AN INVESTIGATION OF THE INFLUENCES
OF COLLEGE STUDENTS' GOALS
ON QUALITY OF EFFORT AND GROWTH
DURING THE FRESHMAN YEAR

by

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(ABSTRACT)

The purpose of this study was to develop and test a conceptual model of influences of motivational factors and quality of effort on two freshman-year developmental outcomes. Literature on college effects indicates the importance of student characteristics in determining college outcomes, but does not provide evidence concerning the influences that students' nonacademic goals have on their growth and development.

A sample of freshmen dormitory residents responded to the College Student Experiences questionnaire. Goals data were provided by a survey conducted during freshmen orientation. Ordinary least squares regression analyses were used to estimate effects of quality of effort dimensions, motivational factors (including goals for college), and four background characteristics on two outcomes--perceived personal-social gains and perceived intellectual gains.

The hypothesized model did not fit the data. Highly intercorrelated quality of effort scores introduced multi-
collinearity and led to unreliable estimates of the independent effects of the three quality of effort dimensions. The implications of collinearity and other characteristics of the data for interpretation of results were discussed.

Regression results indicated that, among the motivational factors, the importance of social goals contributed the most to student estimates of personal-social gains while educational aspirations and certainty about major and career contributed the most to student estimates of intellectual gains. The relationships were partially mediated by quality of effort although interpretation of the indirect effects was limited by the collinearity of quality of effort dimensions. The social goals variable predicted the quality of participation both in group experiences and in personal-interpersonal experiences; educational aspirations and certainty about major and career both predicted the quality of academic experiences; and educational aspirations also contributed to prediction of the quality of personal-interpersonal experiences. The fourth motivational factor, importance of personal development goals, contributed to both outcomes but had no significant relationships with quality of effort dimensions. This surprising finding was thought to merit further investigation. Among the background characteristics, gender (female) was a strong predictor of both outcomes.
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This research could not have been done without the cooperation and counsel of Drs. Richard Howard and Brenda Rogers of North Carolina State University. They were instrumental in my gaining access to data, resource materials, and library facilities and they guided me through the early stages of conceptualization. In return, I offer them the results of this study in the hope that these will suggest ways that their institution can serve the needs of its student body.

Last, but certainly not least, I wish to express appreciation to my husband, Howard Kaufman, for his willingness to make many personal sacrifices to facilitate my completing this work.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>iv</td>
</tr>
<tr>
<td>List of Figures and Tables</td>
<td>viii</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Need for the Study</td>
<td>4</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>5</td>
</tr>
<tr>
<td>Research Questions</td>
<td>6</td>
</tr>
<tr>
<td>Justification</td>
<td>7</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>9</td>
</tr>
<tr>
<td>Literature Review</td>
<td>12</td>
</tr>
<tr>
<td>Relationships between Student Goals and the Outcomes of College</td>
<td>13</td>
</tr>
<tr>
<td>Relationships between Student Involvement and Developmental Outcomes</td>
<td>18</td>
</tr>
<tr>
<td>Relationships between Student Characteristics and Developmental Outcomes</td>
<td>19</td>
</tr>
<tr>
<td>Relationships between Student Characteristics and Student Involvement</td>
<td>21</td>
</tr>
<tr>
<td>College Characteristics, Student Characteristics and the Outcomes of College</td>
<td>24</td>
</tr>
<tr>
<td>Student Goals and the Assessment of College Outcomes</td>
<td>26</td>
</tr>
<tr>
<td>The Conceptual Model</td>
<td>28</td>
</tr>
<tr>
<td>Methodology</td>
<td>33</td>
</tr>
<tr>
<td>The Sample</td>
<td>34</td>
</tr>
<tr>
<td>Variables</td>
<td>35</td>
</tr>
</tbody>
</table>
Data Analysis........................................ 42

Elimination of Observations and Treatment
of Missing Values.............................. 43
Recoding and Creation of Variables............ 45
Path Analysis..................................... 48

FINDINGS........................................... 54

Influences of Quality of Effort, Motivational
Factors, and Background Characteristics
on Intellectual Gains............................ 54

Influences of Quality of Effort, Motivational
Factors, and Background Characteristics
on Personal-Social Gains....................... 60

Comparison of the Hypothesized Model
with the Obtained Model....................... 62

Summary of Findings............................ 64

DISCUSSION OF FINDINGS, CONCLUSIONS,
AND RECOMMENDATIONS................................ 71

Discussion of Factors Limiting Interpretation
and Generalization of Results................... 71

Collinearity.................................... 73
Implications of Collinearity for
Interpretation of Results....................... 76
Sample-Population Comparisons.................. 77
Implications of Differences Between
the Sample and the Population............... 81

Conclusions and Recommendations............... 84

REFERENCES....................................... 91

APPENDIX A: Data Collection Instruments........ 97

APPENDIX B: Results of Sample-Population Comparisons
and Sample-Sample Comparisons............... 108

VITA............................................... 123
LIST OF FIGURES AND TABLES

Figures

Figure 1. Path diagram: Expected influences of motivational factors on quality of effort and growth......................................................... 29

Figure 2. Obtained path model........................................... 63

Tables

Table 1. Varimax Rotated Loadings for All Seven Goal Items.............................................................. 38

Table 2. Intercorrelations among Goal Items for Population and Sample.............................................. 47

Table 3. Intercorrelations among Twelve Individual Experience Scales and among Three Composite Scales.................................................. 49

Table 4. Intercorrelations among Nine Gains Items.... 50

Table 5. Means, Standard Deviations, and Intercorrelations for Variables Used in Analyses...... 55

Table 6. Regression Equations for Effects of Each Quality of Effort Dimension, Motivational Factor, and Background Characteristic on Gains... 56

Table 7. Indirect Effects of Each Motivational Factor and Background Characteristic on Gains.... 58

Table 8. Summary of Effects from Each Quality of Effort Dimension, Motivational Factor, and Background Characteristic on Gains........ 59

Table B-1. Results of One-sample T-tests for Personal Goals Scale.................................................. 109

Table B-2. Results of One-sample T-tests for Social Goals Scale.................................................. 110
Table B-3. Results of One-sample T-tests for Educational Aspiration Level..................... 111
Table B-4. Results of One-sample T-tests for Certainty about Major and Career Choice......... 112
Table B-5. Results of One-sample T-tests for SAT Quantitative Scores.......................... 113
Table B-6. Results of One-sample T-tests for SAT Verbal Scores................................. 114
Table B-7. Results of One-sample T-tests for Parents' Education.................................. 115
Table B-8. Results of T-tests Comparing Mean Scores of Males and Females on Background Characteristics and Motivational Factors: Sample........... 116
Table B-9. Results of T-tests Comparing Mean Scores of Males and Females on Background Characteristics and Motivational Factors: Population..... 117
Table B-10. Results of T-tests Comparing Mean Scores of Males and Females on CSEQ Experience and Growth Dimensions................................. 118
Table B-11. Means, Standard Deviations, and Inter-correlations for White Sample: Motivational Factors and Background Characteristics............ 119
Table B-12. Means, Standard Deviations, and Inter-correlations for White Population: Motivational Factors and Background Characteristics........... 120
Table B-13. Regression Equations for Effects of Background Characteristics on Motivational Factors: White Sample................................. 121
Table B-14. Regression Equations for Effects of Background Characteristics on Motivational Factors: White Population................................. 122
INTRODUCTION

Young people attend college for a variety of reasons. The reasons may be as circumscribed as wanting to gain vocational competence in a designated area or as amorphous as wanting to be a better educated person. They may be founded on a desire to achieve social status, satisfy a need for self-fulfillment, make a social contribution, or quite simply, to gain release from parental control and have a glamorous social life.

An individual's expectations for college are not independent of social climate. In *The Cycles of American History* Arthur Schlesinger, Jr. develops the (familiar) theme that American society alternates between periods of public purpose and private interest. Periods of public purpose are characterized by idealism and reform—efforts to improve human conditions. During periods of private interest materialism, hedonism, and a "quest for personal gratification" are evident. These trends are apparent in survey data from college freshmen for the period 1967 to 1983. Astin (1984b) noted an increase from 40 percent to 70 percent in endorsement of the life goal "being financially well off." By contrast, "developing a meaningful philosophy of life" dropped sharply in popularity—from first to eighth in importance. Because of these and other changes in responses concerning goals, Astin sees an increasing importance placed
on acquiring money, status, and power. At the same time the evidence points to a steady decline in altruism and social concern.

Gender-related differences in the motivations of college students have diminished since the decade of the sixties. Data from that period showed women to be less career oriented than men and more "attracted to intellectual pursuits and a liberal education" (Husbands, 1972). Goldberg and Shiflett (1981) interpreted 1976 data to show that women and men differed little with the regard to the importance of a career, but that they had different notions of career. While men wanted to attain status through their work, women wanted to fulfill themselves and obtain challenging work. However, Astin and Kent (1983) found that between 1971 and 1980 increases in the importance of status and achievement goals were more marked for women than they were for men (Astin & Kent, 1983).

The shift in values has been accompanied by corresponding changes in fields of study chosen by freshmen. While enrollments in business, engineering, and computer science steadily rise, enrollments in the arts, humanities, and social sciences (other than economics) have been on the decline. Although men still outnumber women in the more popular fields, the relative increases in enrollments are far greater for women (Astin, 1984b). One characteristic of the popular fields is that they lead to higher paying jobs.
The adolescent's educational plans develop under the influence of parents, peers, teachers, and other factors in the high school environment (Davies & Kandel, 1981; Kandel & Lesser, 1970; Marjoribanks, 1985). The impact of significant others upon educational aspirations has received considerable research attention. There is a not so surprising consensus that parents' level of education is among the best predictors of college attendance, along with student ability or past achievement (Marini & Greenberger, 1978; Sewell & Shah, 1968a; Williams, 1972) although the degree aspiration levels of young women may depend more upon ability and achievement than upon parents' education (Pascarella, 1984). Evidence suggests that perceived parental and teacher encouragement mediate some of the influence that background factors have on college plans (Davies & Kandel, 1981; Marjoribanks, 1985; Sewell & Shah, 1968b).

The influences on decisions about attending college are better documented than are the influences on expectations that young people have for the outcomes of a college education. It appears that the expectations differ from one generation of students to the next because of changes in the social context. To some extent the changing trends in freshmen goals may reflect changes in the values passed on by parents.
Need for the Study

Once on the campus the student is exposed to a new set of peers and teachers, whose influence may take precedence over that of parents (Weidman, 1984). Changes in values, educational aspirations, and career choice are among the impacts attributed to the college experience (Astin, 1977; Astin & Panos, 1969; Feldman & Newcomb, 1969; Fenske & Scott, 1973; Terenzini, Pascarella, & Lorang, 1982; Weidman, 1979) although input orientations are by far the best predictors of outcomes. Some change may be due simply to maturation or continued influence from the larger social environment (Astin, 1977; Jacobs, 1986). Sorting out the many sources of variability in measures of college outcomes is a difficult task. One source which has received relatively little research attention is student values at college entrance, as reflected in the importance placed on achieving personal development and social goals in addition to the usual intellectual and vocational goals.

Students come to a campus with expectations about what the college experience should provide. Their reasons for attending college may influence the ways students invest time and effort, leading them to pick and choose from available opportunities in accordance with the importance placed upon potential benefits.

The nonacademic (personal development and social) goals of college students are generally absent from models
relating student involvement (for example, interaction with peers and faculty, participation in extracurricular activities, time spent studying) to a variety of outcomes that include persistence, personal growth, and intellectual development.

Also, student involvement has been measured in a variety of ways. Comparison of findings from apparently similar studies is hampered by the diversity of indicators used to represent student process variables—sometimes measuring behaviors and sometimes measuring perceptions but almost always based on a few items that cover a limited range of activities. The few studies that have used the more comprehensive instrument developed by Pace (1979, 1983) report relationships between quality of effort scores and student age and sex. But they provide little evidence to indicate how quality of effort is affected by other student background characteristics or by student goals. Because student inputs and student involvement (quality of effort) have both been found to affect outcomes, there is a need for a better understanding of the relationship between the two.

Statement of the Problem

This study investigated the influences that student goals have on quality of effort and developmental outcomes. The study tested a model that included four background characteristics—gender, race, ability, and parents'
education—along with other student variables thought to have both direct and indirect impact on outcomes. These student variables (or motivational factors) included: (a) The importance placed on personal development goals; (b) the importance placed on social goals; (c) the highest degree aspired to; and (d) the extent of certainty about choices for an academic major and a future career.

