The noncognitive questionnaire : an instrument to discriminate between successful and unsuccessful EOP students?
by Russell Velo Boham

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education
Montana State University
© Copyright by Russell Velo Boham (1997)

Abstract:
Historically, in the United States higher education has been the nearly exclusive domain of White citizens. In the 1960s the California State legislature sponsored a program called Educational Opportunity Program (EOP) to increase access to the California State University for low-income and first-generation college students who are disproportionately ethnic minorities.

The use of standard cognitive criteria in admissions to predict academic success is unreliable for ethnic minorities. EOP student applicants receive special admit consideration, but may be denied due to low standard scores. The Noncognitive Questionnaire (NCQ) measures eight noncognitive variables and has been shown to be reliable in some studies for predicting academic success of ethnic minorities. The question was, could the NCQ be used to discriminate between successful and unsuccessful students, thus aiding the admissions process.

The NCQ was administered to 93 first time freshman EOF students entering Humboldt State University during the fall semesters of 1995 and 1996. Data on first semester GPA, number of credit hours completed, gender and ethnicity were included along with the NCQ in the analysis. The data were grouped by GPA, gender and ethnicity, then analyzed using discriminant analysis, stepwise multiple regression and analysis of variance. One purpose of the study was to describe the study population in a case study design. Another purpose was to determine if such information was useful to develop intervention and support programs.

The NCQ failed to discriminate between high and low GPA groups. Stepwise Multiple Regression did not demonstrate a significant relationship between GPA and the variables measured. However, students who performed better academically took fewer than 14 credit hours. White EOP students had higher GPAs than did ethnic minorities.

EOP students who performed less well academically had coursework overloads. The results did not support a noncognitive admissions model. The complex noncognitive phenomena were not adequately addressed using the NCQ. Future research should look at other ways to examine such variables. It is recommended that portfolios and personal interviews be considered for use and evaluation.

THE NONCOGNITIVE QUESTIONNAIRE: AN INSTRUMENT

TO DISCRIMINATE BETWEEN SUCCESSFUL AND

UNSUCCESSFUL EOP STUDENTS?

by

Russell Velo Boham

A thesis submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Education

MONTANA STATE UNIVERSITY--BOZEMAN
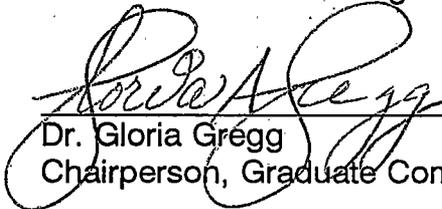Bozeman, Montana

April 1997

APPROVAL

of a thesis submitted by

Russell Velo Boham

This thesis has been read by each member of the graduate committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

_____   _April 16, 1997_
Dr. Gloria Gregg   Date
Chairperson, Graduate Committee

Approved for the Major Department

_____   _April 16, 1997_
Dr. Gloria Gregg   Date
Head, Major Department

Approved for the College of Graduate Studies

_____4/26/97_____   _____
Dr. Robert L. Brown   Date
Graduate Dean

STATEMENT OF PERMISSION TO USE

Signature _____

Date _____April 8, 1997_____

iv

TABLE OF CONTENTS

TABLE OF CONTENTS--<u>Continued</u>

TABLE OF CONTENTS--<u>Continued</u>

LIST OF TABLES

ABSTRACT

Historically, in the United States higher education has been the nearly exclusive domain of White citizens. In the 1960s the California State legislature sponsored a program called Educational Opportunity Program (EOP) to increase access to the California State University for low-income and first-generation college students who are disproportionately ethnic minorities.

The use of standard cognitive criteria in admissions to predict academic success is unreliable for ethnic minorities. EOP student applicants receive special admit consideration, but may be denied due to low standard scores. The Noncognitive Questionnaire (NCQ) measures eight noncognitive variables and has been shown to be reliable in some studies for predicting academic success of ethnic minorities. The question was, could the NCQ be used to discriminate between successful and unsuccessful students, thus aiding the admissions process.

The NCQ was administered to 93 first time freshman EOP students entering Humboldt State University during the fall semesters of 1995 and 1996. Data on first semester GPA, number of credit hours completed, gender and ethnicity were included along with the NCQ in the analysis. The data were grouped by GPA, gender and ethnicity, then analyzed using discriminant analysis, stepwise multiple regression and analysis of variance. One purpose of the study was to describe the study population in a case study design. Another purpose was to determine if such information was useful to develop intervention and support programs.

The NCQ failed to discriminate between high and low GPA groups. Stepwise Multiple Regression did not demonstrate a significant relationship between GPA and the variables measured. However, students who performed better academically took fewer than 14 credit hours. White EOP students had higher GPAs than did ethnic minorities.

EOP students who performed less well academically had coursework overloads. The results did not support a noncognitive admissions model. The complex noncognitive phenomena were not adequately addressed using the NCQ. Future research should look at other ways to examine such variables. It is recommended that portfolios and personal interviews be considered for use and evaluation.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

History of the Problem

College admissions have historically been a competitive process. The more prestigious colleges and universities traditionally have had many more applicants than available resources would allow them to reasonably handle. Admission standards are selected to discriminate among the applicants in terms of their potential for success (Crouse & Trusheim, 1988).

In the 1960s and early 1970s many universities and colleges adopted open door policies to provide access to historically underrepresented groups. The State of California, in 1969, adopted a policy and provided program funds for underrepresented or educationally disadvantaged groups through a program called The Educational Opportunity Program (EOP). The program has been in existence for 28 years on the campus of Humboldt State University. It has remained very close to its original mission as outlined in the enabling legislation. The focus of EOP is not exclusively on underrepresented ethnic minorities. Its primary focus is to provide admission and retention activities to all students who are first generation college students, who come from a family that meets the U.S. federal poverty guidelines and who do not meet regular

admission standards or are considered to be at risk academically (see Appendix A).

Students who meet EOP guidelines for special admit status will often be low in standard scores (such as the SAT) used by universities and colleges as predictors of academic success. The variables used by EOP screening committees include those such as level of disadvantage (i.e., socioeconomic status), age of applicant, whether or not the student is a first generation college student, et cetera. However, high school GPA and SAT scores are also used in evaluating EOP applicants' ability to succeed academically (see Appendix B). The use of these standardized cognitive variables as predictors of academic success can often, for students with low scores, result in their being rejected for admission.

Jones and Grieneeks (1970), in a study at the University of Texas, Austin, where several variables (including self-concept of ability) were used to predict GPA, found that self-concept of ability was a more reliable predictor of academic success than was the SAT score. It is apparent from a review of the literature on dropouts that there is a significant relationship between cognitive test scores and academic success for the general student population (Tinto, 1975). However, for disadvantaged students and particularly for Black students, self-perception of ability to succeed (positive self-concept) and motivation to succeed provide a better basis for prediction of academic achievement than do standardized measures of intelligence (Fry & Coe, 1980;

Morse, 1963; Rushland & Feld, 1977). In addition, Rosenthal and Jacobson (1968) contend that grades do not predict minority student future academic performance because teachers tend to have

lower expectations of minority students and, as a consequence, they will have lower grades that are not reflective of their true academic capability.

Thompson (1971) conducted a study comparing disadvantaged college students with regularly admitted college students. She found that some noncognitive variables (including self-esteem) were valuable as predictors of success for disadvantaged students. According to Fitts (1972) there should be a positive relationship between success and self-concept. However, Martel and Richman (1985), in a longitudinal study, concluded that self-concept was a poor predictor of academic success. While results of studies using different populations and different measures of self-concept create confusion in the study of self-concept as it relates to successful behavior, enough evidence exists to suggest that a positive self-concept is important in achieving academic success (Martel & Richman, 1985).

