	-.096
Resident/Commuter	.092
Arts and Sciences	-.074
Loan 1	-.065
White	-.056
Family Size	-.042
Parent Contribution	.027
High School Athletics	-.025
Grant 1	-.014
Verbal SAT	-.011
Need	-.011
Quantitative SAT	.009

TABLE 13

Standardized and unstandardized Canonical Discriminant Coefficients,
and group centroids for Discriminant Function Analysis Number 1

<u>Variable</u>	<u>Standardized Canonical Discriminant Function Coefficients</u>	<u>Unstandardized Canonical Discriminant Function Coefficients</u>
Income 78	.5860	.0001
Parents Contribution	-.5784	-.0002
Need	.3663	.0002
Preferential 1	-.3096	-.0005
Work 1	-.3911	-.0010
SES	.2363	.1732
No Major	.3099	.6667
Psychology & Education	-.2776	-.7520
Verbal SAT	.3686	.0459
High School Rank	.4084	.0712
New Hampshire/Vermont/ Maine	.1928	.9223
State Other	.2346	.7871
Catholic	.6464	1.3228
Protestant	.6840	2.0395
Religion Other	1.0931	2.2686
Registration Date	.1971	.1058
(Constant)		-6.3140

Groups Means (Group Centroids)

<u>Group</u>	<u>Centroid</u>
Nongraduates	.5419
Graduates	-.5601

TABLE 14

Results of Classification for Discriminant Function Analysis Number 1

<u>Actual Group</u>	<u>No. of Cases</u>	<u>Predicted Nongraduates</u>	<u>Group Membership Graduates</u>
Nongraduates	154	104 67.5%	50 32.5%
Graduates	149	40 26.8%	109 73.2%

Percent of "Grouped" Cases correctly classified: 70.3%

of classifying the same values as were used to develop the function. Technically this is not generally desirable because the resulting classifications may represent a "best case" analysis. This is because the function was developed out of the same values as those classified. A separate sample of values for classification obviously would not have exactly the same means, variances, or intercorrelations as the values used to develop the function. Nevertheless, the question of the meaningfulness of the function can best be assessed by classification accuracy.

In this first discriminant function, two of the financial aid variables added significantly to prediction, first year preferential aid and first year work. In addition, three family financial factors also contributed significantly to prediction, i.e. parents' income, parents' contribution toward education, and financial need.

The second discriminant function analysis used the same variables as the first, except that the four financial aid variables, first year preferential aid, grant, work, and loan were not allowed to enter the function in the stepwise procedure, but entry criteria for these variables were printed as a part of the analysis. The results of this analysis and classification procedure allow a comparison with the first analysis, which should indicate the degree to which first year financial aid factors contribute to the accuracy of classification in the first analysis. Tables 15, 16, 17 and 18 summarize the results of this analysis. When aid variables are not allowed to enter the function, overall classification accuracy as shown in Table 18, when

compared to the classification accuracy for the first function in Table 14, was 67%, or a bit over 3 percentage points lower. Examination of Table 15 shows that of the variables not entered in the function, two had significant F ratios and could have entered the function if they had been allowed to do so. The implication is that first year work aid and first year preferential aid add significant information to the first function which other variables included in the analysis cannot add. It is still possible, however, that first year work and preferential aid would not both have entered the second function if they had been allowed to do so. It could be, for example, that the entry of first year work in the function might have changed the F ratio for the first year preferential aid variable, and, in which case, it might not have entered.

In order to test this possibility, a third discriminant function was performed in which the four financial aid variables were not allowed to enter the analysis until all other variables which met the entry criteria had been entered. In this analysis, summarized in Tables 19 and 20, first year work and first year preferential aid did enter the function, demonstrating that both variables did contribute significantly to the function.

The second set of three discriminant functions was done in order to determine whether classification could be improved by the inclusion of 6 variables in addition to the same 33 variables used in the first three discriminant function analyses. The added variables used were change of major while at American International College, freshman

TABLE 15

Summary Table for Discriminant Function Analysis Number 2

		<u>Summary of Steps</u>		<u>Wilks' Lambda</u>
<u>Step</u>	<u>Action</u>	<u>Entered</u>	<u>Removed</u>	
1	No Major			.9438
2	Catholic			.9104
3	High School Rank			.8875
4	SES			.8724
5	Parents Contribution			.8619
6	Verbal SAT			.8501
7	Psychology and Education			.8411
8	New Hampshire/Vermont/Maine			.8325
9	State Other			.8247
10	Income 78			.8175
11	Registration Date			.8107

VARIABLES NOT IN THE ANALYSIS AFTER 20TH STEP

<u>Variable</u>	<u>F to Enter</u>	<u>Wilks' Lambda</u>
Family Size	.4106	.8095
Savings	.2018	.8101
Need	.0524	.8105
Arts and Sciences	.7715	.8085
Business	.2004	.8101
Quantitative SAT	.1673	.8102
Sex	.0001	.8107
Connecticut/Rhode Island	.0555	.8105
High School Athletics	.5465	.8091
High School Activities	.0627	.8105
Part Time Jobs	.0956	.8104
White	.0174	.8106
Pace Other	.1583	.8102
Protestant	.0089	.8106
Religion Other	.7271	.8086
Academic Purpose	.1879	.8101
Other Purpose	.2348	.8100
Resident/Commuter	.4970	.8093
Grant 1	.9904	.8079
Preferential 1	3.4301	.8012
Work 1	4.6251	.7980
Loan 1	.0728	.8105

TABLE 16

Structure Matrix for Discriminant Function Analysis Number 2

Pooled within-groups correlations between canonical discriminant function and discriminating variables are ordered by the function with largest correlation and the magnitude of that correlation

<u>Variable</u>	<u>r</u>
No Major	.5049
Catholic	-.4531
High School Rank	.4370
Registration Date	.3783
SES	.3361
Religion other	.3209
Sex	-.2819
Psychology and Education	-.2752
New Hampshire/Vermont/Maine	.2547
Savings	-.2255
State Other	.2186
Academic Purpose	-.1733
High School Activities	-.1493
Arts and Sciences	-.1482
Income 78	.1444
Part Time Job	-.1380
Connecticut/Rhode Island	-.1371
Protestant	.1183
Other Purpose	.1178
Resident/Commuter	.1125
Business	-.1056
White	-.1992
Loan 1	-.0740
Work 1	-.0687
High School Athletics	.0461
Preferential 1	.0334
Parent Contribution	.0310
Family Size	-.0304
Need	-.0232
Race Other	-.0195
Quantitative SAT	.0152
Verbal SAT	-.0131
Grant 1	-.0055

TABLE 17

Standardized and unstandardized Canonical Discriminant Coefficients,
and group centroids for Discriminant Function Analysis Number 2

<u>Variable</u>	<u>Standardized Canonical Discriminant Function Coefficients</u>	<u>Unstandardized Canonical Discriminant Function Coefficients</u>
Income 78	.5143	.0001
Parents' Contribution	-.7141	.0003
SES	.3311	.2426
No Major	.3072	.6608
Psychology & Education	-.2784	.7541
Verbal SAT	.3318	.0413
High School Rank	.4730	.0199
New Hampshire/Vermont/ Maine	.2546	1.2180
State Other	.2152	.7221
Catholic	-.4577	-.9366
Registration Date	.2201	.1181
(Constant)		-3.9700

Groups Means (Group Centroids)

<u>Group</u>	<u>Centroid</u>
Nongraduates	.5419
Graduates	-.5601

TABLE 18

Results of Classification for Discriminant Function Analysis Number 2

<u>Actual Group</u>	<u>No. of Cases</u>	<u>Predicted Nongraduates</u>	<u>Group Membership Graduates</u>
Nongraduates	154	103 66.9%	51 33.1%
Graduates	149	49 32.9%	109 67.1%

Percent of "Grouped" Cases correctly classified: 67.00%

TABLE 19

Summary Table for Discriminant Function Analysis Number 3

		<u>Summary of Steps</u>		
	Action		Variables	Wilks'
<u>Step</u>	<u>Entered</u>	<u>Removed</u>	<u>In the Analysis</u>	<u>Lambda</u>
1	No Major		1	.9438
2	Catholic		2	.9104
3	High School Rank		3	.8875
4	SES		4	.8724
5	Parents Contribution		5	.8619
6	Verbal SAT		6	.8501
7	Psychology and Education		7	.8411
8	New Hampshire/Vermont/Maine		8	.8325
9	State Other		9	.8247
10	Income 78		10	.8175
11	Registration Date		11	.8107
12	Work 1		11	.7979
13	Preferential 1		13	.7867

VARIABLES NOT IN THE ANALYSIS AFTER 13TH STEP

<u>Variable</u>	<u>F to Enter</u>	<u>Wilks' Lambda</u>
Family Size	.8762	.7843
Savings	.1370	.7863
Need	1.2165	.7834
Arts and Sciences	.2430	.7861
Business	.3840	.7866
Quantitative SAT	.1144	.7864
Sex	.1734	.7862
Connecticut/Rhode Island	.4293	.7867
High School Athletics	.4916	.7866
High School Activities	.4801	.7866
Part Time Jobs	.1014	.7864
White	.9637	.7865
Race Other	.2025	.7862
Protestant	.7136	.7865
Religion Other	1.7480	.7820
Academic Purpose	.1297	.7864
Other Purpose	.1183	.7864
Resident/Commuter	.2202	.7867
Grant 1	.2505	.7860
Loan 1	.3300	.7858