Involvement was operationalized as the quality of effort invested in the use of campus facilities and opportunities associated with three areas of campus life—academic experiences, personal-interpersonal experiences, and group experiences. Involvement was conceptualized as a wide range of experiences and activities, and consideration was given to the fact that within each area some experiences and activities were more likely than others to promote development. The study examined the potential of quality of effort to mediate influence from motivational factors upon two types of developmental outcome—gains in intellectual skills and gains in personal-interpersonal development.

Research Questions

The following research questions were addressed in the study:

(1) Does the importance that entering freshmen ascribe to either personal development or social goals for
college influence their use of facilities and opportunities for learning and development?

(2) Does either educational aspiration level or certainty about a future career influence the use of facilities and opportunities for learning and development?

(3) Is the importance ascribed to either personal development or social goals influenced by student gender or race?

(4) Is level of educational aspiration influenced by either student ability or parents' education?

(5) Are level of educational aspiration, certainty about major and career choice, or importance ascribed to either personal development or social goals related, directly or indirectly, to the extent of growth perceived by a student?

Justification

Higher education has been under attack for some time. There is pressure for institutions to implement assessment programs and demonstrate the nature and degree of their effectiveness (or ineffectiveness). The Value-Added Student Assessment Model of Northeast Missouri State University is seen as a prototype (Taylor, 1985). One aspect of this or any assessment program is the collection of student input data. Typically, the purpose of such data is to provide
controls so that outcomes can more readily be attributed to the college experience or to the particular institution's faculty, programs, facilities and so on. However, this value-added approach may put undue emphasis on the college as an architect of student learning and development while discounting the student's own role in determining what he or she gets out of college. Consequently, student characteristics were examined in the present investigation while certain institutional/environmental influences were limited by restricting the study to a population of new freshmen residing in dormitories.

There is ample evidence that student inputs strongly influence outcomes. Yet there is only a limited understanding of how student values, interests, abilities, and various other background characteristics exert their impact.

Using a causal modeling approach, the present research provided a plausible explanation of the process whereby certain of these student input characteristics influence outcomes. The study focused on a particular combination of student input characteristics expected to influence developmental outcomes through their impact on student involvement. By operationalizing involvement with Pace's quality of effort scales, the study also sought to provide new evidence concerning their validity as measures of involvement.
Definition of Terms

Several key concepts are referred to throughout this dissertation. The terms and the meanings ascribed to them are as follows:

**Effort**—Behaviors or activities that students engage in (such as taking notes or explaining course material to other students, attending club meetings or serving on an organization committee), which can be categorized hierarchically to reflect their potential for learning and development (Pace, 1980).

**Environmental factors**—Various structural-organizational and demographic characteristics of colleges and, especially, the climate of "interpersonal conditions" and "pressures, demands, and opportunities" that these create on a college campus (Feldman & Newcomb, 1969).

**Goals**—Statements of specific benefits that college attendance can be expected to provide, such as preparation for a career, opportunities to meet people, or an understanding of one's values and beliefs.

**Inputs**—Any student background characteristics (such as, gender, race, ability, parents' education level) as well as expectations, aspirations, and various personal characteristics that can be measured prior to college enrollment.

**Involvement**—The "physical and psychological energy" a student invests in the college experience. To
illustrate, a student who "devotes considerable energy to studying, spends much time on campus, participates actively in student organizations, and interacts frequently with faculty members and other students" (Astin, 1984a, p. 297) would be described as highly involved. According to Astin, the involvement concept resembles the learning theorist's time-on-task. Involvement subsumes aspects of the concept of effort, which for Astin is narrower; both concepts emphasize behavior or what students do on campus. Thus, when "quality of effort" is used as a synonym for involvement, it is the behavioral component of the latter that is being equated with effort.

Motivational factors--The entering student's goals for college, educational aspiration level, and extent of certainty about college major and career choice.

Outcomes--Aspects of a student's development that are influenced (or that educators hope will be influenced) by college attendance (Astin, 1970a). In practice, investigators have used the term for any dependent variables thought to be influenced by college attendance, thus including grades, persistence, and satisfaction with college as well as various development measures, and even student goals for college and degree aspiration level if these are measured after a student has been in school for a period of time.
Chapter two reviews the findings of previous research and develops the conceptual model used to investigate the influences of student characteristics on student involvement and growth. Descriptions of the sample, data collection, variables, and analytical procedures used in testing the model are presented in Chapter three. Chapter four contains the results of the study—including an evaluation of the hypothesized model. Chapter five contains a discussion of the findings along with conclusions and recommendations.
LITERATURE REVIEW

This literature review was undertaken to develop a conceptual model to guide the design of the present study. The review sought to answer several questions—What is known about relationships between student goals and college outcomes? What is known about relationships between student involvement and developmental outcomes? What student background characteristics are likely to influence developmental outcomes? What student characteristics are likely to influence student involvement? What other variables can be expected to influence either student involvement or outcomes? Insights provided by previous research were used to select variables to include in the present investigation and to hypothesize relationships among the selected variables.

The emphasis given here to students' initial goals derives primarily from findings that student preenrollment characteristics have a substantial influence on student outcomes (Astin, 1977; Astin & Panos, 1969; Bean, 1985; Feldman & Newcomb, 1969; Pascarella, 1984, 1985; Pascarella, Terenzini, & Wolfle, 1986; Terenzini, Pascarella, Theophilides, & Lorang, 1985; Theophilides, Terenzini, & Lorang, 1984), with the more recent investigations indicating that some influences are indirect. The nature and statistical significance of these effects are not well substantiated—due, in some cases, to the limitations of the
statistical procedures used to investigate them. Although the use of path analysis can increase methodological soundness, the credibility of findings also depends upon the researcher's conceptual framework—the basis for selecting variables and positing relationships among them—and upon the adequacy of measurements. In addition, techniques for determining the statistical significance of the indirect effects produced in path analysis have become available only recently (Sobel, 1982; Wolfle & Ethington, 1985).

Relationships between Student Goals and the Outcomes of College

The relative importance a student assigns to various goals that might be achieved by attending college is seldom taken into account in models intended to explain college outcomes. Studies limiting measured goals to the importance of graduating from college or of obtaining an advanced degree have reported an indirect influence of these factors on persistence in college (Bean, 1985; Terenzini et al., 1985). Bean (1985) included both a Goals variable (based on the importance of obtaining a degree or completing a program) and a Utility variable (based on such factors as perceived usefulness of student's education for obtaining employment and perceived impact of the chosen college on seeing alternative points of view). Both Goals and Utility had significant direct influences on an institutional fit
variable (sense of belongingness, satisfaction with choice of college). Bean's Utility scale focused on the perceived likelihood that the student's college would facilitate certain outcomes but did not ask about the value or importance that students placed on these outcomes for themselves. Terenzini et al. (1985) reported a direct influence of degree aspiration level on indicators of social integration—which, in turn, directly affected persistence. This finding suggests that initial goals have an impact on what students do while in college. (Social integration was operationalized with several measures that included time spent on extracurricular activities as well as extent and frequency of contact with faculty and peers.) Perhaps other student goals would also help to explain why students spend their time as they do.

Theophilides et al. (1984) looked into the inverse of this possibility, that is, the extent to which certain first-year college experiences influenced specific goals reported at the end of freshman year. However, the measures of input goals (controlled in the analyses) were based on recall—students reported preenrollment and end-of-year goals on the same instrument. With the (substantial) influence of input goals partialed out, certain college experience variables contributed significantly to an explanation of variance in three of four outcome goals: Importance of (a) gaining a liberal arts education and
appreciation of ideas; (b) gaining knowledge and skills directly applicable to a career; and (c) learning about different kinds of people and enhancing interpersonal skills. The fourth goal, learning about self, own values, and own life goals— for which no significant college experience impact was found— had high zero-order correlations with the third goal, .60 and .52 for input and outcome measures, respectively. This suggests that the two goals may represent a single dimension and, therefore, might better have been treated as a single variable. The researchers indicated that multicollinearity might have been a problem.

While their findings support the contention that college experiences are related to student goals, little can be inferred about the potential of goals to influence college experiences.

Astin (1984a) proposed that how students distribute their energies (that is, the quality and quantity of involvement) has enormous consequences for the subsequent outcomes of academic achievement and personal and intellectual development. Astin advanced the point of view that teachers and administrators must look more carefully at "what is going on with the student." He suggested that the key to working with students who are having problems may be in understanding "the principal objects on which their energies are focused." A point not dealt with explicitly is the role of the student's own priorities regarding what he
or she would like to accomplish in college. Student priorities may or may not coincide with institutional objectives and need to be considered when defining accomplishments.

Even if one accepts that the most important purpose of higher education is intellectual development, there is much room for debate concerning the adequacy of grades as the sole measure of student accomplishment in the intellectual sphere. It is conceivable that a student might strive for, and succeed in, developing intellectually without winning honors or even high grades. A number of college student typologies have been proposed and whatever their differences there is striking consistency in the identification of (and consequent distinction between) two categories--academics and intellectuals. Whereas the former characterizes students who work for and tend to achieve good grades, the latter characterizes students interested in ideas but not in routine course work or grades per se (Feldman & Newcomb, 1969, Appendix A). Few individuals would fit squarely into the "boxes" of a typology; and the practical value of typologies is debatable (Cross, 1985). Nevertheless, typologies and the studies that attempt to validate them do bring to light the heterogeneity of motives and interests that exist within and among students on a single campus. Diversity of talents, interests, and goals indicates a need for a broader definition of achievement or success than
grades alone would imply. The student's own objectives and estimates of accomplishment may be as important as institutional objectives and criteria of accomplishment for assessing college effects (Ewell, 1983a).

There is a sizeable body of literature dealing with the prediction of accomplishment in college. Some studies have defined accomplishment to include various levels of recognition (had poems published outside the college, won a literary prize, have done unpublished writing on my own) and to span a broad range of talents and fields of interest (writing, art, science, business, social service, etc.). Findings do not consistently support the value of past (high school) accomplishment in predicting subsequent (college) accomplishment (Astin, 1977; Baird, 1969a; Holland & Richards, 1965). Other important variables related to college accomplishments are students' own ratings of their competencies and the importance students ascribe to specific goals (Baird, 1969a; Holland & Nichols, 1964).

If student accomplishments are dependent on student goals, it is likely that student participation in both academic and nonacademic aspects of campus life is also dependent somewhat on student goals. That is, student involvement or quality of effort may be a mediating element in the relationship between goals and accomplishments.

This seems not to have been investigated although the research of Pascarella, Duby, Terenzini, and Iverson (1983)
did consider the relationship between importance of achievement in four goal areas and self-estimates of freshman year developmental outcomes. The study was limited to non-residential students. Only intended artistic achievement had a significant impact on a developmental outcome. The authors suggested that small sample size, in combination with the statistical model used, could have produced conservative estimates. Their findings provide no information about the indirect effects of intended accomplishments—possibly transmitted through involvement variables that were included in the regression equations.

Relationships between Student Involvement and Developmental Outcomes

This section of the review was limited to studies concerned with influences on personal and intellectual growth. Because researchers have operationalized involvement in a variety of ways, the comparability of results from different studies is difficult to establish. Only two studies were deemed to measure a sufficiently broad range of involvement—both academic and nonacademic—to warrant inclusion here.

Terenzini, Pascarella, and Lorang (1982) investigated influences of a number of college experience variables on students' academic and personal development. They reported that a measure of social involvement had a significant and
strong influence on perceived personal growth. A measure of classroom involvement affected two cognitive outcomes—academic process and academic content.

Friedlander (1980/1981), in a study evaluating the validity of the College Student Experiences questionnaire (Pace, 1979), found that quality of effort invested in interactions with peers was important in predicting gains in personal/interpersonal understanding while quality of effort invested in academic experiences helped predict gains in intellectual competencies.

In a review of the instrument, Brown (1985) gave it a favorable evaluation for the content and construct validity and for the internal consistency of its quality of effort scales but noted shortcomings in other sections—such as the lack of behavioral specificity in items assessing gains. Evidence concerning criterion-related validity is available only for studies using data from other scales in the same instrument (for example, the section entitled "Estimate of Gains").

Relationships between Student Characteristics and Developmental Outcomes

Evidence concerning influences of background characteristics on student perceptions of personal or intellectual growth is limited. Terenzini et al. (1982), in their assessment of social and academic influences on develop-
mental outcomes, used several student background variables as covariates. Two of these—sex and combined SAT scores—were significant influences on growth. Women were likely to report more personal growth than men. The effect of higher ability scores on personal growth was negative.