Sedlacek (1989) and Tracy and Sedlacek (1985) have described eight noncognitive variables that when used in conjunction with one another are valid predictors of academic success for minority students: (1) positive self-concept, (2) understands and deals with racism, (3) realistic self-appraisal, (4) prefers long-range goals to short-term or immediate needs, (5) availability of a strong support person, (6) successful leadership experience,

(7) demonstrated community service, and (8) nontraditional knowledge

acquired in a field.

Statement of the Problem

Fitts (1972) reported approximately 90 studies using the Tennessee Self-

Concept Scale to predict academic success. Very few of the studies Fitts

reviewed dealt with college students and fewer yet dealt with disadvantaged

students. One of the problems in evaluating studies involving self-concept is

the ambiguity in the definition of self-concept (Knapp, 1975).

Self-concept is also measured in as many ways as there are definitions.

There are global measures of self-concept and specific measures of self-

concept. Locus-of-control measures also fall into the category of self-concept.

The logic of the idea that a positive self-image should lead to successful

behavior somehow gets lost in attempting to measure accurately and reliably

the concept of self-image. The results of studies relating self-concept to

academic success are inconclusive. Daly (1972) found that neither ACT scores

nor self-esteem were predictive of academic success. Nichols and Schauffer

(1975) reviewed 15 studies dealing with self-concept and academics and found

that among those dealing directly with predicting success only one-half

reported positive findings. They also reported, in a study they conducted on

college women, that the evidence for a self-concept/academic performance

relationship is so inconclusive that perhaps other noncognitive variables might

be better predictors of academic success. Fekrat (1969) found self-concept to be positively and significantly related to academic success as measured by GPA. Smith (1972) also found a positive relationship between self-concept and academic success among a group of specially admitted Black students at the University of Pittsburgh. She also concluded that SAT scores for this group were not predictive of success as measured by quarterly grade point.

Coupled with the problems of variability in self-concept measures and the variability in populations tested is the fact that from 1980 forward there have been very few studies on self-concept and academic achievement, especially among disadvantaged students (Martel & Richman, 1985). Martel and Richman's own conclusions from their longitudinal study of specially admitted students at 19 independent colleges and universities across the state of New York were that no relationship exists between self-concept and two measures of academic success. The researchers also concluded that further study using different measures of self-concept (different than the Tennessee Self-Concept Scale) would be useless, especially in light of the high reliability and validity of the Tennessee Self-Concept Scale and its high correlation with other measures of self-concept.

The conclusions and recommendations of Martel and Richman (1985) are not unreasonable considering the exhaustive literature review they conducted and the extensive nature of their own study. The researchers did not, however, imply that the population they studied would represent other

populations of disadvantaged students in other locations, nor did they suggest that other noncognitive measures may exist that could be useful in predicting academic success.

Sedlacek and Brooks (1976), Sedlacek and Pelham (1976), Sedlacek and Webster (1978), and Tracey and Sedlacek (1987a) have extensively studied the problem of predicting academic success in college for minority students. They conclude that usual cognitive measures such as SAT scores and high school GPA are poor predictors. They also further conclude that self-concept, when combined with seven other non-cognitive measures, will be useful in predicting academic success of minority students.

EOP students at Humboldt State University in Arcata, California, are not exclusively minority students. They are low income, first generation college students who are considered to be at risk academically. These students constitute a unique group. Applicants to Humboldt State University seeking special admit status through EOP may be turned away due to low SAT scores and low high school GPA if they cannot demonstrate their potential to succeed in other ways.

The problem is that there is a unique group of students applying for admission to Humboldt State University under special admit status and standard cognitive measures of potential for success are being used as part of the screening process. There are students who may be screened out and low standard scores may contribute to the situation.

Purpose of the Study

The first purpose of this study was to investigate if the eight variables in the Noncognitive Questionnaire (NCQ) (see Appendix D for a copy) developed by Sedlacek and Brooks (1976) and later modified by Tracey and Sedlacek (1986) and the variable number of units taken could be used to discriminate between successful and unsuccessful EOP students. The eight variables of the NCQ are (1) positive-self-concept, (2) understands and deals with racism, (3) realistic self-appraisal, (4) prefers long-range goals to short-term or immediate needs, (5) availability of a strong support person, (6) successful leadership experience, (7) demonstrated community service, and (8) nontraditional knowledge acquired in a field.

A second purpose of the study was to investigate if the eight variables in the NCQ, the variable number of units taken and the variable GPA could be used to discriminate between males and females in the study population. A third purpose of the study was to investigate if the eight variables in the NCQ, the variable number of units taken, and the variable GPA could be used to discriminate among the various ethnic groups in the study population.

Research Questions

For the purpose of this study the research questions were:

1. Is it possible to use the eight variables in the NCQ and the variable
    number of units taken to discriminate between successful and
    unsuccessful EOP students at HSU?

2. Is it possible to use the eight variables in the NCQ and the variable
    number of units taken to discriminate between males and females in the
    study population?

3. Is it possible to use the eight variables in the NCQ and the variable
    number of units taken to discriminate among the ethnic groups defined
    in the study population?

4. Do males and females in the study population differ from one another
    with regard to GPA?

5. Do ethnic groups as defined in the study differ from one another with
    regard to GPA?

Significance of the Study

Members of ethnic minority groups lag far behind the majority
population in terms of educational attainment largely due to the fact that,
disproportionately, minorities are underprepared to enter college because they
have been the victims of long-term educational disadvantage (Astin, 1982;
Lang, 1988; Reed & Hudepohl, 1983; Willie & McCord, 1972). This is an

historical trend that has made some changes in recent years that include modest gains for minorities, but there is no major improvement in the areas of acceptance or success of minorities in institutions of higher education. Their retention and graduation rates lag far behind those of the dominant society's (Lang, 1988).

Across the United States, institutions of higher education and the federal and state legislatures have responded to this need by providing programs and opportunities aimed at underrepresented minority groups (Cross, 1972; Kulik, Kulik, & Shwalb, 1983; Roueche & Roueche, 1977; White & Bigham, 1982). These efforts, while not massive, have managed to make a difference in the lives of some individuals since the late 1960s when many such programs were initiated. Efforts to increase the admission, retention, and graduation rates of underrepresented minorities need to be evaluated and modified because, despite such efforts, the retention and graduation rates for high-risk students nationwide remain far below that of students in general despite higher education's best programmatic efforts (Jones & Watson, 1990; Princes, 1990).

If California is going to have higher education for all and develop special programs to assist special populations to gain admission, they need to find more appropriate methods to help determine which students from such populations may be successful. Specially admitted students at colleges and universities are considered high risk in terms of their ability to succeed academically. While noncognitive variables are used in selecting students for

special admit status, standard cognitive variables such as high school GPA and SAT scores will also be considered and will have a discriminating effect that will sometimes result in some special admit applicants being rejected.

Many studies have been conducted to find noncognitive variables that could be used as predictors of success. These studies have met with varying results (Carstens, 1993; Robinson & Cooper, 1984; Trippi & Stewart, 1989). Consequently, the results are inconclusive. The Noncognitive Questionnaire developed by Sedlacek and Brooks (1976) and later modified by Tracey and Sedlacek (1986), while proving to be reliable and valid for minority students, has not been demonstrated to be useful in predicting the academic success of students in the unique category of EOP special admit as defined by California State University (CSU) guidelines. As a consequence, students who may not meet regular admission requirements do not have a reliable objective method for assessing their potential for academic success. If the Noncognitive Questionnaire can prove to be useful in discriminating between successful and unsuccessful EOP admitted students, the EOP staff will be better equipped by having the potential to utilize appropriate noncognitive tests in their admission decision-making process.

Another possible result of this study is the potential development of early intervention projects or programs. If, for example, the Noncognitive Questionnaire should prove to be useful in discriminating between successful and unsuccessful EOP students, it would be likely that the EOP staff would

develop high school leadership projects or self-assessment instruments should such variables prove to be significant.