TABLE 20

Structure Matrix for Discriminant Function Analysis Number 3

Pooled within-groups correlations between canonical discriminant function and discriminating variables are ordered by the function with largest correlation and the magnitude of that correlation

<u>Variable</u>	<u>r</u>
No Major	.4686
Catholic	-.4206
High School Rank	.4056
Registration Date	.3511
SES	.3120
Work 1	-.2989
Religion Other	.2576
Psychology and Education	-.2554
New Hampshire/Vermont/Maine	.2364
Savings	-.2171
Sex	-.2156
State/Other	.2029
Preferential 1	-.1887
Academic Purpose	-.1692
Business Mjoe	-.6714
Connecticut/Rhode Island	-.1524
Protestant	.1515
High School Activities	-.1353
Income 78	.1340
Part Time Jobs	-.1263
Other Purpose	.1263
Loan 1	-.1057
Arts and Sciences	-.0985
White	-.0727
Family Size	-.0627
Need	-.0601
Grant 1	-.0508
Parents Contribution	.0287
High School Athletics	-.0196
Verbal SAT	-.0121
Race Other	-.0107
Quantitative SAT	.0080
Resident/Commuter	.0075

grade point average, and average loan, grant, work and preferential aid per semester. Table 21 summarizes the results of the first of the second three analyses. In this analysis all of the variables were allowed to enter the function in stepwise fashion. The variables entered, the steps at which they were entered or removed, and Wilks' Lambda are included in the table. The equivalent F for the Wilks' Lambda obtained was 12.96, significant at the .0001 level for 22 and 280 degrees of freedom. Table 22 shows the structure matrix and Table 23 includes the standardized and unstandardized canonical discriminant function coefficients for the entered variables and the group centroids for graduates and nongraduates.

Once again, classification was done on the same scores used to develop the function. Table 24 shows the results of the classification process for this analysis. Accuracy of classification was slightly better for the nongraduate group, with accuracy for this group over 15 percentage points better than the same group in the comparable analysis done without the addition of the 6 variables. Classification for the graduate group was over 7 percentage points better than the graduate group in the comparable analysis done without the 6 variables added. Overall accuracy of classification (81.85%) is 11.35 percentage points better when the additional 6 variables are added in the analysis. In this analysis, 7 of the 8 financial aid variables entered the function, first year preferential aid, grant, and work, and average grant, work, loan, and preferential aid. Parents' 1978 income and parents' contribution also entered the function.

TABLE 21

Summary Table for Discriminant Function Analysis Number 4

<u>Step</u>	<u>Summary of Steps</u>		<u>Variables</u> <u>In the Analysis</u>	<u>Wilks'</u> <u>Lambda</u>
	<u>Action</u> <u>Entered</u>	<u>Removed</u>		
1	Freshman GPA		1	.8732
2	Major Change		2	.7944
3	No Major		3	.7362
4	Arts and Sciences		4	.7061
5	Religion/Other		5	.6849
6	Average Grant		6	.6688
7	Grant 1		7	.6107
8	State Other		8	.5930
9	Verbal SAT		9	.5801
10	Average Loan		10	.5684
11	SES		11	.5561
12	Work 1		12	.5488
13	Average Work		13	.5378
14	Business		14	.5272
15	Savings		15	.5203
16	Average Preferential		16	.5165
17	Registration Date		17	.5127
18	Sex		18	.5095
19	Need		19	.5065
20	Preferential 1		20	.5033
21	Income 78		21	.5002
22	White		22	.4972
23	Parents Contribution		23	.4946
24	Need		22	.4958
25	Savings	Savings	21	.4973
26	High School Activities		22	.4954

VARIABLES NOT IN THE ANALYSIS AFTER 26TH STEP

<u>Variable</u>	<u>F to Enter</u>	<u>Wilks' Lambda</u>
Family Size	.1339	.4952
Savings	.8176	.4940
Need	.4205	.4947
Loan	.8057	.4940
Psychology and Education	.4731	.4946
Quantitative SAT	.5273	.4945
High School Rank	.9380	.4937

TABLE 21 (CONTINUED)VARIABLES NOT IN THE ANALYSIS AFTER 26TH STEP

<u>Variable</u>	<u>F to Enter</u>	<u>Wilks' Lambda</u>
Connecticut/Rhode Island	.0666	.4953
New Hampshire/Vermont/Maine	.3526	.4948
High School Athletics	.0039	.4954
Part Time Jobs	.0005	.4954
Race Other	.1418	.4952
Catholic	.0295	.4954
Protestant	.2613	.4949
Academic Purpose	.5427	.4944
Other Purpose	.5950	.4943
Resident/Commuter	.0696	.4953

TABLE 22

Structure Matrix for Discriminant Function Analysis Number 4

Pooled within-groups correlations between canonical discriminant function and discriminating variables are ordered by the function with largest correlation and the magnitude of that correlation

<u>Variable</u>	<u>r</u>
Freshman GPA	-.3775
Major Change	-.2833
No Major	.2418
Catholic	-.2259
Religion Other	.1908
Registration Date	.1812
Psychology and Education	-.1648
Average Preferential	-.1639
SES	.1609
Work 1	-.1542
High School Rank	.1492
Sex	-.1355
Average Grant	.1073
State Other	.1047
Preferential 1	-.0973
Part Time Jobs	-.0871
Average Loan	.0819
Business Major	-.0754
New Hampshire/Vermont/Maine	.0746
Income 78	.0691
Savings	-.0682
Race Other	-.0645
Connecticut/Rhode Island	-.0611
Quantitative SAT	-.0580
High School Activities	-.0561
White	-.0547
Academic Purpose	-.0525
Family Size	.0498
Grant 1	-.0478
Resident/Commuter	.0301
High School Athletics	-.0287
Other Purpose	.0257
Protestant	.0256
Arts and Sciences	-.0245
Loan 1	.0241

TABLE 22 (CONTINUED)

Structure Matrix for Discriminant Function Analysis Number 4

<u>Variable</u>	<u>r</u>
Need	.0236
Parents' Contribution	.0148
Verbal SAT	-.0063
Average Work	-.0010

TABLE 23

Standardized and unstandardized Canonical Discriminant Coefficients,
and group centroids for Discriminant Function Analysis Number 4

<u>Variable</u>	<u>Standardized Canonical Discriminant Function Coefficients</u>	<u>Unstandardized Canonical Discriminant Function Coefficients</u>
Income 78	.4496	.0001
Parents' Contribution	-.5817	-.0003
Grant 1	-.7057	-.0006
Preferential 1	.2646	.0004
Work 1	-.6245	-.0016
SES	.2391	.1752
No Major	.6729	1.4475
Arts and Sciences	.4216	.9973
Business	.1783	.4592
Verbal SAT	.2919	.0364
Sex	-.1548	-.3214
State Other	.2392	.8027
High School Activities	.0938	.0632
Major Change	-.7565	-1.5893
White	-.1239	-.3821
Religion Other	.3338	.6928
Registration Date	.1246	.0069
Freshman GPA	-.4251	-.0048
Average Grant	.8998	.0018
Average Preferential	-.4298	-.0012
Average Work	.4888	.0027
Average Loan	.2756	.0006
(Constant)		1.9304

Groups Means (Group Centroids)

<u>Group</u>	<u>Centroid</u>
Nongraduates	.9894
Graduates	-1.0026

TABLE 24

Results of Classification for Discriminant Function Analysis Number 4

<u>Actual Group</u>	<u>No. of Cases</u>	<u>Predicted Nongraduates</u>	<u>Group Membership Graduates</u>
Nongraduates	154	128 83.1%	26 16.9%
Graduates	149	29 19.5%	120 80.5%

Percent of "Grouped" Cases correctly classified: 81.85%

The second of the second set of analyses was done in a manner similar to the second of the first set of analyses. That is, the variables included were the same as the first of the second set of analyses, but the financial aid variables of first year loan, grant, work, and preferential aid, and average grant, loan, work, and preferential aid were not allowed to enter the function. Tables 25, 26, 27, and 28 summarize the results of this analysis. Overall classification accuracy was 75.58%, compared to the overall accuracy of 81.85% when the 7 financial aid variables entered the function, a difference of over 6 percentage points. First year preferential aid, grant, and work, and average grant, work, loan, and preferential aid add over 6 percentage points to the accuracy of classification. Note that in this analysis 6 of the financial aid variables not entered in the function had F ratios which would have allowed them to enter, but for reasons outlined above it may be that not all of these would have entered the function.