Friedlander (1980/1981) controlled for certain student background variables while using a stepwise regression procedure to estimate contributions of four sets of variables in predicting student growth. Background characteristics (age, sex, ethnic identification, martial status, and parents' socioeconomic status) accounted for between one and thirteen percent of variance in four measures of student gains—contributing the least to an Intellectual Competencies variable and the most to a Personal/Interpersonal Understanding variable. Only three independent contributions were reported. Sex (male) influenced intellectual outcome variables—Intellectual Competencies and Understanding Science; and parents' education influenced gains in General Education Objectives. While no preenrollment measures of aspirations, ability, or achievement were used, a set of College Treatment and Condition Characteristics included overall grade point average and advanced degree aspirations. Grade point average made a small contribution only to prediction of Intellectual Competencies; degree aspirations did not contribute significantly to prediction of any of the outcome variables.
Relationships between Student Characteristics and Student Involvement

Research using Pace's quality of effort scales provides some evidence that quality of effort scores are associated with student characteristics. Two studies provide the only available information concerning these relationships. Using an early version of Pace's instrument, Shaver (1978/1979) compared mean quality of effort scores to determine whether these varied with certain student and environmental factors. Results for different age groups and for males and females showed significant differences on several quality of effort scales. Younger students had higher mean scores on scales entitled "Participation in Clubs," "Use of Facilities," and "Some Personal Experiences;" gender differences were found for scales entitled "Course Learning--General," "Science Lab Activities," "Art," "Theatre," and "Some Personal Experiences." These and other findings of the study (such as differences by class level, academic discipline, and residence arrangement) were thought to support the construct validity of the scales.

Results from another study using the 1979 edition of Pace's instrument were consistent with Shaver's findings regarding the importance of age. Although Alexander (1985/1986) observed no significant differences between younger and older undergraduates on academic quality of effort scales, she found that older students scored
significantly lower on level of social effort. No significant gender differences were reported.

A different operationalization of involvement was used in the very comprehensive study of college impact conducted by Astin (1977). But several of his involvement factors included behaviors (for example, studied in the library, had personal contacts with faculty, attended a meeting of some college organization) similar in content to items in Pace's scales. Various student entering characteristics were associated with later involvement. For example, a low pre-test score on hedonism (drinking, smoking, partying, gambling and so forth) was associated with higher academic involvement. Other positive predictors included high school achievement, use of the library in high school, and religiousness; but artistic interests, political liberalism, low intellectual self-esteem, lack of religious preference, and being black were negative predictors of academic involvement.

Student-faculty interaction was most strongly related to students' interpersonal self esteem at college entry but was also related to frequent library use in high school, religiousness, musical interests, altruism, and artistic interests. Most of these same characteristics also were related to another involvement factor concerning familiarity with faculty in the student's major field.
Involvement in student government was most strongly related to interpersonal self esteem but also was predicted by having been president of a high-school organization, frequent high-school library use, religiousness, and altruism. In addition, having highly educated and affluent parents, higher degree aspirations, a Protestant or a Roman Catholic affiliation, and being black were all predictors with small positive weights.

Finally, athletic involvement was very strongly associated with athletic interest at college entry. Other positive predictors included winning a varsity letter in high school, being male, religiousness, and hedonism, but artistic interests, being a smoker, and having no religious preference were negative predictors.

Evidently college student involvement is to some extent predetermined by what the student brings to the enterprise. Nevertheless, Burton's (1981) attempt to predict a specific type of participation (in extracurricular activities) from demographic and personality characteristics was unsuccessful.

Identifying the student characteristics that predict the various types of involvement is of some consequence for research assessing student outcomes since differences among students that are not controlled—either statistically or in research design—may confound the results. If environmental factors (such as, opportunities for participation or encour-
agement from peers) were major determinants of student involvement, the implications for student development professionals would be quite different than if participation were mainly determined by student characteristics. More than likely it is the interplay between the two—the student in the environment—that determines outcomes, but to understand the impact of one it may be necessary to control for the impact of the other.

College Characteristics, Student Characteristics, and the Outcomes of College

Colleges have been categorized using a variety of means—type of curricular organization; type of control; coeducational versus men's or women's schools; geographical location; types of degrees conferred; demographic characteristics (such as size of enrollment, operating budget, library resources, faculty educational level, faculty-student ratio, or proportion of students with given characteristics); and, finally, the climate of "interpersonal conditions" and "environmental pressures, demands, and opportunities" created by the demographic and structural-organizational factors (Feldman & Newcomb, 1969).

Institutional and student selectivity make for a nonrandom distribution of students among institutions.

Not surprisingly, the characteristics of newly admitted students that distinguish one college from another continue, as students remain in college, to distinguish those same colleges. This fact, however,
does not mean that colleges present no distinctive influences to their students—quite the contrary. Various indices of college environments suggest that the different types of colleges tend—though with many variations within each type—to confront their students with different environments. For example, teachers colleges and state colleges are apt to be high in influences of a "practical" nature, while in highly selective liberal arts colleges the emphasis is on scholarship, and sense of community is usually prominent in strongly denominational colleges. This fact is multi-determined, but not the least of its sources is the simple consideration that, after all, an important part of any student's environment consists of the other students. It is quite as true that colleges' and universities' ability to attract and keep faculty members depends on the characteristics of their students as that students are attracted by faculty characteristics. For such reasons colleges' distinctive impacts tend to be cumulative: the kinds of students they admit help to determine the kinds of impacts those students will confront. And insofar as faculty influences are adapted to the aspirations and capacities of their students, the process is reinforced. One would therefore anticipate that distinctive differences found among colleges in respect to their entering freshmen would become still more pronounced on the part of their graduating seniors. (Feldman & Newcomb, 1969, pp. 144-145)

Analogous to the interinstitutional differences are the subenvironments within a single institution.

Departmental and student selectivity along with the normative influences of particular academic disciplines can lead to quite different student outcomes across disciplines. Residence arrangement also affects the uniformity of experiences—the elements of student self-selection and, in some cases, group recruitment can help to create peer environments that impede development as often as they stimulate it.

Thus college characteristics include both between-college and within-college environmental variables whose
independent influences are not readily discerned because students are not randomly distributed among environments and are not uniformly affected by these environments (Astin, 1970a, 1970b). But the influence of between-college environmental variables on some outcomes may be small in comparison to the influence of preenrollment characteristics (Astin & Panos, 1969; Nichols, 1964). Perhaps, as Pace (1974) contends, there is an increasing homogeneity and conformity across American campuses and, therefore, between-college differences would be slight. On the other hand, it may be that the between-college differences are responsible primarily for indirect influences (Pascarella, 1985) that have gone undetected because of methodological limitations.

Within-college environmental differences may actually be a greater source of influence on student outcomes than are between-college differences (Harnett & Centra, 1977). Although, again, a factor such as major department may mediate the influence of student background characteristics so that what students bring with them to college and their actual involvement or effort once there play a larger role in explaining outcomes.

Student Goals and the Assessment of College Outcomes

Large-scale multiinstitutional studies have increased the breadth of our understanding of the interplay between
student inputs and environmental influences. Yet every institution presents, in some respects, a unique set of circumstances and must assess its own effectiveness, make day-to-day decisions, and plan its own future based on information specific to that institution (Ewell, 1983a; Jones, 1982). Both Ewell and Jones address themselves primarily to higher education decision makers. Ewell (1983a), informed by the findings of multiinstitutional research, discusses how to get and use information on student outcomes. He recommends that institutional self-assessment proceed in part from data on student "programs"—student personal goals, behavioral objectives, and strategies for obtaining these objectives given the limitations imposed by available resources. If practitioners have tended to overlook this important data, researchers have also been somewhat remiss. Perhaps student goals are poorly articulated and likely to change over time; this is all the more reason for including them as data. The nature and clarity of goals are outcomes as well as inputs, subject to change under the influence of environmental conditions. But more important for the present research was the possibility that student goals influence personal and intellectual growth by motivating certain kinds of involvement to the exclusion of other kinds.
The Conceptual Model

Because of the nature of the relationships to be investigated—causal associations mediated by intervening variables, a causal modeling approach was adopted for this study. The strength of this approach is not in its analytical techniques but in the requirement that a conceptual schema be developed a priori. The researcher is forced to think carefully about the possible interrelationships of variables to make hypotheses explicit in a path diagram (Wolfle, 1985). This section describes the model that was developed from a synthesis of previous findings.

The conceptual model evaluated in this study posited student input variables as influences on quality of effort and developmental outcomes. The hypothesized influences are depicted in Figure 1. Student background characteristics (gender, race, ability, and parent's education) were distinguished from motivational factors (such as the importance of personal development goals), and the motivational factors were presumed to have the greater impact on outcomes. Their influences were thought to be both direct and indirect (that is, transmitted via quality of effort as a measure of involvement).

Three of the motivational factors—level of educational aspiration, importance of personal development goals, and importance of social goals—were themselves thought to be influenced by student background characteristics represented
Figure 1. Path diagram: Expected influences of motivational factors on quality of effort and growth.
in the model. Parents' education and student ability were expected to positively influence student educational aspirations (Pascarella, 1984). Gender and race were expected to influence goals for college; that is, women would be more likely to place importance on personal development goals (Husbands, 1972) and black men would tend more than white men to place importance on social goals (Allen, 1985). The remaining motivational factor—certainty about major and career choice—was believed not to be influenced by these background characteristics since none were indicators of interests, personality characteristics, or developmental level—the factors commonly associated with career indecision (Gordon, 1981). However, evidence that many students who are undecided about their future career are concerned with self-identity, have a humanitarian orientation, or have multiple interests (Appel, Haak, & Witzke, 1970) led to certain predictions concerning the effects upon student involvement of certainty, or lack of certainty, about major and career choice.

It was hypothesized that both educational aspiration level and certainty would positively influence quality of effort in academic experiences; that is, students with well-defined career objectives and high levels of degree aspiration were expected to dedicate themselves primarily to academic and intellectual pursuits. Whereas students who gave major importance to personal development or social
goals would put more effort into their nonacademic pursuits, such as participation in extracurricular activities, and in peer relationships.

A negative influence of certainty about major and career choice upon personal-interpersonal quality of effort was predicted from findings (Baird, 1969b; Bohn, 1968) that career indecision is associated with having strong interests other than academic-vocational. Such interests could lead students to use peers as a resource for self-understanding, clarification of values, and exploration of intellectual issues. On the other hand, a positive influence for certainty about major and career choice upon the quality of effort invested in group experiences was predicated on the assumption that skills (for example, ability to work as a team member and to be a leader) are required for certain career objectives and are best developed through participation in extracurricular activities.

The model also posited influences of educational aspiration level on both types of nonacademic involvement although these influences were thought to be smaller than the influence on academic experiences. Terenzini et al. (1985) and Pascarella (1985) both reported a direct influence of input aspiration level on social integration (measuring in part aspects of peer and extracurricular involvement).
Based on findings reported by Pace (1984) it was expected that the largest direct influences on gains would come from the respective quality of effort dimensions--from academic involvement to intellectual gains and from personal-interpersonal and group involvement to personal-social gains. The latter influence was also suggested by the finding of Terenzini et al. (1982) that social involvement affected personal growth. Direct influences from motivational factors were expected only for personal-social gains and only from the personal and the social goals variables. Neither Friedlander (1980/1981) nor Terenzini et al. (1982) found any direct influence of degree aspiration level on developmental outcomes similar to those used in the present study.

Finally, a significant indirect impact on gains was expected from each of the motivational factors. The personal and social goals variables were expected to influence personal-social gains while educational aspirations and certainty about major and career choice were expected to influence intellectual gains. Chapter three details the investigation that tested this model.
METHODOLOGY

This study investigated the appropriateness of the proposed model for explaining college student developmental outcomes as a function of preenrollment motivational factors--with their influences hypothesized as being both direct and indirect (mediated by quality of effort). Testing of the model required the use of data collected prior to college entry as well as data gathered at some later point. However, the longer the time interval between the two data collections, the greater would be the likelihood for unmeasured variables to influence student involvement and outcomes. For this reason the model was tested with data that had been collected prior to enrollment (background characteristics and motivational factors) and data collected near the end of freshman year (quality of effort and developmental outcomes).

To eliminate the potential for previous college experiences to influence input goals, the population was limited to new freshmen (thereby excluding transfer students and returning students). To reduce somewhat the variety of environmental conditions and their varying influences on freshman-year involvement, the population was further limited to freshmen living in residence halls. At the participating institution more than 90 percent of freshmen met these conditions. Although this limits generalizability
of the results, internal validity may have been improved by
reducing the effects of unmeasured environmental factors on
student involvement.