In addition, universities in other states who are examining their admissions policies may wish to consider appropriate noncognitive instruments as part of their overall admission decision-making process. If the Noncognitive Questionnaire is shown to be useful in discriminating between successful and unsuccessful EOP students at Humboldt State University, these institutions may wish to test it to see if the questionnaire can also be useful in their admissions process.

Definition of Terms

EOP student: A student admitted to Humboldt State University under the special admit category as defined by Humboldt State University and EOP guidelines.

Successful EOP student: A grade point average of 2.0 or better for one semester in an undergraduate curriculum of twelve or more semester units.

Unsuccessful EOP student: A grade point average of less than 2.00 for one semester in an undergraduate curriculum of twelve or more semester units.

Noncognitive variables: The eight variables described by William E. Sedlacek and used in the Noncognitive Questionnaire.

Positive self-concept: Strong self-feeling, strength of character, determination independence.

Understands and deals with racism: Realist based upon personal experience of racism. Is fighting to improve existing system. Not submissive to existing wrongs, nor hostile to society, nor a "cop-out." Able to handle racist system. Asserts school or organization role to fight racism.

Realistic self-appraisal, especially academic: Recognizes and accepts any
deficiencies and works hard at self-development. Recognizes need to
broaden his/her individuality.

Prefers long-range goals to short-term or immediate needs: Able to respond to
deferred gratification.

Availability of a strong support person: Someone to turn to in a crisis.

Successful leadership experience in any area pertinent to his/her background:
Demonstrated community service. Has involvement in his/her cultural
community.

Nontraditional knowledge acquired in a field: Demonstrates knowledge of
his/her culture. Unusual and/or culturally related ways of obtaining
information and demonstrating knowledge. Field itself may be
nontraditional.

Units: The credit hours associated with HSU classes.

Literature Review

This section provides a basis for the study by examining the literature

on college admission practices. Cognitive factors and noncognitive factors are

reviewed. Particular emphasis is placed on examining nontraditional college

students and on nontraditional admission practices. The focus is on the

literature as it relates to predicting college student academic success and in

particular on noncognitive measures as they may be used as predictors.

At the turn of the 20th century several colleges and universities on the

eastern seaboard met to discuss their divergent admissions policies in an effort

to establish a single comprehensive essay exam which tested knowledge in

various subjects. The tests would be developed and evaluated by a single

group of examiners. These colleges formed the College Entrance Examination Board which developed what they termed achievement tests. These tests measured students' levels of knowledge acquired in specific subject areas and were developed by instructors in those specific fields.

In 1926, the College Board began to administer the Scholastic Aptitude Test (SAT) which abandoned the idea of knowledge acquired in a specific field in favor of the idea of broad math and verbal skills acquired over a period of time. The SAT was also an objective test which could be scored easily by clerks (Simon, 1978). The College Board along with others in 1947 established the Educational Testing Service (ETS) so that it could assume the role of administering the SAT and developing new tests in an effort to provide colleges with a standardized method to restrict college admission (Crouse & Trusheim, 1988).

Selective admissions policies became widespread after World War II when large numbers of qualified students began making application (Irby, 1978). Academic preparedness, taking the right sequence of high school courses, obtaining above average grades and scoring high on standardized tests (as general measures of broad knowledge) are typical of what admissions personnel consider good predictors of potential college academic performance. The most common purpose in establishing admission requirements was to assure the entry of students who had the capability to complete their educational program successfully (Quann & Associates, 1979).

Cognitive Factors

Cognitive factors have been utilized in many studies and have demonstrated that they are useful in predicting academic success as it is variously defined (Astin, 1982; Carney & Geis 1981; Lavin, 1965; Merritt, 1972; Wheeler, 1971). In a study examining the prediction of college student GPA over a 4-year period at Murray State University in Murray, Kentucky, it was concluded that ACT sub-tests and composite scores were predictive of cumulative GPA (Rowan, 1978). Richards and Lutz (1968) and Bauer, Mehren, & Vinsonhaler (1968) agreed that pre-college cognitive factors are the single best predictors for academic success, even when noncognitive factors are included in the study.

Such selective admission practices that utilize standardized tests, high school grade point average, high school class standing, and appropriate course sequences have been criticized as culturally inappropriate and racially biased in part because they were normed on middle class White males (Sedlacek, 1989). Manning (1989) cites several studies that clearly demonstrate the discrepancy between minority and White students in standardized test scores, even when similar socioeconomic variables are considered. He further states that personal qualities such as demonstrated ability to overcome adversity should be used in the admissions process and that using such criteria would be a fair way to account for the inherent discrepancy in standardized test scores such as the SAT.

Hall and Coates (1973), in a study comparing regular admit students with students who were financially disadvantaged and were participants in one of several special programs, found that using the SAT to predict first year GPA or first year persistence was inadequate, leaving between 78% and 97% of the variance unaccounted for. In fact, in one conclusion, the researchers stated that "there is much valid criticism on the part of financially disadvantaged Anglos and minorities who claim that the present system for selection is inadequate" (p. 16). The use of standard admission procedures for students from underrepresented minority groups is unreliable, and other measures of potential for academic success for such students need to be evaluated.

Noncognitive Factors

In a study on tribal college admissions, Boham (1991) concluded that students who were admitted under the ability-to-benefit criteria were able to complete college programs successfully. The ability-to-benefit admission criteria utilize a subjective assessment of an applicant's ability to benefit from a college education based on unmeasured noncognitive factors. This assessment was applied to applicants who otherwise would have been denied admission based on their prior academic and cognitive factor performance.

Noncognitive factors, which include personality characteristics, have been the focus of research in conjunction with prediction of academic performance for several decades. In one early study, Hackett (1955),

recommended that personality variables be included along with cognitive variables for predicting academic success. His study examined college freshmen and predicted college quality point average (QPA) using the Hypomania Scale (Ma) from the Minnesota Multiphasic Personality Inventory (MMPI) and scores from the American Council Psychological Examination (ACE) to predict freshman QPA.

In a study predicting freshman GPA using the Edward's Personal Preference Schedule (EPPS), Michael, Haney, and Jones (1966) found a positive relationship between the Order Scale and a negative relationship between GPA and the Autonomy Scale of the EPPS. Utilizing a combination of cognitive and noncognitive variables, Szabo and Feldhusen (1970) also found that certain personality variables were positively correlated with freshman and sophomore academic success, as defined by GPA.

Abrams and Jernigan (1984), in a study comparing noncognitive factors and standard admissions criteria (which included the SAT) with a group of students who were considered to be at risk academically, found that there was no correlation between standard admissions criteria and the defined variables associated with academic success and the population they were studying. In fact, the noncognitive variables were more predictive of academic success than were the SAT and other cognitive variables.

Snowman, Leitner, Snyder, and Lockhard (1980) examined if the Descriptive Tests of Language Skills, designed to diagnose language and

reading skills, could improve on the predictive value of the ACT. The study population was drawn from academically underprepared students who were admitted to the university through one of its special admit programs. Stepwise multiple regression was employed to investigate any possible linear correlations. The ACT and the Descriptive Tests of Language Skills when correlated with fall and spring semester GPAs were found to have no practical significance, accounting for only 13% and 4% of the variance, respectively.

Astin (1982) discusses the severe underrepresentation of minorities in institutions of higher education in the United States. He accounts for the underrepresentation by examining many factors, including college and university admission policies, which Astin says are inappropriate models for use with minorities largely because standardized tests used in the admission process are biased. Duran (1986) found in a study on Hispanic college student achievement that high school GPA, standardized admission test scores, and the combination of both sets of scores were less predictive of early college grades among Hispanics than among White non-Hispanics.