The last of the discriminant function analyses was done in a manner similar to the last of the first set. That is, the 8 financial aid variables were not allowed to enter the function until all others which met the F to enter criterion had entered. Tables 29 and 30 summarize the results of this analysis. All 8 of the financial aid variables entered, contributing significantly to the function.

Two stepwise multiple regression analyses were done in order to determine whether the two variables of freshman grade point average or

TABLE 25

Summary Table for Discriminant Function Analysis Number 5

<u>Step</u>	<u>Summary of Steps</u>		<u>Wilks' Lambda</u>
	<u>Action</u>	<u>Variables In the Analysis</u>	
1	Freshman GPA	1	.8732
2	Major Change	2	.7944
3	No Major	3	.7362
4	Arts and Sciences	4	.7061
5	Religion Other	5	.6850
6	SES	6	.6727
7	State Other	7	.6601
8	Verbal SAT	8	.6488
9	Parents' Contribution	9	.6362
10	New Hampshire/Vermont/ Maine	10	.6291
11	Income 78	11	.6234
12	Registration Date	12	.6173
13	Other Purpose	13	.6141
14	Business	14	.6115

VARIABLES NOT IN THE ANALYSIS AFTER 26TH STEP

<u>Variables</u>	<u>F to Enter</u>	<u>Wilks' Lambda</u>
Family Size	.5694	.6114
Savings	.4721	.6105
Need	.1270	.6113
Psychology and Education	.2091	.6115
Quantitative SAT	.1141	.6113
High School Rank	.5752	.6103
Sex	.3697	.6114
Connecticut/Rhode Island	.1764	.6115
High School Athletics	.2003	.6111
High School Activities	.9315	.6095
Part Time Jobs	.9522	.6113
White	.1353	.6112
Race Other	.4884	.6105
Catholic	.3331	.6115
Protestant	.3804	.6107
Academic Purpose	.3540	.6108
Resident/Commuter	.5466	.6104
Grant 1	.1460	.6112

TABLE 25 (CONTINUED)VARIABLES NOT IN THE ANALYSIS AFTER 26TH STEP

<u>Variables</u>	<u>F to Enter</u>	<u>Wilks' Lambda</u>
Preferential 1	3.3278	.6045
Work 1	2.7523	.6057
Loan 1	.4000	.6107
Average Grant	8.6921	.5935
Average Preferential	8.0789	.5948
Average Work	2.5758	.6061
Average Loan	8.4311	.5941

TABLE 26

Structure Matrix for Discriminant Function Analysis Number 5

Pooled within-groups correlations between canonical discriminant function and discriminating variables are ordered by the function with largest correlation and the magnitude of that correlation

<u>Variable</u>	<u>r</u>
Freshman GPA	-.4781
Major Change	-.3588
No Major	.3061
Catholic	-.2634
Religion Other	.2416
Registration Date	.2294
High School Rank	.2048
SES	.2038
Academic Purpose	-.1677
Psychology and Education	-.1643
Average Loan	-.1591
High School Activities	-.1567
Sex	-.1558
New Hampshire/Vermont/Maine	.1544
Average Work	-.1343
State Other	.1325
Savings	-.1125
Other Purpose	.1105
Race Other	-.1085
Business Major	-.0955
Connecticut/Rhode Island	-.0895
Income 78	.0875
Loan 1	-.0812
Part Time Jobs	-.0801
Resident/Commuter	.0792
Work 1	-.0608
Average Grant	-.0565
Average Preferential	.0439
Quantitative SAT	-.0406
White	-.0391
Preferential 1	.0374
Grant 1	-.0352
Arts and Sciences	-.0310

TABLE 26 (CONTINUED)

Structure Matrix for Discriminant Function Analysis Number 5

Pooled within-groups correlations between canonical discriminant function and discriminating variables are ordered by the function with largest correlation and the magnitude of that correlation.

<u>Variable</u>	<u>r</u>
Protestant	.0259
Need	-.0918
Parents' Contribution	.0188
High School Athletics	.0101
Family Size	.0082
Verbal SAT	.0079

TABLE 27

Standardized and unstandardized Canonical Discriminant Coefficients,
and group centroids for Discriminant Function Analysis Number 5

<u>Variable</u>	<u>Standardized Canonical Discriminant Functions Coefficients</u>	<u>Unstandardized Canonical Discriminant Function Coefficients</u>
Freshman GPA	-.8079	-.0043
Major Change	-.7365	-1.6137
No Major	.6831	1.5139
Arts and Sciences	.4440	1.0114
Religion Other	-.3688	-.3404
SES	.2113	.1868
State Other	.2437	.2857
Verbal SAT	.3047	.0381
Parents' Contribution	-.5604	-.0002
New Hampshire/Vermont/ Maine	.1876	.1749
Income 78	.4445	.0001
Registration Date	.1366	.0067
Other Purpose	-.0884	-.1655
Business Major	.1861	.4692
(Constant)		1.9457

Groups Means (Group Centroids)

<u>Group</u>	<u>Centroid</u>
Nongraduates	.6044
Graduates	-.6247

TABLE 28

Results of Classification for Discriminant Function Analysis Number 5

<u>Actual Group</u>	<u>No. of Cases</u>	<u>Predicted Nongraduates</u>	<u>Group Membership Graduates</u>
Nongraduates	154	116 75.3%	38 24.7%
Graduates	149	36 24.2%	113 75.8%

Percent of "Grouped" Cases correctly classified: 75.58%

TABLE 29

Summary Table for Discriminant Function Analysis Number 6

<u>Step</u>	<u>Entered</u>	<u>Variables In the Analysis</u>	<u>Wilks' Lambda</u>
1	Freshman GPA	1	.8732
2	Major Change	2	.7944
3	No Major	3	.7362
4	Arts and Sciences	4	.7061
5	Religion Other	5	.6849
6	SES	6	.6727
7	State Other	7	.6601
8	Verbal SAT	8	.6488
9	Parents Contribution	9	.6362
10	New Hampshire/Vermont/Maine	10	.6291
11	Income 78	11	.6234
12	Registration Date	12	.6173
13	Other Purpose	13	.6141
14	Business Major	14	.6115
15	Average Grant	15	.5935
16	Grant 1	16	.5449
17	Average Loan	17	.5316
18	Work 1	18	.5231
19	Average Work	19	.5112
20	Average Preferential	20	.5045
21	Loan 1	21	.5018
22	Preferential 1	22	.4995

VARIABLES NOT IN THE ANALYSIS AFTER 22ND STEP

<u>Variable</u>	<u>F to Enter</u>	<u>Wilks' Lambda</u>
Family Size	.1167	.4993
Savings	.6644	.4983
Need	.7521	.4982
Psychology and Education	.7231	.4982
Quantitative SAT	.6585	.4983
High School Bank	1.1369	.4975
Sex	1.4389	.4969
Connecticut/Rhode Island	.4687	.4995
High School Athletics	.1595	.4992
High School Activities	.6078	.4984

TABLE 29 (CONTINUED)

VARIABLES NOT IN THE ANALYSIS AFTER 22ND STEP

<u>Variable</u>	<u>F to Enter</u>	<u>Wilks' Lambda</u>
Part Time Jobs	.1113	.4993
White	1.9307	.4961
Race Other	.3384	.4989
Catholic	.2107	.4991
Protestant	1.2837	.4972
Academic Purpose	.3675	.4994
Resident/Commuter	.6636	.4994

TABLE 30

Structure Matrix for Discriminant Function Analysis Number 6

Pooled within-groups correlations between canonical discriminant function and discriminating variables are ordered by the function with largest correlation and the magnitude of that correlation

<u>Variable</u>	<u>r</u>
Freshman GPA	-.3807
Major Change	-.2857
No Major	.2438
Catholic	-.1936
Religion Other	.1924
Registration Date	.1827
Psychology and Education	-.1739
Average Preferential	-.1653
SES	.1623
Work 1	-.1555
High School Rank	.1361
New Hampshire/Vermont/Maine	.1230
Academic Purpose	-.1192
High School Activities	-.1180
Part Time Jobs	-.1126
Average Grant	.1082
State Other	.1055
Preferential 1	-.0981
Other Purpose	.0880
Race Other	-.0828
Average Loan	.0826
Connecticut/Rhode Island	-.0801
Business Major	-.0760
Savings	-.0757
Income 78	.0697
Quantitative SAT	-.0646
High School Athletics	-.0556
Sex	-.0509
Family Size	.0484
Grant 1	-.0481
White	.0449
Resident/Commuter	.0301

TABLE 30 (CONTINUED)

<u>Variables</u>	<u>r</u>
Need	-.0300
Arts and Sciences	-.0247
Protestant	-.0231
Loan 1	-.0186
Parents' Contribution	.0150
Verbal SAT	-.0063
Average Work	-.0011

number of credits completed can be predicted from the same 33 variables entered in the first set of discriminant function analyses, i.e. those which are known at the time a student enters the college. These regression analyses were done using the regression procedure on SPSSX version 1.1 on the American International College Prime 750, with the stepwise subcommand used in the deck setup.