The Sample

The study was conducted at a large, southeastern
landgrant university. The study population was comprised of
those new freshmen living in residence halls who enrolled in
the fall of 1985 and persisted into the spring of 1986. From among 3414 new freshmen, 800 were randomly selected in
March of 1986 by the university's Office of Institutional
Research for participation in a longitudinal study, the
first phase of which required data on freshmen and seniors.
The instrument used for this purpose, the College Student
Experiences questionnaire (Pace, 1983), was administered
during April and May of 1986. Letters requesting partici-
cipation were mailed and, initially, students were asked to
go to one of two designated campus locations—either a room
in the student union or a classroom—to fill out the ques-
tionnaire. As an incentive to participate, students were
told that they would be eligible for a drawing, and the
winner would receive $50.00 in cash. Because the response
rate was low, there was a second data collection wave in
which forms were sent to residence hall addresses of non-
respondents, and they were asked to return completed forms
to residence hall staff. These were accepted until the end
of the semester in early May. The return rate was 32.5 percent. Of the 260 freshmen who ultimately responded, 223 were matched to a data set that contained their responses to a survey of entering freshmen filled out by 3142 students during summer 1985 orientation.

The low response rate for the quality of effort questionnaire raised concern about the representativeness of the sample. To address this potential problem, sample member responses on the freshmen survey were compared to responses of all 3142 freshmen who completed the instrument. Results of one-sample t-tests for these and other comparisons are reported in Appendix B and discussed in Chapter five. Chi-square goodness-of-fit tests were used to compare sample and population proportions on the basis of sex, race, and college major. Data not provided by the freshmen survey instrument were taken from university records.

Variables

The model hypothesized relationships among four categories (blocks) of variables—background characteristics, motivational factors, involvement (quality of effort) scores, and growth (gains) scores. The first category, background characteristics taken from university records, included the following:

(1) Gender (1=male, 2=female);
(2) Race (1=white, 2=black);
(3) Ability (the sum of SAT quantitative and verbal scores); and

(4) Parents' education (eight levels from "less than eighth grade" to "doctorate" coded separately for each parent. These were assigned values from 1 to 8. Values for the two parents were combined to form a single variable with possible values ranging from 2 to 16).

The second category consisted of motivational factors. These were derived from items contained in the survey of entering freshmen. The instrument is included in Appendix A. The following variables formed that group:

(5) Certainty about major and career choice (the sum of scores for two freshmen survey items: How certain are you about your college major? and Have you decided on your future career? These items were scored from 1 to 3: 1=very certain; 2=somewhat certain; and 3=very uncertain; but scoring was reversed for analyses);

(6) Educational aspiration level (a single freshmen survey item: What is the highest level of education you plan to complete? Scored from 1 to 4: 1=some college but less than a bachelor's degree; 2=bachelor's degree; 3=master's degree; 4=doctoral or professional degree);

(7) Importance given to social goals; and

(8) Importance given to personal development goals.
Variables 7 and 8 were scales based on a factor analysis of seven freshmen survey items reflecting "the goals of many college students," adapted from Ewell (1983b). Respondents were asked to "indicate whether each goal is a MAJOR GOAL, a MINOR GOAL, or NOT A GOAL at all," with choices scored 1, 2, and 3, respectively.

Factor analysis of the seven items was carried out using data for 3142 freshmen survey respondents. A principal components analysis extracted three components with eigenvalues greater than 1.0. A varimax rotation produced the factor structure shown in Table 1.

Values for goals items were reversed before summing items to produce the scale scores used in analyses. Scores on the third and fourth items were summed to represent importance given to social goals; scores on the last three items were summed to represent importance given to personal development goals. Since almost all respondents to the freshmen survey checked MAJOR GOAL for the first two items, these were not used in the study. Item intercorrelations and scale reliability coefficients for the sample are reported later in this chapter.

A third category of variables, denoted quality of effort or experience scales, was operationalized as composite scores derived from responses to the College Student Experiences questionnaire (CSEQ, Pace, 1983). This instrument includes 14 scales which measure breadth and depth of
Table 1
Varimax Rotated Loadings for All Seven Goal Items (N=3142)

<table>
<thead>
<tr>
<th>Item</th>
<th>Factors</th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Personal</td>
<td>Social</td>
<td>Vocational</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase knowledge and understanding</td>
<td>.20</td>
<td>-.01</td>
<td>.73</td>
<td></td>
</tr>
<tr>
<td>in academic field</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare for a career</td>
<td>-.06</td>
<td>.09</td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td>Become actively involved in student</td>
<td>.15</td>
<td>.88</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>life and campus activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meet new and interesting people</td>
<td>.26</td>
<td>.83</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Learn skills that will enrich my daily</td>
<td>.79*</td>
<td>.18</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>life or make me a more complete person</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop my ability to be independent,</td>
<td>.83*</td>
<td>.13</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>self-reliant, and adaptable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understand my personal values and</td>
<td>.80*</td>
<td>.20</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>beliefs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Asterisks indicate items included in scales. The academic-vocational scale was not used in this study.*
effort invested in the use of various facilities and opportunities available on a college campus. Campus facilities include classrooms, libraries, science facilities, residence units, student unions, cultural facilities, and athletic and recreational facilities. Each type of facility has characteristic activities associated with it. Experiences or activities not associated with any particular setting include student-faculty contact, involvement in clubs and organizations, experiences in writing, informal conversations and relationships with peers, and various personal experiences. Thus, the 14 scales provide for a broad range of campus experiences.

For certain scales, items reflect increasing levels of involvement, challenge, and effort; other scales focus on the way physical facilities are used. In the construction of scales "the underlying quality dimension or concept was that of capitalizing on the potential for learning and development inherent in the nature of the particular category of experience" (Pace, 1984, p.9).

Each scale consists of a list of activities that range from ones that are easy to do to ones requiring more effort. Students report how often they have engaged in each activity during the current school year. The possible responses are "never," "occasionally," "often," and "very often," scored from 1 to 4 respectively. For most scales possible scores range from 10 to 40. Appendix A contains a copy of the
instrument. Psychometric data for the scales are reported in Pace (1984). Internal consistency estimates ranged from .79 to .90. Intercorrelations and reliability estimates based on sample data are reported later in this chapter.

Friedlander (1980/1981) found three independent and interpretable quality of effort factors—Personal and Interpersonal Experiences; Group Facilities and Opportunities; and Academic Experiences. A "Science Laboratory" scale did not cluster with any other scales; it was replaced in the 1983 version of the instrument by a "Science/Technology" scale that is broader in scope than the original. Another scale, "Art, Music, Theater," represents a fifth dimension. Factor analysis results for the 1979 version reported in Michael, Nadson, and Michael (1983) were consistent with Friedlander's findings. The "Topics of Conversation" scale underwent revision for the 1983 version of the instrument—two items were added and one was reworded.

For the present study quality of effort scores on three dimensions were arrived at by summing scores for the scales associated with each dimension:

(9) Group Experiences (four scales: "Student Union," "Athletic and Recreation Facilities," "Clubs and Organizations," and "Dormitory or Fraternity/Sorority");

(10) Personal-Interpersonal Experiences (four scales: "Personal Experiences," "Student Acquaintences,"
"Topics of Conversation," and "Information in Conversa-
sations"); and

(11) Academic Experiences (four scales: "Library
Experiences," "Experiences with Faculty," "Course
Learning," and "Experiences in Writing").

These three quality of effort dimensions represented the
variables through which preenrollment motivational factors
were expected to influence short-term developmental
outcomes.

The developmental outcomes, or gains, were reported in
the "Estimate of Gains" section of the CSEQ. For 21 goal
statements, students were asked to indicate the extent of
their progress ("very little," "some," "quite a bit," or
"very much") toward achievement of each objective.

For results with the 1983 version of the instrument
Pace (1984) reported five distinct factors--Personal and
Social Development; General Education, Literature, and Arts;
Understanding Science/Technology; Intellectual Skills; and
Vocation. Four of the 21 growth items loaded on the Intel-
lectual Skills factor and five loaded on the Personal and
Social Development factor. The two outcome variables used
in the present study were operationalized as sums of items
associated with the two growth dimensions:

(12) Personal-Social Gains (the sum of scores on five
items: developing your own values and ethical stan-
dards; understanding yourself--your abilities, in-
terests, and personality; understanding other people and the ability to get along with different kinds of people; ability to function as a team member; developing good health habits and physical fitness); and

(13) Intellectual Gains (the sum of scores on four items: ability to think analytically; quantitative thinking--understanding probabilities, proportions, etc.; ability to put ideas together, to see relationships, similarities, and differences between ideas; ability to learn on your own, pursue ideas, and find information you need).

Intercorrelations among gains items along with scale reliabilities for the sample are reported later in this chapter.

Anticipated relationships among the 13 variables are shown by arrows in the path diagram of Figure 1. The four blocks of variables appear in temporal sequence from left to right--background characteristics, motivational factors, college experience variables, and developmental outcomes.

Data Analysis

Personnel from the Office of Institutional Research at the cooperating institution provided the researcher with a data tape containing two separate raw data files--one with 3147 records (background information and freshmen survey responses) and the other with 223 records (CSEQ responses).
These two files were read to system disks and stored as separate SAS (Statistical Analysis System) data sets.

An examination of computer printouts revealed that the file of background information and survey responses contained five duplicate records. For each of these cases, the first record was retained while the second was excluded from subsequently created data sets. The file with CSEQ responses was matched by identification number to background and freshmen survey data using a SAS merge procedure.

Frequency distributions and summary statistics for the sample and the population provided the bases for preliminary data analyses. Background information and freshmen survey response frequencies were tabulated separately for the sample and for the population. Means, standard deviations, and ranges were produced for non-categorical variables. These computer-generated descriptive statistics were subjected to chi-square goodness-of-fit tests and one-sample t-tests. Results of these preliminary analyses are reported in Appendix B and discussed in Chapter five.

Elimination of Observations and Treatment of Missing Values

Thirteen cases were eliminated from subsequent analyses, four because of missing data and nine because the race category was other than white or black. These deletions reduced the analysis sample to 210 cases. To avoid further
diminution, substitution procedures were adopted to replace missing values for father's or mother's education and CSEQ items.

Parents' education was a composite variable arrived at by summing two eight-level variables—father's education and mother's education as taken from admission records. For 13 out of 210 cases, values were missing for either father's education (8), mother's education (3), or both (2)—leading to a total of 15 substitutions. A missing value for either parent was replaced by a group mean. For example, for black females (the group most affected) if father's education was missing, the mean education level reported for fathers by those black females who responded was substituted for missing values. Eight out of fifteen mean substitutions for parent education values were required for the black female portion of the sample, four were required for white females, two for black males, and one for a white male. For the most part, the validity of the substitute value was supported when compared with information concerning parents' education that was reported on the CSEQ (that is, 11 of the 15 substitutions were consistent with the prior source). Data from the CSEQ were complete for all cases but did not provide the same degree of specificity as data from administrative records. Inconsistency between the two sources was also noted for cases having complete data from both sources—19 percent of these evidenced some discrepancy between parent
education information supplied by admission records and information reported on the CSEQ.

A different substitution procedure was adopted for cases with missing values on CSEQ items. Since both experience scale and gain scale scores were arrived at by summing an individual's responses to items belonging to a particular scale, the individual's mean response to completed items was used to replace a missing value. The scale score was computed as the average of the items completed times the total number of items. A total of 31 substitutions affected 24 of the records retained for analyses. Substitutions affected only scales comprised of 10 or more items where at most 2 items had been omitted. In most instances the average of 9 items was substituted for a tenth, omitted item. No single record involved substitution on more than two experience scales (nor for more than 3 out of 118 experience items). Four substitutions were made for gains items. In two instances the average of 3 items was used to replace a fourth, omitted item and in the two remaining instances the average of 4 items was used to replace a fifth, omitted item. All four of these records had complete data for the twelve experience scales.

Recoding and Creation of Variables

With the exception of educational aspiration level, the raw data values for freshmen survey items used in the study
were recoded to reverse the direction of responses. A value of 1 was changed to 3 and a 3 to 1; a value of 2 was left unchanged. The instrument is reproduced in Appendix A.

Subsequent to the recoding, items 57 and 58 were summed to produce a variable representing the importance of social goals, and items 59 through 61 were summed to produce a variable representing the importance of personal goals. Item intercorrelations are shown in Table 2. For purposes of comparison, both population and sample correlations are reported. Alpha coefficients were .71 for the social goals scale (items 57 and 58) and .75 for the personal goals scale (items 59 through 61).

Freshmen survey items 15 and 16, which asked students to indicate their degree of certainty about choice of college major and choice of future career, were summed to represent the "certainty" score used in analyses. The alpha coefficient for the two-item scale was .65.