Carstens (1993), in a study utilizing the Noncognitive Questionnaire to predict persistence and graduation of high risk students, found a relationship between several independent variables: (1) positive self-concept, (2) availability of a strong support person, (3) community involvement, (4) non-traditional knowledge acquired in a field, and (5) prefers long range goals and the dependent variables persistence and graduation. While five independent

variables in the Noncognitive Questionnaire were predictive of persistence and graduation of special admit students in the Carstens study, he also recommended that further study on special admit populations was essential in order for institutions of higher education to attain valid and reliable methodologies for selecting high risk candidates with potential.

In a study using the Noncognitive Questionnaire, White and Sedlacek (1986) tested its validity in predicting GPA and persistence of a sample of 58 specially admitted freshman students at the University of Maryland. The results using stepwise multiple regression were significant for predicting second, third, and fourth semester GPA with multiple correlation's reported of .81, .73, and .74, respectively.

Sedlacek and Adams-Gaston (1992) looked at incoming student athletes and used stepwise multiple regression to evaluate the predictability of fall semester grades using the Noncognitive Questionnaire. The independent variables of positive self-concept, realistic self-appraisal, having a strong support person available, and community involvement were demonstrated to be statistically significant with correlation's reported of .29, .25, .32, and .24, respectively. In addition, the authors examined SAT scores and found them not to be predictive of first semester GPA for student athletes.

Rehberg and Schaffer (1968), in a study examining the characteristics of successful student athletes, discovered that such characteristics as positive self-concept, demonstrated community service, leadership and realistic self-

appraisal are common characteristics of such academically successful student athletes. Boyer and Sedlacek (1988), in a study predicting persistence and cumulative GPA of international students, examined the records of 248 new international students enrolled at the University of Maryland in the fall of 1981. The Noncognitive Questionnaire was administered and the students were followed over a 4-year period. The SAT was not shown to be predictive of persistence or cumulative GPA, and the NCQ was moderately correlated.

Summary

The results of studies predicting academic success have met with varying results. The review of the literature indicated that there was no single definitive method that is best to assess student's potential for academic success. The variables involved are complex and the results are not conclusive. However, studies have made it reasonably clear that standard admission procedures are at least inadequate when applied to special populations of college students.

Specially admitted students at colleges and universities are considered high risk in terms of their ability to succeed. While noncognitive variables are used in selecting students for special admit status, standard cognitive variables such as high school GPA and SAT scores will also be considered and will have a discriminating effect that will sometimes be the reason that some special admit candidates will not receive admission. There are many studies

that have examined standard admission procedures and the recommendations invariably suggest that institutions of higher education abandon inappropriate standard admission procedures where ethnic minorities are concerned and that they adopt more valid and reliable methodologies (Crouse, 1985; Fuller, McNamara & Green, 1978; Tracey & Sedlacek, 1985).

Many studies have been conducted to find noncognitive variables that could be used as predictors of success for minority college students (Crouse, 1985; Crouse & Trusheim, 1991; Narin, 1980; Owen 1985; Sedlacek & Brooks, 1976; White, 1985; White & Sedlacek, 1986). The results of such studies are inconclusive. The Noncognitive Questionnaire, while proving in some studies to be reliable and valid for minority groups, has mixed results. There are virtually no consistent measures demonstrated in the literature to adequately assess academic potential, especially for at-risk students. As a consequence, students who do not meet regular admission requirements do not have a reliable objective method for assessing their potential for success. Furthermore, EOP programs and other programs similar to EOP do not have a reliable and valid instrument to assist them in evaluating program proposals or in assessing the potential of incoming EOP candidates.

CHAPTER 2

METHODS

Design of the Study

The study of EOP, special admit, first-time freshmen at Humboldt State University used a case study design. This study has the appearance of a double blind, quasi-experimental, post-hoc design. However, since the purpose was to describe a population involved in an instance of action, and not to generalize to a larger group, it is classified as a particularistic study of a bounded population and was appropriate for the case study design. The particularistic case study is an especially good design for practical problems, questions, and situations arising from everyday practice. Particularistic case studies are problem-centered and small-scale endeavors that assist groups of people to confront specific problems in a holistic way (Merriam, 1988). This study examined selected characteristics of the entire population of first-time freshmen EOP students who have completed 12 or more units of undergraduate course work during the fall semesters of 1995 and 1996 at Humboldt State University. The intent was to utilize the Noncognitive Questionnaire to describe this population and to use the analysis for possible

future placement of applicants into successful and unsuccessful groups, thus aiding in the admissions decision-making process.

<u>Population</u>

The population of this study consisted of 93 full-time undergraduate first-time freshman students who received special admits as recommended by EOP to Humboldt State University during the fall semesters of 1995 and 1996. This study evaluated and described several noncognitive characteristics of the population that may be related to academic success. It is instructive, when examining such characteristics, to appreciate the context in which the study population is situated.

Humboldt State University is one of 22 campuses in the California State University system (see Appendix C). It is located 270 miles north of San Francisco in the California Redwood Forest and on the Pacific Ocean. San Francisco is the closest metropolitan area; as such, Humboldt State University is considered to be rural and isolated. There are approximately 7,100 students enrolled at HSU in any given semester. There are approximately 670 permanent, part-time, and temporary faculty. With variation in number of courses being offered and number of students enrolled, there is an average of 16 students in an individual class. Traditionally, Humboldt State University is known for its sciences and natural resources programs. It has, in the past decade, strengthened its diversity in the areas of humanities, fine arts, and

business (HSU Catalogue, 1995-96). The study population was a subset of a larger population of students who meet federal income eligibility guidelines for Student Support Services (SSS) in which not all eligible students participate. There were 1,132 students enrolled at HSU during the 1995-96 academic year that met the low-income guidelines for SSS eligibility. In addition, there were 760 students that met both the low-income guidelines and were also first generation college students, 11.4% of the entire HSU undergraduate student population.

Based on national college participation and completion rates, comparing figures with federal income classifications, students who are from families with an annual income of below $22,033 are 75% less likely to complete college than are students from families with an annual income of above $67,881, 21% and 96% completion rates, respectively (U.S. Office of Education, 1995). At Humboldt State University, 98% of SSS eligible students are from the highest risk income group and are projected to have a less than 21% chance of graduating from college. Low-income students at Humboldt State University are also disproportionately underrepresented ethnic minorities. In the fall of 1995, not only were underrepresented ethnic minorities disproportionately represented in the low-income category, but they were also disproportionately represented among those students who required academic remediation. Table 1 provides this data.

Table 1.   Remediation rates of students entering fall 1995.

| | Remediation Rates | | | |
| | | | % Who Need Remediation | |
Ethnicity	New Students	% Low-Income	English	Math
African-American	28	64.3	29	46
Chicano/Latino	162	58.6	25	48
S.E. Asian/Pacific Islander	56	50.0	27	46
Native American	60	48.3	20	38
White	1262	21.9	9	29
All HSU	1870	24.7	10	25

First-generation college students often lack sophistication with regard to the bureaucratic nature of the university system. They also are at a loss when it comes to interpreting the unwritten system. As a result, they find it difficult to accomplish tasks such as registering for classes. The support and familiarity of the university system comes from family and other network systems. For first-generation college students, these support and network systems are often non-existent.

Low-income, first-generation college students often have feelings of isolation on campus and in the community. Humboldt State University is remotely located compared to the other campuses of the California State University (CSU) system. It is located in Arcata, California, which has a population of 16,400. The local community and the university are approximately 90% White. Consequently, the rural isolation is compounded by

cultural isolation among students of color. When students of color leave home to attend HSU, many embark on their first significant experience in a community, in a college and in a classroom in which there are few people who share their cultural background. They become isolated not only from their family and friends, but also from others who can share and affirm their cultural identity. The combination of cognitive and noncognitive factors that characterize the population of SSS eligible students can result in poor academic performance. This is particularly true for students who exhibit a combination of risk factors.