Table 31 summarizes the results for the analysis using freshman grade point average as the dependent variable and Table 32 summarizes the results for the analysis using number of credits completed as the dependedn variable. Each table contains the variables which entered the equation, the values of b and beta associated with each of the entered variables, the multiple R and R square, and the F value and its significance level.

Analysis of the tables shows that both of the dependent variables are predictable to a significant degree, but that the degree of accuracy in prediction is limited. The variable which can be most accurately predicted is freshman grade point average with a multiple R of .567 and R square of .321. Prediction of credits completed is substantially less accurate, with a multiple R of .416 and R square of .173. The only financial aid variable to enter stepwise equation was first year work in predicting number of credits completed. Two variables, high school rank in class and unspecified major, entered both equations.

TABLE 31

Results of Multiple regression for number of credits completed as the dependent variable

Multiple R	.4162
R Square	.1732
Adjusted R Square	.1565
Standard Error	42.7136

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	6	113155.16	18859.19
Residual	296	540038.54	1824.45

F = 10.34 P < .0001

Variables in the equation

<u>Variable</u>	<u>B</u>	<u>S.E.B.</u>	<u>BETA</u>	<u>t</u>
No Major	-20.1327	5.5489	-.2068	-3.628
High School Rank	-.2823	.1063	-.1470	-2.655
Work 1	.0217	7.0004	.1840	2.940
Need	-4.0009	1.0007	-.1942	-2.894
SES	-5.0354	2.0566	-.1495	-2.443
Registration Date	-2.9492	1.3751	-.1199	-2.145
(Constant)	134.8817	11.9612		11.277

TABLE 32

Results of Multiple Regression for Freshman GPA as the Dependent Variable

Multiple R	.5669
R Square	.3214
Adjusted R Square	.3146
Standard Error	79.0552

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	885016.07	295005.35
Residual	299	1868665.30	6249.71

F = 47.20 P < .0001

Variables in the Equation

<u>Variable</u>	<u>B</u>	<u>S.E.B.</u>	<u>BETA</u>	<u>t</u>
High School Rank	-1.4221	.2074	-.3606	-6.858
Verbal SAT	3.1846	.6214	.2674	5.125
No Major	-24.8941	9.7324	-.1245	-2.558
(Constant)	168.2820	30.0675		5.597

DISCUSSIONS OF RESULTS

In a number of ways the results of the univariate and multivariate statistics in the study replicated the findings of prior research on attrition. Graduates had significantly higher rank in their graduating high school classes than nongraduates, for example. This finding is supported by the entry of high school rank in the first three discriminant functions. High school rank did not enter the second three functions, probably because the grade point average variables entered in its place. Also consistent with prior research are the findings that graduates had enrolled (paid a deposit to the college) significantly earlier than had nongraduates, supported by entry of this variable in all 6 discriminant functions. Students with no religious affiliation were significantly more often in the nongraduate group than in the graduate group, and either the "catholic" variable or the "none/other religion" variable entered all 6 discriminant functions. Graduates had significantly higher grades, both at the end of the freshman year and at the time the students graduated from or left American International College, and freshman grade point average entered all three functions in which it was included as a variable of interest. One of the variables, race, showed mixed results in that the univariate results of the comparisons of persisters and nonpersisters showed no differences, but race variables did enter all three of the second set of discriminant functions. In a sense, this is also a replication of prior findings

in that the results of prior research have also tended to be mixed.

The results for the variable of reason for attending college are mixed in the present study, but there is at least some support for the most typical finding in prior research that students with specific career goals tend to persist. In the present study, three variables can be thought of as relating to the variable of specific career goals: academic purpose, change of major, and major field of study chosen at the time of first enrollment. The academic purpose variable showed no difference, but those without specific majors tended to be nonpersisters, a finding supported by the "no major" variable entering all 6 functions. The finding that persisters tended to change majors more often than nonpersisters, supported by entry of this variable in all three functions for which it was included as a variable of interest, seems inconsistent with prior research. But the correlation of $+0.34$ between major change and the category of no chosen major in the major field of study suggests that graduates may have switched from no major to a specific major while the nonpersisters failed to find an acceptable major and were, therefore, more likely to withdraw. A second possibility, however, is that graduates were more motivated to complete requirements for at least some degree, and were willing to change to a secondary major. (A common major change, for example, is from a pre-medical program to a biology major, or even more commonly, to a psychology major.) Both possibilities are supported by the two crosstabs of no major by major change for the persisters and nonpersisters. The possibility that graduates were more motivated

to complete a degree is indirectly supported by the fact that graduates had significantly more savings at the time of first enrollment and had had more part time jobs (though not significantly so) than nongraduates.

Several results of the present study clearly contradict prior research, either by failing to detect differences where differences would have been expected, or by detecting significant results contradictory to prior research. Prior research for the variable of sex, for example, has had mixed results, but has tended to show that males persist to a greater degree than females. The present univariate findings were that women tended to persist to a greater degree than men, but the multivariate analyses fail, for the most part, to support the univariate results in that the variable of sex enters only the fourth function. Some prior research has suggested that sex may interact with ability as measured by SAT scores, and this may be the case in the present study as indicated by the significant (but somewhat unremarkable) correlation of $+0.19$ between sex and verbal SAT score, and the correlation of -0.31 between sex and high school rank in class.

As was the case for sex, the results for socioeconomic status contradict prior research. The socioeconomic status of graduates was significantly lower than that of nongraduates, a finding which was supported by the entry of this variable in all 6 discriminant functions, and by the nonsignificant higher income level of nongraduates. Prior research has shown mixed results, but has tended

to show that higher socioeconomic status students were more likely to persist. It may be that the generally higher levels of first year financial aid for persisters (significant for work aid, and approaching significance for preferential aid) may counteract the lower socioeconomic status level. A second, and equally plausible possibility, may be found in the nature of the college itself.

American International College was founded as a college for immigrants to the United States, a fact borne out in the names which the college had during its first years, i.e. French Protestant College and French American College. The changed to American International College at the turn of the 20th Century, but the college was still primarily involved in the high school (Academy) and college education of immigrants until well into the 1930s. The student population of the college still tends to be overrepresented by second and third generation Americans and first generation college students. These are often upwardly mobile and educationally conscious families and students, even though socioeconomic status and income may be low.

This historical background of the college may also help to explain the low means for verbal and quantitative SAT and the failure of both SAT variables to relate to persistence. (Though the Admissions Office of the College requires SAT scores to be submitted in the college application process, admission is based almost exclusively on high school grades, recommendations and the results of interviews. SAT scores are rarely a deciding factor.) Further, 32 of the 303 students included in the study were participants in a program designed to provide tutorial services and special testing accommodations for

students who are learning disabled but judged (by the Curtis Blake Center which administers the program at American International College) capable of completing college work. SAT scores are required for these students, but are consistently unusually low.

The variables of high school athletics, high school activities, and part time jobs while in high school all have higher means for the graduate group, but none of the results were significant.

The univariate results for the hypotheses of specific interest in this study lend support to at least two of the hypotheses, but not the other two. The hypothesis that preferential aid will be positively related to persistence is supported by the significantly greater average preferential aid provided to persisters, and by the fact that first year preferential aid approaches significance in the same direction. The hypothesis that work aid will be positively related to persistence is also supported by the fact that first year work aid is significantly greater for persisters, but is not supported by the finding that average work aid is virtually unrelated to persistence.

The hypothesis that grant aid will be positively related to persistence is not supported, since first year grant aid favors persisters and average grant aid favors nonpersisters, though neither tendency even approaches significance. The hypothesis that loan aid will be negatively related to persistence is also not supported, with graduates receiving more first year loan aid and less average loan aid. Again, neither of these tendencies approaches significance.

The results for the two t tests for the combined aid variables are

interesting. Graduates receive significantly more assistance from all sources during their first year than nongraduates, in spite of the fact that the financial needs of the groups are virtually identical. This finding probably reflects institutional packaging policy more than it explains persistence or attrition. It has already been noted that persisters enroll about three weeks earlier on the average than nonpersisters. Institutional packaging policy in the fall of 1979 was such that students who enrolled after about May 15th were likely to receive reduced financial aid awards, and if the enrollment was very late (after July 15th), little or no financial assistance. A similar analysis for average grants, loans, work, and preferential aid yields a nonsignificant t test result, with the mean difference slightly favoring the persisters. It may be that students who are seriously underfunded in their first year are more likely to leave the college, and that since the graduate and nongraduate groups tend to enroll at significantly different times, this affects the nonpersisters to a greater degree than persisters. Though first year total aid may be different for the two groups, the differential attrition may ultimately result in similar average aid for the two groups.

The correlations among variables provided results which were, for the most part, unremarkable and expected. The high intercorrelations among need, parents' income, socioeconomic status, and parents' contribution, for example, occur because parents' contribution is heavily influenced by parents' income. Need is primarily a function of parents' contribution, and socioeconomic status and income are

obviously interrelated. The relatively high negative intercorrelations among dummy coded variables from the same nominal dimension are also not surprising since categorical memberships are mutually exclusive and should correlate negatively. Also not surprising are the intercorrelations among first year grants and work, average grants and work, and parents' income, need, and parents' contribution. The other correlations reported are similarly unremarkable.