Reliability estimates for CSEQ experience scales were computed using statistics for composite scales rather than for individual scales. The Academic Experiences composite was the sum of four scale totals each of which, in turn, resulted from summing the 10 items making up a scale. The Group Experiences and Personal-Interpersonal Experiences composites were arrived at in the same manner, each produced by summing scores on four separate scales. Alpha coefficients for the three composite scales were .73 (Academic
Table 2

Intercorrelations among Goal Items for Population (upper diagonal, N=3141) and Sample (lower diagonal, n=222)

<table>
<thead>
<tr>
<th>Item*</th>
<th>57</th>
<th>58</th>
<th>59</th>
<th>60</th>
<th>61</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>1.0</td>
<td>.55</td>
<td>.27</td>
<td>.26</td>
<td>.30</td>
<td>2.32</td>
<td>.57</td>
</tr>
<tr>
<td>58</td>
<td>.54</td>
<td>1.0</td>
<td>.36</td>
<td>.32</td>
<td>.34</td>
<td>2.54</td>
<td>.53</td>
</tr>
<tr>
<td>59</td>
<td>.21</td>
<td>.32</td>
<td>1.0</td>
<td>.53</td>
<td>.51</td>
<td>2.68</td>
<td>.54</td>
</tr>
<tr>
<td>60</td>
<td>.23</td>
<td>.33</td>
<td>.43</td>
<td>1.0</td>
<td>.56</td>
<td>2.73</td>
<td>.51</td>
</tr>
<tr>
<td>61</td>
<td>.21</td>
<td>.32</td>
<td>.53</td>
<td>.58</td>
<td>1.0</td>
<td>2.55</td>
<td>.67</td>
</tr>
<tr>
<td>Mean</td>
<td>2.33</td>
<td>2.55</td>
<td>2.63</td>
<td>2.78</td>
<td>2.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>.56</td>
<td>.52</td>
<td>.55</td>
<td>.42</td>
<td>.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scale          | Social | Personal development
Social         | 1.0    | .42
Personal       | .36    | 1.0
Mean           | 4.88   | 7.95
SD             | .95    | 1.34

*Item 57=Become actively involved in student life and campus activities.
Item 58=Meet new and interesting people.
Item 59=Learn skills that will enrich my daily life or make me a more complete person.
Item 60=Develop my ability to be independent, self-reliant, and adaptable.
Item 61=Understand my personal values and beliefs.
Experiences), .78 (Personal-Interpersonal Experiences), and .59 (Group Experiences). Experience scale intercorrelations are reported in Table 3. Due to the small sample size, no attempt was made to reproduce the factor analysis results reported by Pace (1984). A priori decisions regarding which experience scales or which gains items to combine were adhered to.

Reliabilities for the two gains scales were also estimated. The alpha coefficient for the Personal-Social Gains scale, composed of five items, was .76 and that for the Intellectual Gains scale, composed of four items, was .74. Intercorrelations for these nine gains items are presented in Table 4.

Path Analysis

The validity of the conceptual model was tested using path analysis. The four background characteristics (gender, race, ability, and parents' education) were treated as exogenous, that is, determined by factors outside the model. All other variables were treated as endogenous, that is, influenced by variables within the model.

The estimation of direct and indirect effects and their standard errors required the solution of nine structural equations. A fortran program called GEMINI (Wolfle and Ethington, 1985) was used for this purpose. Input for the GEMINI program included a correlation matrix for the
Table 3
Intercorrelations among Twelve Individual Experience Scales and among Three Composite Scales (n=220)*

<table>
<thead>
<tr>
<th>Experience dimensions</th>
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<th>Personal-interpersonal</th>
<th>Group</th>
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<td>5.59</td>
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<tr>
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<tr>
<td>Mean</td>
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<td>15.46</td>
</tr>
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*1=Library Experiences, 2=Experiences with Faculty, 3=Course Learning, 4=Experiences in Writing, 5=Personal Experiences, 6=Student Acquaintances, 7=Conversation Topics, 8=Conversation Information, 9=Student Union, 10=Athletic-Recreation Facilities, 11=Clubs and Organizations, 12=Dormitory
Table 4

Intercorrelations among Nine Gains Items (n=220)

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<td>.47</td>
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<td>.20</td>
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<td>.30</td>
<td>.23</td>
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<tr>
<td>Mean</td>
<td>2.62</td>
<td>2.94</td>
<td>3.03</td>
<td>2.57</td>
<td>2.45</td>
<td>2.63</td>
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<td>2.63</td>
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<td>.84</td>
<td>.81</td>
<td>.85</td>
<td>.71</td>
<td>.77</td>
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</tbody>
</table>

Scale          | Personal-social | Intellectual
---------------|-----------------|----------------|
Personal-social | 1.0             | .47            |
Intellectual    |                 | 1.0            |
Mean            | 13.54           | 10.52          |
SD              | 2.97            | 2.36           |

*Item 10=Developing your own values and ethical standards.
Item 11=Understanding yourself--your abilities, interests, and personality.
Item 12=Understanding other people and the ability to get along with different kinds of people.
Item 13=Ability to function as a team member.
Item 14=Developing good health habits and physical fitness.
Item 18=Ability to think analytically.
Item 19=Quantitative thinking--understanding probabilities, proportions, etc.
Item 20=Ability to put ideas together, to see relationships, similarities, and differences between ideas.
Item 21=Ability to learn on your own, pursue ideas, and find information you need.
thirteen variables specified in the model, along with means and standard deviations of these variables. These statistics were generated using the SAS procedure CORR with 210 observations and no missing values since the mean substitutions detailed above were effected before creating any of the composite variables.

The block-recursive character of the model dictated that each endogenous variable be regressed on all endogenous variables occurring in antecedent blocks as well as on all exogenous variables, but that variables comprising a single block would not appear in equations having any one of these as the dependent variable.

For example, the two gains variables (Personal-Social Gains and Intellectual Gains) belonged to a single block—no causal nexus was posited between them. Academic Experiences, Personal-Interpersonal Experiences, and Group Experiences formed a second block, not causally related among themselves, but causally antecedent to the gains variables. Similarly, no causal relationships were posited among the four variables educational aspirations, certainty about major and career choice, importance of personal goals, or importance of social goals although all were expected to have significant effects on gains variables. The exogenous variables (background characteristics) also comprised a block. The relationships between variables within blocks remained unanalyzed.
The GEMINI program first performs ordinary least squares regression analyses. These analyses provide the regression or path coefficients. "A path coefficient indicates the direct effect of a variable hypothesized as a cause of a variable taken as an effect" (Pedhazur, 1982). The total effect of one variable on another consists of a direct and an indirect effect. The indirect effect represents the influence transmitted through intervening variables and the direct effect is the unmediated portion (Alwin & Hauser, 1975). The program calculates indirect effects using a method developed by Fox (1980). Finally the program calculates standard errors for the indirect effects using a method that follows from the work of Sobel (1982). In addition to the usual regression output, the program prints various matrices of the effects (total, direct, and indirect) including both metric and standardized values, standard errors for the indirect effects, associated t-ratios, and probabilities for the t-ratios.

The two types of coefficient (metric and standardized) can both be used in interpreting results. The standardized coefficients (beta weights) are an indication of the relative importance of variables in an equation. However, for a comparison of results from different populations the metric coefficient is used. Standardized coefficients are a function of variances and covariances, and if these differ, the magnitudes of the beta weights are affected. However,
metric coefficients tend to be more stable in different populations (Pedhazur, 1982). The results of the regression analyses are presented in Chapter four.
FINDINGS

The means, standard deviations, and zero-order correlations of all variables used in the analyses are shown in Table 5. Regression equations for the effects of quality of effort dimensions, motivational factors, and background characteristics on each developmental outcome are given in Table 6. The results for the two outcome variables--Intellectual Gains and Personal-Social Gains--are discussed separately.

The reader is cautioned to reserve judgment concerning the meaning of results reported in this chapter. Interpretation is subject to a consideration of characteristics of the data which could have produced unreliable regression coefficients.

Influences of Quality of Effort, Motivational Factors, and Background Characteristics on Intellectual Gains

The variable contributing the most to Intellectual Gains was the quality of effort invested in Academic Experiences (ACADMCQE)--use of the library, course work, interactions with faculty, and writing. Also important was the Personal-Interpersonal Experiences dimension (PERSNLQE) --two of the four scales comprising this dimension ("Conversation Topics" and "Information in Conversations")
Table 5
Means, Standard Deviations, and Intercorrelations for Variables Used in Analyses

<table>
<thead>
<tr>
<th>Variable*</th>
<th>GENDER</th>
<th>RACE</th>
<th>SAT</th>
<th>PARENTED</th>
<th>CERTINTY</th>
<th>EDUCASP</th>
<th>SOCODALS</th>
<th>PEROODALS</th>
<th>GROUPQE</th>
<th>PERNLQOE</th>
<th>ACADEMQE</th>
<th>PERGAINS</th>
<th>INIGAINS</th>
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<td>.07</td>
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<td>.09</td>
<td>.15</td>
<td>.16</td>
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<tr>
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<td>.04</td>
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*GENDER—male coded 1, female coded 2.
RACE—white coded 1, black coded 2.
SAT—combined SAT scores, range 560 to 1490.
PARENTED—father's and mother's educational attainment, range 3 to 15.
CERTINTY—certainty about major and career choice, range 2 to 6.
EDUCASP—educational aspiration level, range 2 to 4.
SOCODALS—social goals scale, range 2 to 6.
PERGAINS—personal development goals scale, range 4 to 9.
GROUPQE—Group Experiences scale, range 52 to 138.
ACADEMQE—Academic Experiences scale, range 54 to 132.
PERSNQOE-Personal-Interpersonal Experiences scale, range 51 to 143.
PERSNQOE—Person-Interpersonal Experiences scale, range 51 to 143.
PERGAINS—Person-Interpersonal Gains scale, range 5 to 20.
INIGAINS—Academic-Intellectual Gains scale, range 5 to 16.
Table 6

Regression Equations for Effects of Each Quality of Effort Dimension, Motivational Factor, and Background Characteristic on Gains

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intellectual b</th>
<th>Std. err.</th>
<th>Beta</th>
<th>Personal-social b</th>
<th>Std. err.</th>
<th>Beta</th>
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<td>.019</td>
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<td>.087</td>
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<td>-.002**</td>
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<td>-.038</td>
<td>.063*</td>
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<td>.323**</td>
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<td>.131</td>
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<td>.144</td>
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<td>.101**</td>
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<td>.313</td>
<td>.066</td>
<td>.908*</td>
<td>.382</td>
<td>.153</td>
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</table>

| R SQUARE   | .27327         |           |       | .31657            |           |      |

*Effects significant at a probability level of .05 or less.
**Effects hypothesized to be greater than zero.
emphasized the intellectual aspects of interactions with peers. These two individual scales had higher zero-order correlations with Intellectual Gains than did three of the four scales that made up the Academic Experiences dimension.

Intellectual Gains were also influenced by motivational factors. Direct effects of .085 from educational aspirations (EDUCASP) and .066 from certainty about major and career choice (CERTNTY)—combined with indirect effects of .075 and .071, respectively—produced total effects of .160 and .137. Indirect effects of motivational factors and background characteristics on outcomes are shown in Table 7. A summary of effects from each variable is shown in Table 8.

The direct effect from importance attributed to personal development goals (PERGOALS) on Intellectual Gains (.131) was larger than expected. However, the indirect effect was minimal (with a negative sign)—reducing the total effect to .117. A total effect of .068 from importance attributed to social goals (SOCGOALS) was primarily indirect but also diminished slightly by combining effects with opposing signs.