The description of the population from which the study group was selected is instructive with regard to understanding the context within which the study group was located. This description includes all SSS eligible students. In general, they are low-income and first-generation college bound. They need academic remediation, especially in math and English, speak a native language other than English, and are members of an ethnic minority group. They also have traveled some distance from home to attend HSU, have feelings of isolation, and are likely to have academic difficulty.

The study population was characteristic of the overall SSS eligible student population, but they constituted a unique group. The group numbered 93 and consisted of only first-time freshmen who were EOP participants. They were also exclusively specially admitted and were enrolled for 12 semester

units or more. They are not a sample but a bounded population.

Consequently, no sampling technique was employed.

Methods of Collecting Data

The NCQ was administered to the study population by the EOP staff

counselors during required academic advising sessions held the first six weeks

of the fall semesters of 1995 and 1996. Students returned the completed

questionnaire in sealed envelopes, and EOP counselors were unaware of any

individual student Noncognitive Questionnaire results. The student's social

security account number was listed on a tear-away sheet stapled to the front of

the envelope. The EOP counselors stored sealed results until grades were

available via computer on the university's banner database system. When

semester grades became available the EOP counselors accessed grades using

the student-provided social security account number on the tear-away sheet.

The semester GPA and the total number of units attempted were then

recorded on the sealed envelope itself and the student identifier (the social

security account number) was removed. The grade point average earned at

the end of the fall semesters of 1995 and 1996 was used to determine group

membership (see Appendixes E and F for participant letter and instruction

form). Students receiving a 2.00 grade point average or better for at least

12 semester units attempted were placed in the successful EOP student group

and students receiving a less than 2.00 grade point average were placed in

the unsuccessful EOP student group. Number of semester units completed

and semester GPA were collected from the Admissions and Records Office at

Humboldt State University and are subject to the confidentiality of the Freedom

of Information Act. The NCQ was scored according to the scoring key

developed for the NCQ. The supplementary work sheet aided in tabulating

scores for analysis (see Appendixes G and H). In addition to scores on the

Noncognitive Questionnaire and university academic data, data were also

collected on (1) gender, (2) age, (3) ethnicity, and (4) parent's occupation.

Statistical Methods

For the purposes of this study, there were three separate statistical

methods employed to analyze the data: (1) discriminant analysis, (2) analysis

of variance and (3) step-wise multiple regression.

Discriminant Analysis

Discriminant analysis is a statistical procedure that analyzes several

variables together in order to determine if the combination of variables can be

used to predict predefined group placement of individual cases. Stepwise

discriminant analysis systematically adds variables into a regression equation

determining statistical significance using Wilks's lambda and partial F. The

stepwise process finds the variable with the greatest univariate discrimination

among several variables. The procedure then pairs this first variable with the

other variables one at a time until the combination that produces the greatest

discrimination is found. The pair of variables are then coupled with the next

added variable, one step at a time, until the next variable adds a significant

contribution to the equation. This continues on until all the independent

variables have been tested and no further sufficient contribution is made

(Klecka, 1980).

Discriminate analysis was appropriate for this study since there are two

groups defined: (1) successful EOP students and (2) unsuccessful EOP

students. Discriminate analysis was also appropriate for this study since it

analyzes combinations of variables at one time and separately to determine

possible group membership. In the stepwise process variables are entered and

eliminated from the equation based on their ability to make a unique

contribution to predicting group membership (Klecka, 1980). Discriminate

analysis does not utilize hypothesis testing. Rather, it requires the researcher

to make meaningful decisions about the data and to impose sense on it (Conti,

1993).

Analysis of Variance

Analysis of variance (ANOVA) is a statistical procedure that examines

the means of two or more groups simultaneously among one or more variables

or treatments. The statistic tests the variation among means in order to

determine if differences can be attributed to factors other than chance. Total

error variance (variations of individual cases about the grand mean) can be

algebraically broken down into within-group variation, between-group variation,

and treatment variation. Variation not accounted for by within-group and between-group error estimates can be attributed to the treatment. ANOVA uses the ratio of the sum of between-group error to the sum of within-group error to calculate an F value that is used along with the number of degrees of freedom to determine significance (Weiss & Hassett, 1982). The null hypothesis of no statistically significant difference among the means of the eight variables of the NCQ, the variable GPA, and the variable number of units taken by defined groups was tested. The alpha level of .05 was set to control for the probability of rejecting a true null hypothesis, thus indicating a difference where none exists (Type I error) (Khazanie, 1975). "The probability of committing this error is denoted by the Greek letter alpha and is referred to as the level of significance of the test" (p. 284). In general the following steps were used to test the hypothesis:

1.   The null hypothesis was stated.

2.   The level of significance was stated. For the purpose of this study, the level was set at the .05 level of confidence. The .05 level is adequate for the control of Type I error (Weiss & Hassett, 1982).

3.   The test statistic was analysis of variance.

4.   The statistic was computed.

5.   The null hypothesis was retained or rejected depending upon the calculated F value.

Stepwise Multiple Regression

Stepwise multiple regression is a procedure that systematically adds variables into the regression equation determining statistical significance. The stepwise process finds the best predictor among several variables and pairs the next added variable until a significant multiple correlation is found. The pair of predictor variables are then coupled with the next added variable, one step at a time, until the next variable adds a significant contribution to the prediction equation and so on until all the independent variables have been tested (Ferguson, 1981). The hypothesis of no statistically significant relationship between any of the eight variables in the NCQ, the variable number of units taken, and GPA by defined groups was tested. The stepwise regression statistic was appropriate for this study since the research project was concerned with which of the eight variables in the NCQ and the variable number of units taken provided a significant and unique contribution to predicting academic success.

In general the following steps were used to test the hypothesis:

1. The null hypothesis was stated.

2. The level of significance was set at the .05 level of confidence for a variable to be included in the regression equation. The .05 level is adequate for the control of Type I error (Weiss & Hassett, 1982).

3. The statistic was computed.

4.   The null hypothesis was retained or rejected depending upon the

calculated R^2 value.

Instrumentation

The Noncognitive Questionnaire was employed to assess the eight

noncognitive variables previously discussed. The Noncognitive Questionnaire

was developed by Sedlacek and Brooks (1976) and later modified by Tracey

and Sedlacek (1984) at the University of Maryland, College Park. The purpose

of developing the questionnaire was to provide an alternate method of

predicting college success of students in special programs admitted to the

University of Maryland (Sedlacek & Brooks, 1976). The Noncognitive

Questionnaire has been used in numerous studies since its development

(Boyer & Sedlacek, 1988; Carstens, 1993; Tracey & Sedlacek, 1984, 1985,

1987b; Young & Sowa, 1992). Reliability and validity of the Noncognitive

Questionnaire have been tested by Tracey and Sedlacek (1984) and they

report a test-retest reliability coefficients ranging from .70 to .94 and a median

coefficient alpha of .83 (Sedlacek & Adams-Gaston, 1992). Tracey and

Sedlacek (1984) found support for construct validity for the NCQ using factor

analysis. It yielded eight factors that closely approximate the dimensions on

the NCQ. The NCQ items were combined in the eight subscales with alpha

coefficients: (1) Self-Assessment of Motivation (.56), (2) Perseverance (.82), (3)

Leadership (.66), (4) Academic Self-Concept (.55), (5) Long-Range Academic

Goals (.58), (6) Community Service (.39), (7) Support of Academic Plans (.57), and (8) Expected Racial Difficulty (.55).

The Noncognitive Questionnaire was a Likert-format scoring device that asked those taking the questionnaire to score 18 items on a one to five scale as to whether they strongly agree, agree, are neutral, disagree, or strongly disagree. In addition to the 18 Likert-type items, the Noncognitive Questionnaire had two multiple choice items on educational aspirations and three open-ended items pertaining to current goals and past accomplishments.

In this study, in order to assure reliability of the open-ended items the method of triangulation was employed. Two different raters analyzed the three open-ended items, and the inter-rater reliability coefficient (Pierson r) was calculated at 0.94.