What is worth noting, however, is that the variables of first year loan and average loan are virtually uncorrelated with parents' income, parents' contribution, or financial need. This is notable, considering that loans are usually considered need-based financial aid and not available to students who have no financial need. The factor which is probably responsible for this anomaly (and which probably confounds all results related to loan assistance in the study) is that loans through the Guaranteed Student Loan Program were not need-based for the fall semesters beginning in 1979, 1980 and 1981. Any student, regardless of family income, could apply for and receive these loans during those years. As was the case in the early and mid-1970s, for the fall semesters beginning in 1982, need had to be established in order to qualify for these loans. Thus first year loans and average loans are uncorrelated with family financial factors or financial need, since over 90% of loan funds are in the form of Guaranteed Student Loans at American International College.

Also worthy of note is the fact that first year preferential aid

and average preferential aid are poorly correlated with the SAT variables, high school rank, and freshman grade point average. Much of the preferential aid is in the form of academic scholarships which are provided to students on the basis of high school record and to a much smaller extent on the basis of SAT scores. However, the preferential aid category also included assistance provided to students as athletic grants-in-aid, scholarships for dependents of faculty and staff, and in a few instances work-study awarded to students based on student employment skills. The inclusion of these categories of assistance with scholarships based on academic merit is probably responsible for the failure of the preferential aid variables to correlate with academic variables.

The results of the discriminant function analyses support the generalization that financial aid variables add significantly to the functions, even when aid variables are not allowed to enter the function until all other variables are allowed to enter first. In the first three analyses, the variables of first year work and first year preferential aid, when included in the function, increased classification accuracy by 3.3 percentage points. These findings supported the hypotheses that preferential aid will be positively related to persistence and that work aid will be positively related to persistence. The hypotheses that grant aid will be positively related to persistence and that loan aid will be negatively related to persistence were not supported, since neither first year loans nor first year grants entered the function.

The results of the second three discriminant function analyses

also lend some support to the hypotheses of interest, but they also fail to support, or contradict others of the hypotheses. In general, the addition of the financial aid variables added 5.9 percentage points to the accuracy of classification, and when the 8 financial aid variables were allowed to enter the function only after all other variables had entered, all 8 entered the function. The hypotheses that grants, preferential aid and work would relate positively to persistence were supported by the fact that first year grants, preferential aid, and work contributed to the function with persisters receiving more assistance from these sources. Nonpersisters received more first year loan aid, which supports the hypothesis that loan aid will be negatively related to persistence. The fact that the variable of average preferential aid entered the function supports the hypothesis that preferential aid will relate to persistence. The finding that average work assistance also contributes to the function supports the hypothesis that work aid will correlate with persistence, though the mean difference between persisters and nonpersisters was miniscule in this instance. Nongraduates had higher average grant assistance than graduates, which contradicts the hypothesis that grant aid will be positively related to persistence, and the higher average amount of loan assistance for nonpersisters supports the hypothesis that loan aid will be negatively related to persistence.

In summary, the hypotheses that preferential aid and work aid will be positively related to persistence are consistently supported, with at least partial support for the hypothesis that loan aid will be

negatively related to persistence, and mixed or contradictory results for the hypothesis that grant aid will be positively related to persistence. Prior studies which have, for the most part, found positive relationships between grant assistance and persistence may have found such relationships only because most of these studies have mixed aid from two sources, grants and scholarships, under the heading of grant aid, thus confounding the results of the studies. The separation of aid provided on the preferential bases of academic, athletic, or other talent from aid provided as a grant based purely on financial need allows an analysis of each of these sources of aid separately from one another and avoids this potential source of confounding. Loan aid may be negatively related to persistence, but it must be kept in mind that the results of this study may have been confounded by the ready availability of loans, without regard to need, during the first three years encompassed by the research. At least some credibility is lent to the conclusions regarding loans by the general agreement of these results with the results of prior studies, but it is still possible that students may have withdrawn because loans which had been freely available suddenly became unavailable after their second or third year of study when loan regulations were changed.

The present findings also lend support to the general notion that financial aid (from all sources combined) may not be related to persistence at all, since average aid from all sources was not significantly different for persisters and nonpersisters. First year

aid was significantly higher for persisters, but this may be a function of first year packaging policy. It may be that the long term positive effects of preferential and work aid are counteracted by the neutral effect of grants and the negative effects of loans. Students are clearly unhappy about the prospect of indebtedness and may be dissuaded from continuing their educations by large loan burdens, especially if they are unsure of their academic and career goals.

If it is true that financial aid in general may not be related to persistence, but that specific forms of aid are related to persistence, then several suggestions can be made regarding financial aid policy at the federal, state, and institutional levels. The current trend in policy at all three levels is an increasing reliance on loans as a form of aid, with little change in the availability of grants and work, and some increasing institutional commitment to preferential aid. The increased reliance on loans is occurring because one appropriated legislative loan dollar (or institutional dollar) will generate several dollars in assistance to students, while one appropriated legislative dollar provides only one dollar of grant or preferential assistance or 1.25 dollars of work assistance. Though causal inferences should not be made, the results of this study and of many others suggest that increasing reliance on loans is, from the standpoint of student attrition, a mistake. It may be true that the short-run cost for grant and employment assistance is greater than the cost of loan assistance, but if persistence rates can be improved by less reliance on loans, the long-run payback in the form of greater

productivity and higher taxes paid by college graduates who presumably will have greater opportunity to earn because of their education may well be worth it. A cost-analysis study, therefore, seems imperative. The suggestion that less emphasis be placed on loans is coupled with the suggestions that greater assistance be provided in the form of employment (which already has general legislative appeal) and preferential aid for talented students or students who have specific educational goals such as teaching or needed technical skills.

Packaging policy as practiced in 1979 may have contributed to increased attrition in the group of students who enrolled (paid a deposit to the college) late. To the extent that this may be true, financial aid officers should consider husbanding a proportion of available resources so that late enrollees will have at least some resources available. This is no easy task when financial aid resources are already scarce.

Even though financial assistance in its many forms may not be related to persistence, it may be argued that the failure of aid to relate to persistence is, in itself, a positive finding. It was pointed out earlier that there is general agreement that the existence of financial assistance to students has increased student access to higher education and, to a lesser extent, choice of institution to attend. Students are now attending college who simply would not have been able to do so 20 or more years ago, given the relatively scarce resources available prior to 1965. The fact that financial aid recipients who attend college have persistence rates comparable to students who attend college without aid suggests that many students

are completing college programs, with all that that implies, who would not have otherwise been able to do so.

The present study is limited in several ways. The results are from a single entering class of traditional age first time financially dependent freshmen at a single private college. Further, a group of 32 learning disabled students was included in the group of 303. What is needed is a number of studies which incorporate some of the procedures used in the present study, particularly a multivariate approach with both aid recipients and nonrecipients and separation of preferential forms of aid from grant aid, at a variety of types of institutions. In such further research, the separation of preferential aid into two or more categories might be advisable, where appropriate. These categories might separate scholarships based on academic merit from those provided on the basis of athletic or other talents. For some institutions variables such as participation in intercollegiate athletics, participation in cocurricular activities, or residence in off-campus apartments as well as dormitories and at home (for commuters) might be included as appropriate to specific institutions. The variable of participation in high school activities might also be defined differently than in the present study in order to reflect the recent finding (Willingham, 1985) that it is not the number of activities, but the quality of participation in a few activities, that best predicts persistence. One further suggestion is that future research include as a variable of interest the family's perception of its ability to contribute to the cost of education. An

item on the Financial Aid Form asks parents to estimate the amount of assistance they can provide for their children attending college. Perhaps this perceived contribution, when compared to the calculated contribution, will lend insight to other findings.

One final note is that the discriminant functions developed in this or other similar research studies may have institutional usefulness in the sense that attempts to reduce attrition may be aided by the ability to predict (although far from perfectly) persistence and nonpersistence at a greater than chance level. Students identified as having a high probability of nonpersistence, whether aid recipients or nonrecipients, might be provided with counseling, academic support, and/or academic advising which could increase the probability of persistence. Such discriminant functions are limited to the groups from which they are derived (transfer students, financially independent or self supporting, traditional age freshmen, etc.), should be updated continually, and would, of course, apply only to the institution from which the data were obtained.

CHAPTER V

SUMMARY AND CONCLUSIONS

The history of significant federal involvement in financial aid for students attending institutions of higher education is short, dating only from the late 1950s. Nevertheless, federal (and state) financial aid has become critically important both to students and to the institutions they attend. Students who could not have attended college 25 years ago are now doing so in large numbers, and many institutions owe their continued existence to federal and state financial aid programs. Though clear national goals for financial aid have rarely (if ever) been explicitly articulated as federal policy, several goals can be gleaned from the individual pieces of legislation authorizing and funding financial aid programs. Aid has been provided in order to enhance access to higher education and choice of institution of higher education, so that no qualified student will be denied entrance and choice. Further, the intent of these programs was to enhance economic opportunity for minority students through equal access and choice, regardless of family financial resources. Parents and students now depend on the existence of financial aid, and financial aid is an important part, perhaps even the most important part of the decision to attend college in the first place. Also, aid is often a critical consideration in the decision of which college to attend.