The background characteristic having the most notable impact on Intellectual Gains was gender. Its indirect effect (.086) was greater than its direct effect (.066). The mean Intellectual Gains reported by females was only slightly higher than that for males (10.83 versus 10.25), but females invested (overall) higher quality of effort both
Table 7

Indirect Effects of Each Motivational Factor and Background Characteristic on Gains

<table>
<thead>
<tr>
<th>Variable</th>
<th>Metric Value</th>
<th>Std. Value</th>
<th>Standardized Value</th>
<th>Metric Value</th>
<th>Std. Value</th>
<th>Standardized Value</th>
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<td>.079</td>
<td>.074</td>
<td>.257*</td>
<td>.090</td>
<td>.081**</td>
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<td>.094</td>
<td>.075**</td>
<td>.204</td>
<td>.107</td>
<td>.049</td>
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<tr>
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<td>.062</td>
<td>.071**</td>
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<td>.070</td>
<td>.047</td>
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<td>.038</td>
<td>.054</td>
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<td>.273</td>
<td>.074</td>
<td>.547</td>
<td>.326</td>
<td>.068</td>
</tr>
<tr>
<td>GENDER</td>
<td>.406*</td>
<td>.168</td>
<td>.086</td>
<td>.398*</td>
<td>.200</td>
<td>.067</td>
</tr>
</tbody>
</table>

*Effects significant at a probability level of .05 or less.
**Effects hypothesized to be greater than zero.
Table 8

Summary of Effects from Each Quality of Effort Dimension, Motivational Factor, and Background Characteristic on Gains

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intellectual Total effect</th>
<th>Intel. Dir. eff.</th>
<th>Intel. Ind. eff.</th>
<th>Personal-social Total effect</th>
<th>Pers. Dir. eff.</th>
<th>Pers. Ind. eff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACADMCQE</td>
<td>.335</td>
<td>.335</td>
<td></td>
<td>.087</td>
<td>.087</td>
<td></td>
</tr>
<tr>
<td>PERSNLQE</td>
<td>.180</td>
<td>.180</td>
<td></td>
<td>-.002</td>
<td>-.002</td>
<td></td>
</tr>
<tr>
<td>GROUPQE</td>
<td>-.038</td>
<td>-.038</td>
<td></td>
<td>.323</td>
<td>.323</td>
<td></td>
</tr>
<tr>
<td>PERGOALS</td>
<td>.117</td>
<td>.131</td>
<td>-.014</td>
<td>.111</td>
<td>.130</td>
<td>-.019</td>
</tr>
<tr>
<td>SOCGOALS</td>
<td>.068</td>
<td>-.006</td>
<td>.074</td>
<td>.182</td>
<td>.101</td>
<td>.081</td>
</tr>
<tr>
<td>EDUCASP</td>
<td>.160</td>
<td>.085</td>
<td>.075</td>
<td>.127</td>
<td>.078</td>
<td>.049</td>
</tr>
<tr>
<td>CERTNTY</td>
<td>.137</td>
<td>.066</td>
<td>.071</td>
<td>.089</td>
<td>.042</td>
<td>.047</td>
</tr>
<tr>
<td>PARENTED</td>
<td>-.108</td>
<td>-.146</td>
<td>.038</td>
<td>-.061</td>
<td>-.110</td>
<td>.049</td>
</tr>
<tr>
<td>SAT</td>
<td>.094</td>
<td>.102</td>
<td>-.008</td>
<td>-.111</td>
<td>-.090</td>
<td>-.021</td>
</tr>
<tr>
<td>RACE</td>
<td>-.020</td>
<td>-.094</td>
<td>.074</td>
<td>.049</td>
<td>-.019</td>
<td>.068</td>
</tr>
<tr>
<td>GENDER</td>
<td>.152</td>
<td>.066</td>
<td>.086</td>
<td>.220</td>
<td>.153</td>
<td>.067</td>
</tr>
</tbody>
</table>
in their Academic and in their Personal-Interpersonal Experiences and females gave more importance to personal development goals. These variables mediated influence of gender on Intellectual Gains. Thus, in spite of a nonsignificant difference in gains reported by males and females, the total effect of gender was .152.

The direct effect of parents' education (PARENTED) on Intellectual Gains was negative, that is, higher levels of parents' education were associated with modest estimates of intellectual growth. A small but positive indirect influence reduced the total effect from parents' education to -.108. Although mean levels of parents' education were higher for whites than for blacks, mean scores on the Intellectual Gains variable did not differ by race (10.52 for whites compared to 10.56 for blacks).

Influences of Quality of Effort, Motivational Factors, and Background Characteristics on Personal-Social Gains

The largest contribution to Personal-Social Gains came from the quality of effort invested in Group Experiences (GROUPQE), which entailed participation in clubs, athletics, and activities associated with the student union and with residence halls. There was also a small positive effect from Academic Experiences, but, surprisingly, no influence of Personal-Interpersonal Experiences quality of effort on
Personal-Social Gains. A possible explanation for these results is discussed in a later section on collinearity.

Among the motivational factors, the importance attributed to social goals (that is, the desire to "meet new and interesting people" and "become actively involved in student life and campus activities") influenced Personal-Social Gains the most. A direct effect of .101 (while not statistically significant) was only slightly less than that of importance attributed to personal development goals (.130). The indirect effect of social goals on Personal-Social Gains (.081) increased its total effect to .182.

One other important influence on Personal-Social Gains was gender. The total effect (.220) was largely direct although the indirect effect (.067) was also significant at the .05 level of probability. The mean Personal-Social Gains score of females was higher than that of males, and females attributed greater importance to personal development and to social goals. Although females did not have significantly higher mean scores on the Group Experiences dimension, they surpassed males in the quality of participation associated with the student union and with residence halls--as measured by individual scales. Females also reported higher quality of effort on two scales that formed part of the Personal-Interpersonal Experiences dimension ("Personal Experiences" and "Student Acquaintances"), but (based on regression results) their superior effort in
attempts to understand themselves and their acquaintances made no contribution to Personal-Social Gains. The path coefficient for the effect of Personal-Interpersonal Experiences on Personal-Social Gains was virtually zero so that the contribution to the indirect effect of gender on growth via that quality of effort dimension was also zero. This result was probably due to collinearity among the quality of effort dimensions, which is discussed in the next chapter.

Comparison of the Hypothesized Model and the Obtained Model

The path diagram for the obtained model is shown in Figure 2. The obtained model differed from the hypothesized model in these respects:

(1) The quality of effort invested in personal experiences and interactions with peers (that is, the Personal-Interpersonal Experiences dimension) predicted the intellectual outcome rather than the personal-social outcome. But characteristics of the data appear to have impaired the reliability of coefficients obtained for the experience dimensions.

(2) Importance attributed to personal development goals was related to both outcomes—-not just Personal-Social Gains—and these effects were direct rather than mediated by quality of effort.
Figure 2. Obtained path model.
(3) Importance attributed to social goals influenced quality of effort invested in Personal-Interpersonal Experiences as well as in Group Experiences so that its indirect influence extended to Intellectual Gains and not just to Personal-Social Gains.

(4) Certainty about major and career choice had no negative indirect influence on gains—that is, having lower levels of certainty was not associated with higher Personal-Interpersonal quality of effort; and

(5) Two background characteristics—gender and parents' education—were significant direct influences on Personal-Social Gains and on Intellectual Gains, respectively. And the indirect effects of gender on both outcomes were significant as well. The effects of background variables were thought to be only indirect and too weak to be statistically significant.

Summary of Findings

The results of this study indicated that: (a) Two quality of effort dimensions—Academic Experiences and Personal-Interpersonal Experiences—contributed to Intellectual Gains, but (surprisingly) only the Group Experiences effect was significant for Personal-Social Gains; (b) importance attributed to personal development and to social goals influenced Intellectual Gains as well as Personal-Social Gains; (c) educational aspirations and certainty about major
and career choice affected Intellectual Gains; and (d) among
the background characteristics, gender and parents' educa-
tion produced significant coefficients, but the impact of
the latter was limited to Intellectual Gains while the
influence of gender extended to Personal-Social Gains as
well.

The finding that Group Experiences quality of effort
contributed to Personal-Social Gains is consistent with
Hood's (1984) results, which indicated that participation in
various types of extracurricular activities is associated
with growth in psycho-social areas of development. Simi-
larly, Terenzini et al. (1982) reported an impact of social
involvement on personal growth. The agreement with Hood's
finding is especially important since his study was longi-
tudinal, controlled for development at college entry, and
used criterion measures which were objective rather than
self-estimates. That study also used objective measures of
cognitive growth but found no college experience correlates
for the differences observed between pre- and posttests.
With the exception of participation in extracurricular
activities and postcollege educational plans, the variables
included in Hood's study were not similar to variables
included in the present study. However, his finding that
participation in extracurricular activities did not affect
cognitive outcomes lends support to results of the present
study concerning the absence of an effect from Group
Experiences on Intellectual Gains. Terenzini et al. (1982) found that a measure of classroom involvement did affect intellectual gains. Although their outcome measure was similar to that of the present study, the classroom involvement scale was (superficially) similar to only one of the measures comprising the Academic Experiences variable.

Obtained path coefficients for the effects of individual quality of effort dimensions on outcomes were only partially consistent with expectations. Although Group Experiences was the dimension contributing the most to Personal-Social Gains, and Academic Experiences was the dimension contributing the most to Intellectual Gains, two (near) zero coefficients with negative signs suggested the existence of a collinearity problem. This is discussed in the next chapter.

The consequences of collinearity among quality of effort dimensions would extend to estimates of the indirect effects of other variables. The discussion which follows reflects the results obtained for this data. However, general findings regarding the nature and relative importance of influences are (unless otherwise indicated) assumed to be replicable.

Three motivational factors--educational aspiration level, certainty about major and career, and the importance placed on social goals--were found to influence gain scores indirectly by virtue of their impact on quality of effort.
However, the influence of the social goals variable extended to both growth dimensions. Students who felt that "to meet new and interesting people" and "to become actively involved in campus life and activities" were major goals for college tended to invest a high quality of effort in various non-academic pursuits—not just in some group experiences. Attributing importance to social goals was also influential to the quality of effort invested in some personal experiences and interactions with peers. Although degree aspirations and certainty about major and career choice had larger total effects, the importance given to social goals also made an indirect contribution to Intellectual Gains.

Not all of the observed influences of motivational factors were consistent with hypotheses. Personal and social goals variables were found to influence both outcomes. A significant portion of influence from social goals on each developmental outcome was indirect—mediated by quality of effort. In contrast, the importance attributed to personal goals had only direct influences.

Some discrepancies regarding influences of educational aspirations and certainty about major and career choice on quality of effort dimensions may be attributable to the size of the sample. Path coefficients that were not significant were moderate in size. However, certainty about major and career choice did not have the expected negative effect on Personal-Interpersonal Experiences.
The influences observed for background characteristics were largely consistent with findings of Terenzini et al. (1982) although that study did not measure indirect effects. The investigators reported an effect of gender on personal growth but found no influence of parents' education on intellectual growth. Their results showed a negative effect of academic aptitude on personal growth; results of the present study showed the influence of ability on Personal-Social Gains to be negative but not statistically significant--perhaps because of the small sample.

Gender was the background characteristic having the greatest impact on either outcome. While some of its effect on Personal-Social Gains was direct, a significant portion of its influence was mediated. Females attributed greater importance both to personal-development goals and to social goals--the variables through which much of this indirect impact was transmitted.

Mean scores of males and females did not differ for Group Experiences quality of effort. However, differences on two subscales--"Student Union" and "Dormitory"--showed higher quality social involvement on the part of women. Comparisons for other subscales showed superior athletic participation for men but no difference with regard to participation in clubs and organizations.

Women also invested higher quality of effort in experiences that affected Intellectual Gains. On scales compris-
ing the Academic Experiences dimension, females had higher scores for "Course Learning" and "Experiences in Writing."

A significant direct effect of parents' education on Intellectual Gains was negative. However, peculiarities of the sample raise doubt about the generalizability of that result. This and other limitations are discussed in the next chapter.

Neither ability nor race produced statistically significant coefficients but their zero-order correlations with Personal-Social Gains and with some intervening variables--along with the finding of Terenzini et al. (1982) that combined SAT scores had a negative effect on personal growth--support their inclusion in the model. If race were not a relevant variable, including it in the model should have inflated the standard error(s) of ability--because of the high zero-order correlation between the two variables (Berry & Feldman, 1985). There was no evidence that standard errors for ability were affected by the inclusion of race. However, small sample size, collinearity, or peculiarities of the sample may have influenced results for these variables.

The combination of student characteristics--background variables and motivational factors--used in this study explained 19 percent of the variation in Personal-Social Gains and 11 percent of the variation in Intellectual Gains. With the added contribution of quality of effort, the
explained variance for the two outcomes was 32 percent and 27 percent, respectively.

The proportion of variance in each gains variable attributed to each quality of effort dimension was comparable to results reported in Friedlander (1980/1981) and Pace (1984) for 1979 and 1983 versions of the College Student Experiences questionnaire. The present study indicated that with the effects of gender, race, ability, and parents' education partialed out, four motivational factors could explain 9 percent of variance in Personal-Social Gains and 8 percent of variance in Intellectual Gains.

Because this study included only new freshmen (22 or younger) residing in dormitories, the effects of age, class level, and living arrangement were restricted. Results reported by Friedlander (1980/1981) suggest that these along with various environmental factors could account for another 27 percent of variation in Intellectual Gains and 9 percent of variation in Personal-Social Gains—without considering the contribution from quality of effort (which could be expected to mediate some of the effects of environmental factors).