CHAPTER 3

RESULTS

Descriptive Statistics

There were a total of 114 EOP first-time freshman students admitted to Humboldt State University during the fall semesters of 1995 and 1996. After eliminating those students who completed less than 12 semester units, there were a total of 93 cases that were used in the analysis. The average age of the population studied was 19.1 years with a range of 17-47. There were 47 males and 46 females in the population. Students of Hispanic (non-White origin) were the most numerous at 39, White students were second with a total of 19, Black students were third with a total of 8, Asian students had the fourth largest population with a total of 12, American Indian students numbered 9, and students who declared other numbered 6. The mean, standard deviation, and range of the eight variables in the NCQ, the variable number of units taken, and the variable GPA for the study population are reported in Table 2.

Table 2.   Mean, standard deviation, and range of all variables under
             consideration for study.

Variable	Valid N	Mean	Minimum	Maximum	Std. Dev.
Age	93	19.51	17	47	4.31
Grade point average	93	2.80	1.2	4	0.63
Enrolled units	93	15.58	12	25	2.88
Self-concept	93	3.32	2	4	0.55
Ethnicity	93	3.34	2	5	0.70
Self-appraisal	93	3.80	2	5	0.54
Long-range goals	93	2.98	2	4	0.63
Strong support person	93	4.35	2	5	0.70
Leadership experience	93	3.06	1	4	0.67
Community service	93	3.12	1	4	0.73
Knowledge acquired in field	93	2.14	1	3	0.67

The number of units taken was collected in order to determine if a

student was full-time (12 units or more) or not. The number of units taken was

included in the analysis because initial observation of the data suggested that

a possible inverse relationship existed between semester GPA and number of

units taken.

Discriminant Analysis

In this study discriminant analysis was used to determine which, if any,

of the variables used in the NCQ and the variable number of units taken would

contribute most to identifying and describing which students were successful

and which students were unsuccessful. Due to a large difference in the number

of cases between the two groups (85 successful students and 8 unsuccessful

students) the analysis was conducted using the top 15% of students and the bottom 15% of students. These groupings were calculated using GPA scores above and below one standard deviation from the mean of both groups combined. The cutoff point for the top 15% was a GPA of 3.43 and the cutoff point for the bottom 15% was a GPA of 2.17. The mean GPA for all cases was 2.80 and the standard deviation was 0.63.

The number of males and females in the study was nearly evenly split with 47 cases being male (50.5%) and 46 cases being female (49.5%). This frequency distribution suggested two groups for analysis that did not have a large disparity of cases between them. The ethnicity classification had six groupings: Blacks (8), Whites (19), Asians (12), Hispanics (39), American Indians (9), and Other (6). While the Hispanic group was nearly as large as all the other ethnic groups combined, Klecka (1980) does not suggest that this type of uneven distribution is a problem in analysis as long as the assumptions of multi-colinearity and normal distributions are not significantly violated. The pooled within-group correlation matrix of predictor variables was examined and for the groups being tested. Within-group correlations can have an effect on multivariate analysis (Norusis, 1988).

Three separate discriminant analyses were run: (1) NCQ scores on the eight variables and the variable number of units taken using the two groups, top 15% and bottom 15% of GPA, as the grouping variable, (2) NCQ scores on the eight variables and the variable number of units taken using

gender as the grouping variable, and (3) NCQ scores on the eight variables and the variable number of units taken using ethnicity as the grouping variable.

The stepwise method of discriminant analysis was used to examine the groupings described above. The stepwise method is used to determine which of the eight variables from the NCQ and the variable number of units taken are most useful in assigning to which group an individual case likely belongs. The Wilks's lambda takes into consideration both within group homogeneity and between group differences. The Wilks's lambda score will be between 0 and 1 and low Wilks's lambda values are inversely related to high F values calculated for significance (Klecka, 1980). The variables were selected or removed from the equation based on their Wilks's lambda score. The structure matrix contains the coefficients that show the similarity between each individual variable and the total discriminant function and lists the variables that have the strongest relationship with the discriminant function (Klecka, 1980, p. 31). The variables with the highest coefficients are used in naming the discriminant function and coefficients with a value of .30 and above are included.

Discriminant Analysis with High GPA and Low GPA

In this study, the eight variables from the NCQ and the variable number of units taken were analyzed to determine if they could be used to discriminate between students with a high GPA and a low GPA. The high GPA group

contained 14 cases and the low GPA group contained 18 cases for a combined total of 32 cases. The within-group correlation coefficients are presented in Table 3.

Table 3.   Pooled within-groups correlations for high and low GPA groups.

Variable	Units	Self-C.	Race	Self-A.	L.R.G.	S.S.	Ldrshp	C.S.	Knw. F.
Units	1.00	-0.02	-0.25	0.09	-0.10	0.05	0.13	-0.33	0.11
Self-C.	-0.02	1.00	0.37	0.02	0.41	0.14	0.38	0.36	0.33
Race	-0.25	0.37	1.00	0.07	0.11	0.20	0.37	0.37	0.26
Self-A.	0.09	0.02	0.07	1.00	0.33	-0.10	0.40	0.24	0.22
L.R.G.	-0.10	0.41	0.11	0.33	1.00	0.09	0.41	0.25	0.42
S.S.	0.05	0.14	0.20	-0.10	0.09	1.00	0.23	0.45	0.45
Ldrshp	0.13	0.38	0.37	0.40	0.41	0.23	1.00	0.53	0.50
C.S.	-0.33	0.36	0.37	0.24	0.25	0.45	0.53	1.00	0.46
Knw. F.	0.11	0.33	0.26	0.22	0.42	0.45	0.50	0.46	1.00

Key

Units	Enrolled Units	S.S.	Strong Support Person
Self-C.	Self-Concept	Ldrshp	Leadership
Race	Race	C.S.	Community Service
Self-A.	Self-Appraisal	Knw. F.	Knowledge in Field
L.R.G.	Long-Range Goals		

The variable with a Wilks's lambda low enough to be included in the analysis was number of units taken (.85). None of the other variables had a Wilks's lambda low enough to be included in the analysis. The discriminant analysis for the high GPA and low GPA groups is summarized in Table 4.

Table 4.   Summary of discriminant analysis for the high and low GPA
            groups.

Variable	Wilks's Lambda	F value	p level	R^2
Units	0.86	5.03	0.03	0.00
Self-Concept	0.96	1.26	0.27	0.00
Race	0.98	0.69	0.41	0.07
Self-Appraisal	0.99	0.19	0.67	0.01
Long-Range Goals	0.97	0.76	0.39	0.01
Strong Support	0.98	0.67	0.42	0.00
Leadership	0.94	1.95	0.17	0.02
Community Service	1.00	0.10	0.75	0.11
Knowledge in Field	1.00	0.00	0.99	0.01

Standardized discriminant coefficients were used to determine which variables were contributing most to the discrimination between students with a high GPA and students with a low GPA. The relative importance of each variable to the overall discriminant function can be determined by examining these standardized coefficients (Klecka, 1980, p. 29). In this study the variable number of units taken was the only variable included in the process of stepwise discriminant analysis. No canonical analysis was conducted in the stepwise process; hence, no standardized coefficients were obtained nor were there any coefficients obtained from the structure matrix. It is the structure coefficients that are used to name the discriminant function by expressing the degree of relationship between the individual variables under consideration and the discriminant function (p. 31). Variables with a coefficient of .30 and above are included in the process of naming the discriminant function.

A structure coefficient was not obtained for this analysis. However, since the variable number of units taken was the only variable included in the analysis, this discriminant function was named Class Load.