The goal of greater access to higher education has, in the opinion

of most writers, been achieved with some measure of success. Students from low income families are more likely to indicate an interest in attending college (Steif, 1968), and women and minority students increased their enrollment rates by 22 percent during the first 5 years of the existence of the Basic Educational Opportunity Grant Program (Carnegie Council on Policy Studies in Higher Education, 1979). Although black students are still underenrolled, minority participation rates in higher education have risen since the early 1970s (Green, 1982; Higher Education and National Affairs, 1983b; Doermann, 1978).

Two questions of importance are whether financial aid relates to persistence in higher education, and whether the composition of a financial aid package in the amount of grants, loans, preferential aid (merit-based scholarships), and work relate to persistence. A number of studies have been done which address either or both of these questions. The results of these studies have been mixed, but the general conclusions to which most writers have come are that preferential aid is related most often to persistence, grants are frequently related to persistence, work is related to persistence, and loans are related most often to nonpersistence. The overall effects of aid appear to be positively related to persistence, but a significant number of studies have failed to find any relationship between financial aid and persistence.

Studies attempting to answer these two questions have been marred by a lack of methodological strength which has resulted in equivocal

and therefore arguable results. These studies have lacked consistent and proper definitions of terms, particularly the terms persistence and attrition, financial aid recipient, student status as either part time or full time, student class level as freshman, sophomore, etc., apparent ability level, socioeconomic status, and others. Most studies have failed to use a sufficiently long longitudinal approach - at least 5 years from the time of entrance into college. Rarely has relevant institutional policy for the awarding of financial aid been clearly specified. Few studies have included merit-based preferential aid as a separate variable, but instead most have included such aid in the category of grant aid based primarily on financial need. Many studies have not tracked financial aid status for the duration of the entire study, with one of the variables of interest being the average amount of aid per semester from each of the 4 sources. Only a few studies include both financial aid recipients and nonrecipients. Finally, and most important, relatively few studies have used appropriate multivariate design and statistics with a sufficient number of potentially relevant variables (other than financial aid variables) which the literature has shown to be related to persistence/attrition. The fact that these studies are often flawed, particularly because most of the studies have been univariate, leaves the conclusions with respect to the two questions of interest with little solid research support. The failure to use multivariate statistical approaches often results in overinterpretation since two or more significant differences found in univariate approaches may

only represent a difference on a single dimension when the interrelationships are accounted for in multivariate approaches.

The present study was conceived as an attempt to include as many of the elements missing from prior research as possible, using data available and obtained only from a variety of college offices and records.

The hypotheses tested are four in number: (1) First year grants and average grant aid per semester are positively related to persistence, (2) First year preferential aid and average preferential aid are positively related to persistence, (3) First year work and average work are positively related to persistence, (4) First year loan and average loan aid are negatively related to persistence.

METHOD

Subjects

The subjects used for the study consisted of 303 students who began as freshmen in the fall of 1979 at a small, non-sectarian, private, urban college located in Western Massachusetts. The only students included in the study were those who could be thought of as traditional freshmen - those with no prior college experience, unmarried, full time, dependent upon parents for support, of traditional college age, graduated from high school the previous June, and not foreign students. The students' progress was tracked through

5 years or 10 semesters. Persisters were defined as students who continued until they obtained a baccalaureate degree or who continued to enroll on a full-time basis through the ten semesters encompassed by the study, with or without stopouts. Nonpersisters were students who left school, for whatever reason, and who were not enrolled at the end of the tenth semester and who had not received a 4-year degree. The group of persisters included 149 students, only one of whom had not graduated by the end of the 10th semester. The nonpersisters included 154 students who had dropped out at various times during the five years.

Procedure

The first procedural step was the compilation of a list of variables (other than financial aid variables) which prior research had shown to be related to persistence/attrition. The list of variables is summarized beginning on page 55, and includes socioeconomic status, major field of study, SAT scores, high school rank, sex, state of residence, participation in high school athletics or activities, religious preference, date of registration, first year and final grade point average, resident/commuter status, and others. The family financial and financial aid variables chosen for study included parents' 1978 income, estimated parents' contribution toward the cost of education, the student's financial need, grant, preferential aid, employment, and loan for the student's first year,

and the averages for grants, preferential aid, employment, and loans over the 5 years encompassed by the study.

RESULTS AND DISCUSSION

The results of descriptive and univariate statistics are summarized in Tables 6, 7, 8, 9, and 10. Statistically significant univariate results are summarized in Table 33. Persisters have significantly greater savings, greater amounts of first year work aid, have lower socioeconomic status, higher high school rank, register earlier, have higher terminal and first year grade point averages, and receive greater average preferential aid. Persisters also have significantly more semesters of aid, more semesters completed, and more credits completed, but these three findings are not surprising, given the definitions of the two groups. Students with no chosen field of study at the time of first enrollment tended not to persist, while School of Psychology and Education majors tended to persist. Women graduated in proportionately greater numbers than men, and persisters tended to change major while in college more often than nonpersisters. Catholics, and/or students with a stated religious preference tended to persist, while students without a religious preference were less likely to persist.

For reasons noted above, univariate statistical results may be misleading. The primary statistical analyses for the study were, therefore, six discriminant function analyses. The first three of

these analyses were used to determine whether graduates and nongraduates can be classified into groups using data from variables which are available at the time of a student's first enrollment, and the degree to which first year financial aid variables contribute to the ability to classify. The results of these analyses are summarized in Tables 11 through 20. The second set of three discriminant function analyses used the same variables as the first set, but also included the variables of change of major while at the college, freshman grade point average, and average loan, grant, work, and preferential aid per semester. These analyses are summarized in Tables 21 through 30.

Table 34 summarizes the results of these analyses with respect to the four hypotheses of interest. The hypotheses that first year and average preferential aid are positively related to persistence and that first year and average work are positively related to persistence are consistently supported by these results. The hypothesis that first year and average loan aid are negatively related to persistence is supported in that average loan aid is negatively related to persistence, as is first year loan aid, when the variables are allowed to enter the function only after variables other than financial aid variables have been allowed to enter the function. First year loan is unrelated to persistence in the first set of analyses. It should be noted that eligibility for loans changed after three years of the study, and that these results may be confounded by that fact. The hypothesis that first year grant and average grant are positively

TABLE 33

SUMMARY OF SIGNIFICANT UNIVARIATE STATISTICAL RESULTS

t test results

<u>Variable</u>	<u>Mean (Persisters)</u>	<u>Mean (NonPersisters)</u>	<u>t Value</u>
Student Savings	334.66	212.42	2.33*
First Year Work	394.63	273.38	2.70**
Semesters of Aid	6.65	2.42	16.56***
Socioeconomic Status	3.19	3.63	2.82**
Credits Completed	120.32	36.77	31.91***
Semesters Completed	8.16	3.20	26.10***
High School Rank	.40	.50	3.66***
Registration Date	4.08	4.76	3.17**
Terminal GPA	2.76	1.87	9.22***
Freshman GPA	2.57	1.89	6.61***
Average Preferential Aid	220.24	105.07	2.87**

Chi Square Results

<u>Comparison</u>	<u>Chi Square</u>
Persister/Nonpersister by field of study	19.59***
Persister/Nonpersister by sex	5.56*
Persister/Nonpersister by State of Residence	9.10*
Persister/Nonpersister by Change of Major	22.91***
Persister/Nonpersister by Religion Preference	15.83**
Field of Study by Change of Major (Persisters)	16.10***
Field of Study by Change of Major (Nonpersisters)	18.32***

*p < .05

**p < .01

***p < .001

TABLE 34

Summary of Discriminant Function Analyses For Hypothesis of Interest

First Set of Analyses

<u>Variable</u>	<u>Entered Function</u>	<u>Relationship to Persistence</u>	<u>Support for Hypothesis (Number)*</u>
First Year Grant	No	-	None (1)
First Year Preferential Aid	Yes	Positive	Yes (2)
First Year Work	Yes	Positive	Yes (3)
First Year Loan	No	-	None (4)

Second Set of Analyses

First Grant	Yes	Positive	Yes (1)
First Year Preferential Aid	Yes	Positive	Yes (2)
First Year Work	Yes	Positive	Yes (3)
First Year Loan	No**	-	None (4)
Average Grant	Yes	Negative	Contradictory (1)
Average Preferential Aid	Yes	Positive	Yes (2)
Average Work	Yes	Positive	Yes (3)
Average Loan	Yes	Negative	Yes (4)

- (1) First Year Grant and Average Grant are positively related to persistence
- (2) First Year Preferential Aid and Average Preferential Aid are positively related to persistence
- (3) First Year Work and Average Work are positively related to persistence
- (4) First Year Loan and Average Loan are negatively related to persistence

**First Year Loan did enter third Function and was negatively related to persistence, a finding which partially supports hypothesis four.

related to persistence is unsupported, with grant unrelated to persistence in the first set of analyses, first year grant positively related to persistence and average grant negatively related to persistence in the second set of analyses.