Several factors known or suspected to have affected the results of this study have important implications for the interpretation of findings. These are considered in the next chapter.
DISCUSSION OF FINDINGS,
CONCLUSIONS, AND RECOMMENDATIONS

This study utilized path analysis to evaluate the validity of the proposed model for explaining self-reported freshman-year developmental outcomes as a function of direct and indirect influences from preenrollment motivational factors. The results reported in chapter four showed that the hypothesized model did not fit the correlations observed for the sample. Among the factors that may have contributed to this failure are the following: (a) Specification error; (b) small sample size; (c) limited variability of responses because of a homogeneous population; (d) multicollinearity; and (e) peculiarities of the sample. Some discussion of the known and suspected impact that these factors had on the results should inform future attempts to replicate present findings or to test similar models. Interpretation and generalization of results are necessarily subject to the limitations of the data.

Discussion of Factors Limiting Interpretation and Generalization of Results

A model has been misspecified if it includes irrelevant variables, omits relevant variables, or posits zero coefficients for paths that are nonzero (and vice versa). Omit-
ting a relevant variable has by far the more severe consequences for interpreting results. Omitting an exogenous variable (such as a background characteristic) that is correlated with, or predicted by, any included exogenous variable(s) allows the included variable(s) to be correlated with the residual or error term, which represents unmeasured causes. This can lead to biased estimates of the regression coefficient(s) (Kenny, 1979). The exogenous variables in this study were limited to gender, race, parents' education, and student ability because previous research suggested that these would be important indicators of student goals and educational aspirations. The results obtained in this study provide no evidence to the contrary. Although the results do indicate that several paths were misspecified, the hypothesized model cannot be summarily rejected. Consideration must also be given to the roles that other factors may have played in producing the results.

Small sample size and highly intercorrelated predictor variables (multicollinearity) can both lead to errors of inference (Kenny, 1979) because they affect the magnitude of a test statistic. The range of a regressor variable also affects the magnitude of a test statistic (Pedhazur, 1982). These factors may have contributed to the failure of some coefficients to achieve statistical significance. Furthermore, peculiarities of the sample—as well as collinearity—appear to have produced some unreliable coefficients. The
discussion which follows will focus on collinearity and sample-population differences since interpretation and generalization of the findings are known to be limited by these two problems. The conclusions which follow the discussion are necessarily tentative, and recommendations emphasize the importance of anticipating collinearity problems in future research using Pace's quality of effort scales.

Collinearity

When regressor variables in an equation are too highly correlated among themselves, effects "rightfully" due to one variable may be attributed to another. For example, the zero-order relationship between the Personal-Interpersonal Experiences composite scale and the Group Experiences composite scale was .67. These two variables were correlated .34 and .43, respectively, with the Personal-Social Gains variable. A likely consequence of these high zero-order relationships is an inflated beta weight for the variable that has the stronger relationship with the criterion—even though the absolute magnitude of the relationship is very similar (Pedhazur, 1982). Path coefficients obtained for the effects of Group Experiences and Personal-Interpersonal Experiences on Personal-Social Gains were .323 and -.002, respectively—a difference almost certainly attributable to a collinearity problem rather than to the importance of
Group Experiences alone in promoting the developmental outcome. The same phenomenon may have inflated the effect of Academic Experiences on Intellectual Gains—causing it to take on some of the effect attributable to Personal-Interpersonal Experiences. Path coefficients obtained for these effects were .335 for Academic Experiences and .180 for Personal-Interpersonal Experiences; but zero-order correlations with the criterion differed little—.43 versus .38. The correlation between the two experience variables was .56. Indeed, none of the path coefficients obtained for effects of quality of effort dimensions on developmental outcomes is exempt from the potentially biasing effect of collinearity. Furthermore, since indirect effects attributed to motivational factors and to background characteristics were a function of the regression coefficients obtained for the quality of effort dimensions, they too might have been over- or underestimated.

In view of this, separate analyses were conducted in which outcomes were regressed on motivational factors and background characteristics (without the intervening quality of effort dimensions). These reduced models explained 19 percent of the variance in Personal-Social Gains and 11 percent of the variance in Intellectual Gains—compared to 32 percent and 27 percent for the full models (quality of effort included). Metric values for the total effect of each of the eight variables (motivational factors and
Consideration was given also to the possibility that the effects observed for the personal goals and the social goals variables might have been distorted due to the magnitude of their zero-order correlation (.36). Although there was almost no difference in the magnitudes of their respective zero-order relationships with Personal-Social Gains (.25 versus .26), the total effect (standardized) attributed to social goals was half again as large as that attributed to personal goals.

To investigate further the problem of collinearity, the correlation matrix was inverted—following a recommendation in Pedhazur (1982). Diagonal elements in the inverted matrix were 2.2, 1.96, and 1.64 for the three quality of effort dimensions—Personal-Interpersonal, Group, and Academic Experiences, respectively. Diagonal elements for two background characteristics—ability and race—were both 1.78, also undesirably high. However, for the two goals variables, the diagonal elements were lower—1.25 for social goals and 1.24 for personal goals.

The more these diagonal elements deviate from 1.0, the greater the likelihood that there is a problem; and (in general) the greater the magnitude of zero-order correlations between regressor variables, the more severely biased are the results. A difference in the magnitude of each
regressor variable's relationship with the criterion could produce unexpected and contradictory results (Pedhazur, 1982).

Implications of Collinearity

for Interpretation of Results

The consequences of collinearity for results obtained in this study cannot be determined with any degree of assurance. Absolute zero or near-zero coefficients with a negative sign for influences of quality of effort dimensions on gains are certainly not reliable. And, since indirect effects are computed from regression coefficients, in some cases their magnitudes would have been over- or underestimated. Speculation about specific consequences of collinearity would not be warranted.

It must be concluded that both the hypothesized model and the obtained model fail to provide an adequate representation of the influences of quality of effort dimensions on the developmental outcomes. Given the nature of the data, the analytical technique used in this study could not produce reliable estimates of the independent effects of the three quality of effort dimensions on either outcome.

Certain characteristics of the population itself may have produced results that would not be duplicated for students in less technical curricula. And, since bias may have been introduced to sample data through nonresponse, the
results must be interpreted in light of some important differences between the sample and the population.

Sample-Population Comparisons

About 29 percent of all freshmen at the participating institution were enrolled in engineering fields and 15 percent in sciences, but the sample was comprised of 36 percent engineering students and 19 percent from sciences. Students enrolled in humanities and social sciences (which included business fields), agriculture, and textiles made up 18, 16, and 6 percent of the sample, respectively; and these proportions closely approximated those of the population. The relatively larger proportion of engineering and science students may account for the somewhat higher SAT quantitative scores of the sample (mean = 552.99, standard deviation = 91.06). The mean for the population was 545.85, the standard deviation, 89.72. The negative path coefficient from ability to the personal goals variable (-.172) reflects a tendency for high scorers on either the quantitative or the verbal part of the SAT to give less importance to personal development objectives. For the sample, zero-order correlations between the personal goals scale and the SAT were -.22 for quantitative scores and -.17 for verbal scores. Zero-order relationships for the population were -.21 and -.19, respectively. Separate analyses for whites and blacks revealed that no relationship existed between the
personal goals and SAT scores of blacks either in the population or in the sample.

The proportion of women in the sample was significantly larger than the proportion in the population (chi square = 7.43, df = 1, p < .01). The population consisted of 38 percent women, but 47 percent of the sample members were women. However, the imbalance occurred primarily among blacks. Women made up only 41 percent of whites in the sample, but 79 percent of blacks were women. Despite this difference, sample mean responses to items regarding the importance of personal goals and the importance of social goals were consistent with population means for three out of the four race-gender groups—with black females having the highest mean score on the personal goals scale and white males having the lowest mean scores on both social and personal goals scales. Results of one-sample t-tests are reported in Appendix B (see Tables B-1 and B-2).

Results of independent t-tests revealed a tendency for (white) women to place more importance on social goals, and to report higher quality of effort in Personal-Interpersonal Experiences and greater gains on both dimensions than did white males. However, path coefficients for influences of gender on personal goals (.105) and on social goals (.131) were not statistically significant—perhaps because of the small sample size. Men and women did not differ with regard to mean scores on degree aspirations and only black men and
women differed with regard to certainty about major and career choice. Results of independent t-tests are reported in Appendix B (see Tables B-8 through B-10).

The only significant path coefficient obtained for race was its impact on certainty about major and career choice; however, the magnitude (.218) was exaggerated. Black sample mean responses regarding the certainty of choices were not typical of responses from the black population. Results of one-sample t-tests reported in Appendix B (see Table B-4) showed that black females indicated significantly greater certainty than their population counterparts while black males indicated less certainty (although the latter difference was not statistically significant). There is another identifiable way in which the sample's race-gender imbalance probably affected results. Black females in the sample reported significantly lower degree aspirations than black females in the population. On the other hand, white females reported higher levels than their population group (but not significantly so). These aberrations would limit the generalizability of findings concerning the influence (or lack of influence) from race.

Lower SAT scores and lower levels of parent education of blacks in the sample reflected (for the most part) actual differences among blacks and whites in the population. Nevertheless, results of one-sample t-tests reported in Appendix B (see Table B-5) showed that whites in the
sample—both males and females—had significantly higher SAT quantitative scores than their counterparts in the population.

The mean parent education level of black females was significantly lower than that of their population counterparts. Because black females in the sample had unusually high levels of certainty when compared to population counterparts and their already low parent education levels were accentuated (possibly by substitution of the group mean for missing values), the path coefficient from parents' education to certainty (−.134) was probably exaggerated. (This coefficient does not appear in the path diagram of Figure 2 because it was not significant at the .05 level of probability.)

To further evaluate the likelihood of bias due to non-representativeness, regression analyses were conducted using statistics for whites only (n=2509 for the white population and n=176 for the white sample) and the race variable was dropped from the equations. Means, standard deviations, and zero-order correlation coefficients used for the analyses are reported in Appendix B (see Tables B-11 and B-12). Regression results are reported in Tables B-13 and B-14. Because population and sample standard deviations differed little, standardized regression coefficients are referred to in discussing the results of these analyses.
Three of the coefficients obtained for the white sample were larger by comparison with coefficients obtained for the white population--the influences of gender on social goals (.171 versus .087) and on educational aspirations (.141 versus .085) and the influence of parents' education on certainty about major and career (-.157 versus -.098). One pair of coefficients also had opposite signs--the influence of parents' education on personal development goals was positive (.081) for the sample but negative (-.054) for the population. Three other coefficients obtained for the sample were smaller compared to population values--the influences of ability on social goals (-.080 versus -.124) and on educational aspirations (.072 versus .106) and the influence of parents' education on educational aspirations (.0175 versus .1472).

Implications of Differences Between the Sample and the Population

Regression coefficients for paths cited in the preceding paragraph were not statistically significant for the sample (blacks and whites). Nevertheless, some differences between covariances of the white sample and the white population along with some atypical responses noted for blacks in the sample have implications for interpreting results.

For the most part differences between regression coefficients for the white population and the white sample are
probably no greater than might be expected as a consequence of sampling fluctuation. The variable showing the most disparity was parents' education. The results for the white population along with certain sample-population differences noted for blacks suggest that the effects of parents' education reported for the sample would not be accurate estimates of that variable's effects in the population.

Effects observed for race also would not be generalizable. As pointed out in the previous section, mean responses of blacks concerning educational aspirations and certainty about major and career choice differed from black population means.

Because of these known limitations and because of the uncertain consequences of multicollinearity, the interpretation of findings must be considered somewhat speculative. Nevertheless, it is possible to accept with reasonable confidence the statistical significance of effects from gender, educational aspirations, certainty about major and career choice, and the importance attributed to personal development and to social goals on quality of effort and perceived freshman-year growth.

The magnitudes of the path coefficients reported in Figure 2 should be viewed only as indicating the relative importance of these variables in predicting the associated quality of effort or growth dimension. That is, for the population studied, educational aspirations and certainty
about major and career choice were significant predictors of academic involvement while importance attributed to personal development or to social goals were not. On the other hand, importance attributed to social goals was the best predictor of nonacademic involvement (both Personal-Interpersonal and Group Experiences quality of effort). Total effects reported in Table 8 provide an indication of the relative importance of variables in predicting each growth dimension, but special caution is advised in interpreting the values reported for quality of effort variables and for the background characteristics race and parents' education.