Another method to determine the usefulness of the calculated discriminant function is the number of cases in predefined classifications that the function accurately predicts. In order for the function to be useful it must accurately predict the correct group placement at a level 25% greater than chance. There were two groups in this analysis and the percent of cases that would be expected by chance alone to be included in the groups was 50%. Therefore, the discriminant function Class Load should have a predictive accuracy of 75% in order for it to be considered useful. The proportion of cases placed correctly in both categories, high GPA and low GPA, was 69% (8/14 for the high GPA group and 14/18 for the low GPA group). The percent increase beyond chance alone is 18%. This is below the 25% increase beyond chance required in order for the discriminant function Class Load to be considered to be useful (see Table 5 for classification matrix).

Table 5.   Classification matrix for the high and low GPA groups.

Group	Percent Correct	High GPA p = .50	Low GPA p = .50
High GPA	71.43	10	4
Low GPA	55.60	8	10

Discriminant Analysis with Gender

In this study, eight variables from the NCQ and the variable number of units taken were analyzed to determine if they could be used to discriminate between gender groups. The number of males was 47 and the number of females was 46 for a combined total of 93 cases. The within-group correlation coefficients are presented in Table 6.

Table 6.   Pooled within-groups correlations for gender.

Variable	GPA	Units	Self-C.	Race	Self-A.	L.R.G.	S.S.	Ldrshp	C.S.	Knw. F.
GPA	1.00	-0.18	-0.13	0.04	-0.12	-0.09	-0.14	0.16	0.15	0.06
Units	-0.18	1.00	0.07	0.03	0.26	0.05	-0.10	-0.02	-0.28	0.06
Self-C.	-0.13	0.07	1.00	0.42	0.19	0.27	0.20	0.23	0.24	0.12
Race	0.04	0.03	0.42	1.00	0.23	0.22	0.22	0.28	0.21	0.18
Self-A.	-0.12	0.26	0.19	0.23	1.00	0.22	0.07	0.17	0.09	0.26
L.R.G.	-0.09	0.05	0.27	0.22	0.22	1.00	0.12	0.26	0.10	0.44
S.S.	-0.14	-0.10	0.20	0.22	0.07	0.12	1.00	0.20	0.30	0.18
Ldrshp	0.16	-0.02	0.23	0.28	0.17	0.26	0.20	1.00	0.49	0.44
C.S.	0.15	-0.28	0.24	0.21	0.09	0.10	0.30	0.49	1.00	0.30
Knw. F.	0.06	0.06	0.12	0.18	0.26	0.44	0.18	0.44	0.30	1.00

Key

GPA	Grade Point Average	L.R.G.	Long-Range Goals
Units	Enrolled Units	S.S.	Strong Support Person
Self-C.	Self-Concept	Ldrshp	Leadership
Race	Race	C.S.	Community Service
Self-A.	Self-Appraisal	Knw. F.	Knowledge in Field

The variables with a Wilks's lambda low enough to be included in the analysis were realistic self-appraisal (.94) and nontraditional knowledge acquired in a field (.87). None of the other variables had a Wilks's lambda low

enough to be included in the analysis. The discriminant analysis for the male

and female gender groups is summarized in Table 7.

Table 7.   Summary of discriminant analysis for the male and female gender
            groups.

Variable	Wilks's Lambda	F value	p level	R^2
Knowledge in Field	0.86	12.85	0.00	0.07
Self-Appraisal	0.94	5.62	0.02	0.07
GPA	0.98	1.84	0.18	0.02
Units	0.98	2.38	0.13	0.07
Self-Concept	0.99	0.63	0.43	0.04
Race	1.00	0.34	0.56	0.07
Long-Range Goals	0.99	1.33	0.25	0.21
Strong Support	0.99	0.64	0.42	0.03
Leadership	1.00	0.38	0.54	0.20
Community Service	0.99	0.87	0.35	0.09

Standardized discriminant coefficients were used to determine which

variables were contributing most to the discrimination between male students

and female students. The relative importance of each variable to the overall

discriminant function can be determined by examining these standardized

coefficients (Klecka, 1980, p.29). In this study the variables realistic self-

appraisal and nontraditional knowledge acquired in a field had standardized

discriminant coefficients of -.65 and .95, respectively. These were the only

variables included in the process of stepwise discriminant analysis. Table 8

displays standardized discriminant coefficients for the male and female gender

groups.

Table 8.   Standardized discriminant coefficients for the male and female
            gender groups.

Variable	Coefficient
Knowledge in Field	0.95
Self-Appraisal	-0.65

Structure coefficients are used to name the discriminant function by
expressing the degree of relationship between the individual variables under
consideration and the discriminant function (Klecka, 1980, p. 31). Variables
with a coefficient of .30 and above are included in the process of naming the
discriminant function. The variables realistic self-appraisal and nontraditional
knowledge acquired in a field were the only variables included in the analysis
and they had structure coefficients of -.40 and .78, respectively.

Based on the structure coefficient values for the variables realistic self-
appraisal and nontraditional knowledge acquired in a field, the discriminant
function was named Cultural Introspection. The name of this function
demonstrates that nontraditional knowledge and having a realistic self-
appraisal are related to an individual's placement in either the male gender
group or the female gender group. Males scored significantly higher on the
NCQ variable realistic self-appraisal than did females, 4.0 and 3.7, respectively.
Females scored significantly higher on the NCQ variable nontraditional
knowledge acquired in a field than did males, 2.4 and 1.9, respectively.

Another method to determine the usefulness of the calculated discriminant function is the number of cases in predefined classifications that the function accurately predicts. In order for the function to be useful it must accurately predict the correct group placement at a level 25% greater than chance. There were two groups in this analysis and the percent of cases that would be expected by chance alone to be included in the groups was 50%. Therefore, the discriminant function Cultural Introspection should have a predictive accuracy of 75% in order for it to be considered useful.

The proportion of cases placed correctly in both categories, male gender and female gender, was 68% (36/47 for the male gender group and 27/46 for the female gender group). The percent increase beyond chance alone is 18%. This is below the 25% increase beyond chance required in order for the discriminant function Class Load to be considered useful. Table 9 displays the classification matrix for the male and female gender groups.

Table 9.   Classification matrix for the male and female gender groups.

Group	Percent Correct	Male p = .50538	Female p = .49462
Male	76.60	36	11
Female	58.70	19	27
Total	67.74	55	38

Discriminant Analysis with Ethnicity

In this study, the eight variables in the NCQ and the variable number of units taken were analyzed to determine if they could be used to discriminate among the ethnic groups. The number of cases in each ethnic group was Blacks (8), Whites (19), Asian (12), Hispanic (39), American Indian (9), and Other (6).

No variable had a Wilks's lambda low enough to qualify for inclusion in the analysis; consequently, none were selected and none were eliminated. This line of inquiry was abandoned.

Analysis of Variance

In this study, the eight variables from the NCQ and the variable number of units taken were used to determine if the two groups, high GPA and low GPA, differed significantly from one another on any of the eight NCQ variables or on the variable number of units taken. In addition, the eight variables from the NCQ, the variable number of units taken and the variable GPA were analyzed to determine if significant differences occurred with regard to gender and with regard to ethnicity.

Three separate analysis of variance tests were run: (1) NCQ scores on the eight variables and the variable number of units taken using the two groups, high and low GPA, as the grouping variable, (2) NCQ

scores on the eight variables, the variable number of units taken and the variable GPA using gender as the grouping variable, and (3) NCQ scores on the eight variables, the variable number of units taken and the variable GPA using ethnicity as the grouping variable.

A one-way analysis of variance was conducted to analyze the groupings described above. The one-way analysis of variance compares the mean scores between/among groups on selected variables in order to determine if a significant difference occurs. The F value is calculated using within-group error and between-group error. The variables are determined to be significant or not based on their calculated F value, the degrees of freedom and the alpha level set (Steel & Torrie, 1960).