A consistent finding from other studies is that grant assistance is positively related to persistence, but these studies fail to separate grant assistance (based only on financial need) from preferential aid (scholarships or other aid based solely on academic or other talent). Further, some colleges have aid awarding policies which provide more grant and less loan to academically talented students and less grant and more loan for students less academically qualified. It may be that the positive relationship between grants and persistence found in other studies is due to the confounding of need-based and merit-based aid in these studies. The findings regarding loan aid (though possibly confounded) are consistent with prior research. Though causal inferences should be made, this does not bode well for future persistence since the current trend is for increasing reliance on loans as a form of financial aid, primarily because relatively small appropriations are needed in order to generate loan dollars for students. The positive relationship between work assistance and persistence is consistent with prior research, and suggests that greater reliance on work as a form of assistance might have beneficial effects. Note that the maximum number of hours of work per term-time week at the college is 16. This finding applies, therefore, only to 16 or fewer hours per week of work.

Although preferential aid and work aid relate positively to persistence and loan aid relates negatively to persistence, with grants unrelated to persistence, the combined amounts received from all types of aid programs may not be related to persistence (with the negative loan relationship counteracting the positive preferential and work aid relationships). Since many students are now attending college who would not have been able to attend without financial assistance, it may be argued that the persistence rates of these students are comparable to the persistence rates for students who do not receive aid and would have attended whether financial aid was available or not. The implication is that the investment of federal and state dollars in these programs allows many students to complete college programs, with all that that implies, who would not have otherwise been able to do so.

The results of the study are limited in that only a single entering class of traditionally aged first-time financially dependent freshmen was used as subjects at a single private college. A further limitation is that preferential aid included scholarships based on academic merit, work assistance provided on the basis of student talent or skill, scholarships for children of faculty and staff, as well as aid based on athletic skill. Future studies might consider separating preferential aid from different sources. Because of the limitations of the study, the predictive ability of the discriminant functions applies only to student data at the college where the functions were developed. At that college the functions may have

institutional usefulness in the sense that attempts to reduce attrition may be aided by the ability to predict (although far from perfectly) persistence at a greater than chance level.

Further suggestions for research include using participation in high school activities (based on recent findings) in terms of high quality involvement with one or two activities rather than simply the number of activities in which students have engaged, and including the perception of parents of the amount of money which they feel they can contribute toward the cost of education, as well as the amount of parents' contribution as calculated from information given on the Financial Aid Form. Finally, researchers may need to modify other variables as appropriate to circumstances at their own institutions.

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APPENDIX

POOLED WITHIN-GROUPS CORRELATION MATRIX

	INCOME78	FAMSIZE	PCON	SAVINGS	NEED	GRANT1
INCOME78	1.					
FAMSIZE	.154	1.				
PCON	.897	.008	1.			
SAVINGS	.116	.026	.285	1.		
NEED	-.834	.040	-.917	-.206	1.	
GRANT1	-.638	-.036	-.694	-.261	.736	1.
PREF1	-.040	.000	-.054	.019	.031	-.090
WORK1	-.311	.128	-.398	-.184	.503	.505
LOAN1	.028	.050	.039	.082	.043	-.015
SENSAID	-.424	-.015	-.437	.008	.447	.434
SES	.462	.032	.470	.173	-.457	-.314
NOMAJOR	.248	.004	.242	-.123	-.222	-.143
AANDS	-.105	-.095	-.096	.061	.048	.041
BUSINESS	-.016	.029	-.012	.129	.027	-.044
PSYANDED	-.117	.086	-.111	-.077	.168	.155
NURSING	-.083	-.020	-.106	.038	.041	.036
VSAT	.107	-.041	.114	-.011	-.144	-.151
QSAT	.156	-.018	.144	.098	-.160	-.128
CRCOMPL	.003	-.049	.014	-.016	-.001	.052
SENCOMPL	-.036	-.086	.004	-.020	-.001	.044
HSRANK	.004	-.014	.013	-.085	.038	.019
SEX	-.159	-.028	-.184	-.033	.133	.141
MASS	-.053	-.040	-.098	-.022	-.017	.053
CTRI	.094	.075	.154	.111	-.087	-.162
NHVTME	.001	.066	-.017	-.050	.059	.102
STATEOTH	-.046	-.085	-.044	-.084	.107	.067
HSATH	-.032	.016	-.052	-.038	.111	.086
HSACT	-.093	-.077	-.096	-.032	.140	.090
MAJCHG	-.012	-.083	-.017	-.146	.009	.053
PTJOBS	.059	.065	.060	-.004	-.024	-.032
WHITE	.259	.051	.265	.094	-.261	-.206
BLACK	-.249	-.040	-.257	-.129	.261	.224
RACEOTH	-.073	.014	-.079	.116	.036	.010
CATHOLIC	.008	.181	-.011	.070	-.019	-.038
PROTEST	-.105	-.142	-.092	-.064	.100	.031
JEVISH	.061	-.046	.056	.067	-.080	-.078
RELIGOTH	.056	-.072	.068	-.044	-.040	.031
ACADPURP	.033	.084	.030	.037	-.004	.011
PURPNOA	-.067	.008	-.098	.107	.046	-.017
OTHPURP	.003	-.079	.020	-.030	-.047	-.028
RESCOM	.014	.063	.008	.014	.247	.163

POOLED WITHIN-GROUPS CORRELATION MATRIX (CONT.)

	INCOME78	FAMSIZE	PCON	SAVINGS	NEED	GRANT1
REGDATE	-.069	.007	-.056	-.075	.002	.004
TERMGPA	.132	.006	.115	.108	-.120	-.037
FRESHGPA	.099	.070	.077	.093	-.088	-.037
AVGRANT	-.650	.030	-.695	-.242	.724	.913
AVPREF	-.092	.035	-.126	.011	.133	-.035
AVWORK	-.292	.129	-.379	-.154	.452	.448
AVLOAN	-.055	.040	-.045	.062	.128	.054

POOLED WITHIN-GROUPS CORRELATION MATRIX (CONT.)

	PREF1	WORK1	LOAN1	SEMSAID	SES
PREF1	1.				
WORK1	-.083	1.			
LOAN1	-.104	.179	1.		
SEMSAID	.203	.367	.233	1.	
SES	-.038	-.318	-.113	-.264	1.
NOMAJOR	-.050	-.059	-.039	-.215	.103
AANDS	.047	-.119	-.029	.047	.028
BUSINESS	.121	.103	.035	.054	-.013
PSYANDED	-.099	.107	.102	.132	-.062
NURSING	-.027	-.008	-.081	.041	-.125
VSAT	.271	-.123	-.102	.053	.096
QSAT	.163	-.097	-.152	-.071	.181
CRCOMPL	.074	.093	-.020	.435	-.066
SECOMPL	.041	.065	-.040	.392	-.035
HSRANK	-.132	-.006	.020	-.139	.122
SEX	-.028	.015	.038	.182	-.140
MASS	.076	-.110	-.276	-.057	-.064
CTRI	-.084	.043	.309	.032	.062
NHVTME	-.041	.017	.043	.039	.099
STATEOTH	.024	.108	-.014	.020	-.053
HSATH	-.006	.192	-.004	.042	-.030
HSACT	.025	.065	-.046	.109	-.060
MAJCHG	-.045	-.028	.074	-.058	.055
PTJOBS	-.048	.030	.024	-.128	.060
WHITE	-.040	-.137	-.034	-.251	.286
BLACK	.026	.141	.048	.250	-.306
RACEOTH	.049	-.022	-.054	.049	.000
CATHOLIC	.031	-.003	-.078	-.023	.087
PROTEST	-.050	-.033	-.031	-.018	-.098
JEWISH	-.032	-.062	-.084	-.091	.041
RELIGOTH	.037	.038	.118	.059	-.029
ACADPURP	-.057	.073	-.006	.038	-.038
PURPNONA	-.017	.115	-.064	.046	-.030
OTHPURP	.061	-.120	.049	-.053	.048
RESCOM	.006	.290	.263	.068	.035
REGDATE	.039	-.115	-.009	.036	-.046
TERMGPA	.168	-.008	-.026	.127	.042
FRESHGPA	.163	-.000	-.058	.138	.053
AVGRANT	-.130	.457	-.044	.372	-.291
AVPREF	.876	-.002	-.066	.227	-.047
AVWORK	-.079	.832	-.096	.309	-.299
AVLOAN	-.121	.198	.797	.311	-.110

POOLED WITHIN-GROUPS CORRELATION MATRIX (CONT.)