Analysis of Variance with High GPA and Low GPA

In this study, the eight variables from the NCQ and the variable number of units taken were analyzed to determine if they differed from one another between students in the high GPA group and students in the low GPA group. The high GPA group contained 14 cases and the low GPA group contained 18 cases for a combined total of 32 cases.

The variable that had an F ratio high enough to be significant was number of units taken (F=7.01). High GPA and low GPA groups differed significantly from one another with mean number of units taken, 14 and 17,

respectively. See Table 10 for analysis of variance of all variables under consideration for the high and low GPA groups.

Table 10.   Analysis of variance for all variables under consideration for the high and low GPA groups.

Variable	SS Effect	df Effect	MS Effect	SS Error	df Error	MS Error	F	P
Units	44.79	1	44.79	267.20	30	8.91	5.03	0.03
Self-Concept	0.42	1	0.42	8.80	30	0.29	1.42	0.24
Race	0.72	1	0.72	10.16	30	0.34	2.12	0.16
Self-Appraisal	0.11	1	0.11	7.36	30	0.25	0.46	0.51
Long-Range Goals	0.20	1	0.20	11.30	30	0.38	0.53	0.47
Strong Support Person	0.61	1	0.61	17.61	30	0.59	1.04	0.32
Leadership	0.57	1	0.57	11.30	30	0.38	1.52	0.23
Community Service	0.13	1	0.13	23.87	30	0.80	0.16	0.69
Knowledge in Field	0.02	1	0.02	12.94	30	0.43	0.06	0.81

Analysis of Variance with Gender

In this study, the eight variables from the NCQ, the variable number of units taken and the variable GPA were analyzed to determine if they differed from one another between the male gender group and the female gender group. The number of males was 47 and the number of females was 46 for a combined total of 93 cases.

The variable with an F value high enough to be significant was nontraditional knowledge acquired in a field (F=9.6). Males and females differed from one another significantly with mean NCQ score for nontraditional knowledge acquired in a field of 1.9 and 2.4, respectively. See Table 11 for

analysis of variance on all variables under consideration for male and female gender groups.

Table 11.   Analysis of variance on all variables under consideration for male and female gender groups.

Variable	SS Effect	df Effect	MS Effect	SS Error	df Error	MS Error	F	P
GPA	0.34	1	0.34	35.78	91	0.39	0.88	0.35
Units	11.42	1	11.42	735.23	91	8.28	1.38	0.24
Self-Concept	0.20	1	0.20	28.12	91	0.31	0.65	0.42
Race	0.14	1	0.14	44.85	91	0.49	0.29	0.59
Self-Appraisal	0.72	1	0.72	25.79	91	0.29	2.55	0.11
Long-Range Goals	0.00	1	0.00	35.96	91	0.40	0.00	0.98
Strong Support Person	0.94	1	0.94	44.35	91	0.49	1.93	0.17
Leadership	0.18	1	0.18	41.44	91	0.46	0.39	0.53
Community Service	1.85	1	1.85	47.85	91	0.53	3.52	0.64
Knowledge in Field	3.94	1	3.94	37.24	91	0.41	9.63	0.00

Analysis of Variance with Ethnicity

The eight variables from the NCQ, the variable number of units taken, and the variable GPA were analyzed to determine if they differed from one another among ethnic groups. The number of cases in each ethnic group was (1) Blacks 8, (2) Whites 19, (3) Asian 12, (4) Hispanic 39, (5) American Indian 9, and (6) other 6. The variable with an F value large enough to be significant was GPA ($F=2.86$). See Table 12 for analysis of variance on all variables under consideration for ethnicity.

Table 12.   Analysis of variance on all variables under consideration for
            ethnicity.

Variable	SS Effect	df Effect	MS Effect	SS Error	df Error	MS Error	F	P
GPA	0.51	5	1.02	31.02	87	0.36	2.86	0.02
Units	33.49	5	6.70	731.15	87	8.40	0.80	0.55
Self-Concept	2.47	5	0.49	25.85	87	0.30	1.66	0.15
Race	3.75	5	0.75	41.24	87	0.47	1.58	0.17
Self-Appraisal	1.75	5	0.35	24.77	87	0.28	1.23	0.30
Long-Range Goals	1.69	5	0.34	34.26	87	0.39	0.86	0.51
Strong Support Person	2.60	5	0.52	42.69	87	0.49	1.06	0.39
Leadership	1.43	5	0.29	40.19	87	0.46	0.62	0.69
Community Service	4.16	5	0.83	45.54	87	0.52	1.59	0.17
Knowledge in Field	2.00	5	0.40	39.18	87	0.45	0.89	0.49

Stepwise Multiple Regression

Stepwise multiple regression was used to determine which, if any, of the

variables used in the Noncognitive Questionnaire and the variable number of

units taken contributed most to identifying and describing which students were

successful and which students were unsuccessful by assessing whether or not

a relationship existed between any of the variables mentioned and first

semester GPA. In addition, stepwise multiple regression was conducted to

determine if significant a relationship exists between the variables gender and

ethnicity and first semester GPA.

Stepwise multiple regression is a procedure that systematically adds

variables into the regression equation determining statistical significance. The

stepwise process finds the best predictor among several variables and pairs the next added variable until a significant multiple correlation is found. The pair of predictor variables are then coupled with the next added variable, one step at a time, until the next variable adds a significant contribution to the prediction equation and so on until all the independent variables have been tested (Ferguson, 1981).

The hypothesis of no statistically significant relationship between any of the eight variables in the NCQ, the variable number of units taken and GPA was tested. In addition, the variables gender and ethnicity were also tested to determine if a statistically significant relationship existed between either of these variables and first semester GPA. The alpha level for entry into the regression equation was .05 and for removal it was 1.0. The stepwise regression statistic is appropriate for this study since the research project is concerned with which of the eight variables in the NCQ and the variable number of units provides a significant and unique contribution to predicting academic success.

Stepwise Multiple Regression with First Semester GPA as the Dependent Variable

The eight variables from the NCQ and the variable number of units taken were used to determine if there was a significant relationship between any of these variables and first semester GPA. The number of cases in each variable was 93.

None of the variables received a coefficient high enough to be included in a regression equation. Consequently, no variables were added and none were removed. This line of inquiry was abandoned.

Stepwise Multiple Regression with First Semester GPA as the Dependent Variable by Gender

The eight variables from the NCQ and the variable number of units taken were used to determine if there was a significant relationship between any of these variables and first semester GPA by gender. The number of males was 47 and the number of females was 46.

None of the variables received a coefficient high enough to be included in a regression equation. Consequently, no variables were added and none were removed. This line of inquiry was abandoned.

Stepwise Multiple Regression with First Semester GPA as the Dependent Variable by Ethnicity

The eight variables from the NCQ and the variable number of units taken were used to determine if there was a significant relationship between any of these variables and first semester GPA by ethnicity. The number of cases in each ethnic group was (1) Blacks 8, (2) Whites 19, (3) Asian 12, (4) Hispanic 39, (5) American Indian 9, and (6) other 6.

None of the variables received a coefficient high enough to be included in a regression equation. Consequently, no variables were added and none were removed. This line of inquiry was abandoned.

CHAPTER 4

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study

Access to higher education is one of the cornerstones in empowering individuals and in building self-sufficient communities. Such access has been limited in colleges and universities that have more applicants than they can accommodate, thus making access competitive. Competition for entry into selective colleges and universities has resulted in the development and implementation of screening processes that often include screening protocols that have been found to unfairly block access for individuals from underrepresented minority groups. Included in such screening protocols is the assessment of standard cognitive measures such as high school GPA and SAT/ACT scores. These measures are culturally biased and their use as screening mechanisms may result in qualified members of underrepresented minority groups being excluded from admission to selective colleges and universities. Attempts have been made in the last few decades to correct this inequity by developing programs or instituting policies that provide access.

The number of minorities who are entering college has increased in recent years, largely due to affirmative action efforts on the part of institutions