	NOMAJOR	AANDS	BUSINESS	PSYANDED	NURSING
NOMAJOR	1.				
AANDS	-.408	1.			
BUSINESS	-.342	-.264	1.		
PSYANDED	-.306	-.249	-.224	1.	
NURSING	-.184	-.153	-.138	-.136	1.
VSAT	-.150	.118	-.054	.008	.148
QSAT	-.047	.074	-.021	-.069	.095
CRCOMPL	-.112	.054	.078	.015	-.026
SECOMPL	-.099	.025	.114	.007	-.045
HSRANK	.150	-.137	-.002	.087	-.172
SEX	-.277	.056	-.136	.191	.343
MASS	-.035	.058	-.066	-.019	.095
CTRI	.012	-.011	.068	-.034	-.060
NHVTME	.042	-.081	-.056	.132	-.049
STATEOTH	.010	-.022	.050	-.015	-.037
HSATH	.151	-.124	.027	-.048	-.041
HSACT	-.141	.089	-.027	.040	.092
MAJCHG	.349	.119	-.192	-.207	-.242
PTJOBS	-.045	-.050	.041	.087	-.023
WHITE	.027	-.018	-.013	-.037	.055
BLACK	-.017	.030	-.002	.021	-.049
RACEOTH	-.067	-.056	.036	.041	.101
CATHOLIC	-.092	.102	.056	-.086	.041
PROTEST	-.051	.072	-.077	.023	.057
JEWISH	.133	-.072	.003	-.062	-.038
RELIGOTH	.087	-.121	-.006	.085	-.072
ACADPURP	-.121	-.074	-.004	.085	.225
PURPNONA	.017	-.050	.083	-.004	-.068
OTHPURP	.100	.092	-.024	-.081	-.181
RESCOM	.063	-.107	.007	.135	-.145
REGDATE	.216	-.083	-.050	-.069	-.080
TERMCPA	-.143	.133	-.063	.021	.107
FRESHGPS	-.164	.107	-.006	.017	.105
AVGRANT	-.138	.003	-.046	.170	.071
AVPREF	-.070	.036	.117	-.054	-.032
AVWORK	-.062	-.071	.048	.057	.074
AVLOAN	-.147	.024	.017	.146	-.010

POOLED WITHIN-GROUPS CORRELATION MATRIX (CONT.)

	VSAT	QSAT	CROMPL	SECOMPL	HSRANK	SEX
VSAT	1.					
QSAT	.620	1.				
CROMPL	.123	.023	1.			
SECOMPL	.013	-.054	.884	1.		
HSRANK	-.409	-.316	-.129	-.010	1.	
SEX	.191	-.016	.073	.020	-.307	1.
MASS	.122	.202	-.039	-.049	-.080	.061
CTRI	-.084	-.180	-.013	.010	.101	-.048
NHVTME	.066	.085	.096	.070	-.058	-.058
STATEOTH	-.128	-.136	.014	.016	.029	.008
HSATH	-.226	-.056	.056	.052	.088	-.277
HSACT	.203	.153	.095	.035	.206	.209
MAJCHG	-.172	-.080	-.076	-.077	.095	-.210
PTJOBS	.010	.120	-.112	-.124	-.031	-.064
WHITE	.272	.303	-.168	-.225	-.060	.004
BLACK	-.299	-.340	.172	.221	.070	-.007
RACEOTH	.092	.120	-.013	.010	-.080	.056
CATHOLIC	.148	.096	-.130	-.151	-.056	.074
PROTEST	-.045	-.043	.053	.089	-.049	-.005
JEWISH	-.001	-.000	-.002	.065	.097	-.105
RELIGOTH	-.106	-.058	.091	.070	.065	-.047
ACADPURP	.072	.110	-.044	-.035	-.087	.102
PURPONA	-.070	-.076	-.027	-.062	.054	.020
OTHPURP	-.039	-.072	.059	.073	.061	-.112
RESCOM	-.171	-.160	-.022	-.029	.155	-.093
REGDATE	-.138	-.144	-.128	-.079	.124	-.084
TERM GPA	.433	.351	.373	.125	-.461	.236
FRESH GPA	.485	.374	.355	.137	-.457	.242
AVGRANT	-.161	-.149	-.030	-.028	.029	.162
AVPREF	.206	.137	.068	.014	-.097	-.017
AVWORK	-.078	-.060	.039	-.014	-.081	.096
AVLOAN	-.123	-.167	.004	-.019	.038	.050

POOLED WITHIN-GROUPS CORRELATION MATRIX (CONT.)

	MASS	CTRI	NHVTME	STATEOTH	HSAT	HSACT
MASS	1.					
CTRI	-.708	1.				
NHVTME	-.286	-.109	1.			
STATEOTH	-.434	-.170	-.087	1.		
HSATH	.012	-.023	-.033	.036	1.	
HSACT	-.093	.055	.082	.017	-.074	1.
MAJCH	-.064	.026	.006	.064	.028	-.021
PTJOBS	-.045	.053	-.001	.000	.022	.238
WHITE	.078	.044	.088	-.250	-.081	.047
BLACK	-.095	-.032	-.089	.261	.098	-.029
RACEOTH	.074	-.056	-.018	-.030	-.082	-.066
CATHOLIC	.007	.065	-.021	-.088	.003	.112
PROTEST	-.053	-.034	-.046	.164	.107	.110
JEWISH	.043	-.072	-.025	.047	.039	-.079
RELIGOTH	.023	-.027	.057	-.041	-.090	-.170
ACADPURP	-.018	.091	.033	-.121	-.087	.142
PURPNOA	.011	-.074	-.001	.085	.236	-.102
OTHPURP	.003	-.035	.033	-.069	-.033	-.089
RESCOM	-.489	.322	.166	.227	.164	.141
REGDATE	.106	-.159	-.031	.072	.049	-.177
TERNGPA	.073	-.137	.088	.010	-.080	.153
FRESHGPA	.056	-.121	.087	.016	-.087	.167
AVGRANT	.078	-.159	.125	.008	.076	.105
AVPREF	.056	-.064	-.035	.024	.035	.052
AVWORK	-.035	-.044	.050	.084	.118	.089

POOLED WITHIN-GROUPS CORRELATION MATRIX (CONT.)

	MAJCHG	PTJOBS	WHITE	BLACK	RACEOTH
MAJCHN	1.				
PTJOBS	-.059	1.			
WHITE	-.014	.138	1.		
BLACK	.017	-.123	-.968	1.	
RACEOTH	-.028	-.042	-.172	-.033	1.
CATHOLIC	-.015	.209	.295	-.278	-.034
PROTEST	-.135	.017	-.313	.297	.063
JEVISH	.041	.028	-.034	-.044	.248
RELIGOTH	.109	-.228	-.069	.084	-.076
ACADPURP	-.216	.086	.041	.059	.000
PURPONA	-.053	-.089	.018	-.014	-.025
OTHPURP	.230	-.033	.033	-.052	.013
RESCOM	.092	.128	.020	.007	-.132
REGDATE	.142	-.137	-.236	.242	-.017
TERM GPA	-.122	.049	.116	-.126	.010
FRESH GPA	-.127	.025	.096	-.114	.119
AVGRANT	.061	-.027	-.156	.168	.029
AVPREF	-.093	-.027	-.124	.118	.027
AVWORK	.040	-.019	-.085	.082	-.010

POOLED WITHIN-GROUPS CORRELATION MATRIX (CONT.)

	CATHOLIC	PROTEST	JEWISH	RELIGOTH	ACADPURP
CATHOLIC	1.				
PROTEST	-.352	1.			
JEWISH	-.129	-.048	1.		
RELIGOTH	-.726	-.330	-.101	1.	
ACADPURP	.073	.042	-.036	-.098	1.
PURPNONA	-.023	-.026	-.033	.048	-.177
OTHPURP	-.063	-.010	.051	.062	-.855
RESOM	-.084	.022	-.064	.106	-.031
REGDATE	-.137	.065	.101	.061	-.125
TERMGPA	.070	-.015	-.015	-.061	.046
FRESHGPA	.108	-.031	.008	-.094	.094
AVGRANT	.018	.018	-.075	-.017	.006
AVPREF	.032	-.030	-.052	.025	-.036
ATWORK	.049	-.056	-.028	-.009	.070
AVLOAN	-.005	-.060	-.046	.051	.052

POOLED WITHIN-GROUPS CORRELATION MATRIX (CONT.)

	PURPNONA	OTHPURP	RESCOM	REGDATE	TERMGPA	FRESHGPA
PURPNONA	1.					
OTHPURP	-.345	1.				
RESCOM	.034	.002	1.			
REGDATE	.138	.046	-.132	1.		
TERMGPA	-.067	-.016	-.146	-.167	1.	
FRESHGPA	-.051	-.068	-.155	-.139	.939	1.
AVGRANT	.038	-.018	.143	.000	-.075	-.075
AVPREF	-.001	.033	.073	.067	.186	.184
AVWORK	.066	-.103	.198	-.107	.051	.060
AVLOAN	-.092	.004	.279	-.030	.006	-.010

POOLED WITH-IN GROUPS CORRELATION MATRIX (CONT.)

	AVGRANT	AVPREF	AVWORK	AVLOAN
AVGRANT	1.			
AVPREF	-.085	1.		
AVWORK	.484	.005	1.	
AVLOAN	.062	-.087	.179	1.