The generalizability of findings concerning the relative importance of gender and motivational factors in predicting involvement and outcomes is clearly limited to the type of population studied. The curricula offered by the participating institution represent primarily applied disciplines within the category "hard" proposed by Biglan (1973). The sample was drawn from a population in which 56 percent of students were enrolled in either engineering, agriculture/life sciences, forest resources, or textiles, and another 15 percent were enrolled in physical and mathematical sciences. Only 22 percent were enrolled either in humanities and social sciences or in associated applied curricula; and 7 percent had not yet made a choice. While these population characteristics restrict generalizability, the relative homogeneity of career interests strengthens the
validity of results obtained for gender and motivational factors and thus increases the likelihood that these would be replicated for other, similar populations.

Conclusions and Recommendations

The relative strength of the importance attributed to social goals as a predictor of quality of effort invested in peer relationships and other campus involvement may pose a challenge for student development professionals. This and other studies (Hood, 1984; Terenzini et al. 1982) indicate that extracurricular involvement is associated with personal growth. But the present research suggests that student values and goal priorities play a significant role in determining the quality of participation. It may be—as suggested by Sandeen (1985)—that many college students in the 1980's "decide whether to participate in a particular activity in direct proportion to its ability to enhance their job resume." The credibility of this assertion is enhanced by evidence from this study. Certainty about major and career choice was more strongly related to quality of participation in activities of the student union (r = .21) and in clubs and organizations (r = .17) than was the importance of social goals (r = .12 and .07, respectively). The effect of social goals on group experiences can be attributed in large part to the former variable's association with participation in residence hall activities (r = .33).
Many career-related gender differences have disappeared over the last two decades. A majority of the women in this population were planning to enter such traditionally male fields as engineering and agriculture and almost universally (99 percent) cited preparing for a career as a major goal for college. Nevertheless, a "traditional" gender difference was still apparent in females' greater tendency to also give importance to personal development and social goals. The quality of their participation in clubs and organizations was not different from that of males. But women tended more than men to have high quality interpersonal relations (more self-disclosure, conversations with people whose values and background were different from theirs). And women tended to be more actively involved in residence hall programs.

Although the results suggest that gender predicted the outcomes in part because of its relationship with two types of goals and with certain categories of involvement, the direct effect of gender on Personal-Social Gains indicates that there were other factors not considered in this study that led females to report greater personal growth. These may include other goals that women tend to value more than men do. Findings of Goldberg and Shiflett (1981) suggest that knowledge of students' expectations for a career (for example, status versus self-fulfillment) might account for some of the gender difference. It is possible, however,
that the differences found in the present study do not persist after the freshman year. A follow-up study could address both of these questions.

It is somewhat paradoxical that placing importance on personal development goals such as self-understanding did not lead to higher quality of effort in personal experiences—an optimal means of achieving them. Although the importance of personal development goals was most highly correlated with three scales measuring personal experiences and peer relations, the importance of social goals was also most highly correlated with these same three scales, but the latter associations were stronger. In spite of this, the importance of personal development goals predicted Personal-Social Gains about as well as did the importance of social goals; either one alone could account for about 6 percent of the variance in that outcome. (Multiple regression results attributed the indirect effect of the social goals variable on Personal-Social Gains almost entirely to involvement in Group Experiences so that the higher quality of personal and interpersonal relations associated with importance of social goals was not shown to affect that outcome—a very untenable finding.) While some of the types of involvement measured by the quality of effort scales were associated with student reports of personal growth, there are other types of involvement (not considered in this study) that also might be related to personal growth—and to personal development.
goals. The CSEQ contains no scales dealing with religious participation or noncampus community involvement because its focus is on campus facilities and opportunities.

The consistency in the ways that the personal and social goals variables were found to relate to outcomes allow speculation that the goals variables may be associated with personality differences (such as introversion and extroversion) or that they identify different student subcultures (such as intellectual and social). The importance of personal development goals was directly related to both outcomes while the importance of social goals was associated with quality of effort so that its relationship to outcomes was partly indirect. This would be expected if giving importance to personal development goals characterized involvement with self or with ideas while giving importance to social goals characterized involvement with the campus environment.

A system for disseminating information concerning campus opportunities that appeal to different personality types was described by Jacoby, Rue, and Allen (1984). This type of information could be introduced during freshmen orientation. Advisors could make use of information a student provides concerning the importance of different goals in order to help the student identify the opportunities for participation that match his or her objectives. If the campus does not offer appropriate conditions or opportunities,
the student may not belong there. Pascarella, Terenzini, and Wolfle (1986) found that participation in an orientation program specifically designed to inform freshmen and to facilitate their integration influenced freshmen decisions to re-enroll at the same college.

It should be of interest for future research that while motivational factors considered in this study helped to explain outcomes by accounting for variance over and above that attributable to gender, race, ability, and parents' education, the inclusion of race and ability in the same regression equation provided redundant information and may have produced unreliable parameter estimates. Greater efficiency in predicting outcomes might be achieved by eliminating one of these variables and, also, by using a single goals variable. The disadvantage of eliminating any variables entirely or of using a single (composite) goals variable would be loss of information concerning influences that have implications for theory and for interpretation of results. Because two goals scales were used in this study, it was possible to observe that relationships between outcomes and educational aspirations, certainty about major and career choice, and importance given to social goals were mediated by quality of effort while the importance of personal development goals was not associated with quality of involvement (as defined for this investigation). Findings concerning race and ability were less easily interpreted
but, nevertheless, suggested influences that merit further investigation.

Interrelationships among the three quality of effort dimensions introduced multicollinearity. This problem decreased the reliability of coefficients and severely hampered interpretation of the results. The research objective (that is, to evaluate the hypothesized model) could not be satisfactorily achieved. Researchers using quality of effort data need to anticipate this problem and avoid using more than one dimension in a single regression equation if reliability of the parameter estimates is important to the research objective.

There was a reasonable degree of conceptual similarity between items comprising the two goals scales and items comprising the personal-social growth variable used in this study. A combined goals score (the sum of all five items) correlated .30 with personal-social gains. By comparison, SAT scores were correlated .16 with intellectual gains and .40 with grades (all self-reported or self-estimated criterion measures). The modest correlation between goals and personal-social gains was higher than correlations between either educational aspirations and grades (.21) or educational aspirations and intellectual gains (.20). The combination of personal development goals and social goals along with a measure of past accomplishment in nonacademic
areas ought to be reasonably good predictors of personal-social growth.

Future research might address the question of how well these entering goals predict gains perceived after a second, third, or fourth year of college, and how well they predict other, objective measures of personal growth. An attempt should be made to replicate findings of this study--ideally, using additional, objective measures of the outcome variables. It is also of interest to test the applicability of the hypothesized model to other, less homogeneous, student populations. However, consideration must be given to the limitations of ordinary least squares regression analyses for evaluating a model that includes such highly intercorrelated variables as the CSEQ quality of effort scales.
REFERENCES


APPENDIX A:

Data Collection Instruments
1985 SURVEY OF ENTERING FRESHMEN

NAME: ______________________   SOCIAL SECURITY NUMBER: ______________________

The Office of Institutional Research is seeking to learn more about the attitudes, plans, and needs of entering students and the reasons they decided to enter NC State. The following survey, which is being given to all entering freshmen, will help to provide that information. Your responses will not be placed in any of your university records. The information will be used in summary statistical analysis. Your cooperation will be appreciated. Please write your name and social security number in the spaces above.

Brenda H. Rogers, Ph.D.
Senior Institutional Research Officer

PART I: Place the number of your response in the brackets to the left of each question.

(For keypunching only)

10.

[ ] In deciding which college to attend, was NC State your...
   KEY: 1 = first choice  2 = second choice  3 = third choice

11.

[ ] How did you receive your application for admissions to NC State?
   KEY: 1 = by mail
   2 = from a high school counselor
   3 = at a college day program
   4 = picked one up at the NC State Admissions Office

12.

[ ] What is the highest level of education you plan to complete? (Mark only one response)
   KEY: 1 = some college, but less than bachelor’s degree
   2 = bachelor’s degree or equivalent
   3 = master’s degree (M.A., M.S., M.A.T.)
   4 = doctoral degree (Ph.D., M.D., Ed.D., J.D.)

13.

[ ] Do you plan to apply to a School of Veterinary Medicine?
   KEY: 1 = Yes
   2 = No

14.

[ ] What are your plans for employment during your first semester at NC State?
   KEY: 1 = I plan to work 20 hours or more each week.
   2 = I plan to work less than 20 hours each week.
   3 = I do not plan to work.

15.

[ ] How certain are you about your college major? (i.e., degree program or field of study)
   KEY: 1 = I feel very certain about my choice of a major.
   2 = I am somewhat uncertain and will probably change majors.
   3 = I am very uncertain about my college major.

16.

[ ] Have you decided on your future career?
   KEY: 1 = Yes, I have a definite career goal
   2 = Yes, but I am somewhat uncertain about my career goal
   3 = No, I do not have a career goal

PART II: Will the following be a MAJOR SOURCE, a MINOR SOURCE, or NOT A SOURCE of funding for your college education?

17.

[ ] Financial assistance through NC State Financial Aid Office (Includes Federal and State Grants, University Scholarships and Loans, National Direct Student Loans, Guaranteed Student Loans, College Work-Study Jobs, and Merit Scholarships)

18.

[ ] Other scholarships (Includes scholarships and grants offered by private organizations and agencies outside the university)

19.

[ ] Parents/relatives

20.

[ ] Spouse’s income

21.

[ ] Veteran’s benefits

22.

[ ] Other loans (Includes PLUS Loans to parents and personal loans to parents or to you)

23.

[ ] Summer employment

24.

[ ] Personal savings

25.

[ ] Employment on or off-campus while attending NC State (do not include College Work-Study jobs)

26.

[ ] Other (identify)
PART III: During your freshman and sophomore years, do you anticipate that you will need help in the following areas?  

KEY: 1 = Yes  2 = No

(27)   A. Study skills  
(28)   B. Time management  
(29)   C. Reading skills  
(30)   D. Tutorial help (English, math, chemistry, etc.)  
(31)   E. Test or math anxiety reduction  
(32)   F. Leadership development  
(33)   G. Selecting an academic major/career field  
(34)   H. Do you give your permission to have your name given to a University Office that can assist you?

PART IV: Were the following reasons important in your choice of NCSU? Use the following key to indicate the importance of each reason.  

KEY: 1 = very important  
2 = important  
3 = neutral  
4 = unimportant  
5 = very unimportant

(35)   A. I liked the location  
(36)   B. The costs were low  
(37)   C. My parents wanted me to attend here  
(38)   D. I was offered a Merit (no need) Scholarship  
(39)   E. I was offered adequate financial assistance  
(40)   F. I had friends planning to attend here  
(41)   G. The faculty seemed friendly and helpful to me  
(42)   H. I liked the size of the university  
(43)   I. I felt the students were friendly and I would make friends here  
(44)   J. The school offered many cultural opportunities  
(45)   K. NCSU has a strong program in my major  
(46)   L. Many social activities were offered here  
(47)   M. I felt I would have a good academic average here  
(48)   N. I had relatives who attended here  
(49)   O. The school has an excellent academic reputation  
(50)   P. I wanted to be challenged academically  
(51)   Q. I received a personal letter from a NCSU faculty member or student  
(52)   R. I was influenced by the printed information received from the Admissions Office (e.g., catalogue, brochure, etc.)  
(53)   S. I was influenced by the staff in the NCSU Admissions Office to attend  
(54)   T. I am a supporter of the NCSU athletic teams

PART V: The following statements reflect the goals of many college students. Please indicate whether each goal is a MAJOR GOAL, a MINOR GOAL, or NOT A GOAL at all.  

KEY: 1 = Major Goal  
2 = Minor Goal  
3 = Not a Goal

(55)   To increase my knowledge and understanding in an academic field  
(56)   To prepare for a career  
(57)   To become actively involved in student life and campus activities  
(58)   To meet new and interesting people  
(59)   To learn skills that will enrich my daily life or make me a more complete person  
(60)   To develop my ability to be independent, self-reliant, and adaptable  
(61)   To understand my personal values and beliefs

Please list other goals:

PART VI: Please answer these questions about your experience with computers.  

KEY: 1 = Yes  
2 = No

(62)   Have you had a course that introduced you to what a computer is and how it works?  
(63)   Have you used a computer to assist you in learning course material?  
(64)   Have you used a computer to solve a problem or for word processing?  
(65)   Have you written a program in a computer language (BASIC, Pascal, Fortran, etc.)?  
(66)   Do you plan to bring a personal computer with you to campus?  

If yes, what kind of personal computer will you bring?
The main purpose of this inquiry is to learn more about how students spend their time— in course work, in the library, in contacts with faculty, in extracurricular activities, in various social and cultural activities, and in using other facilities and opportunities that exist in the college setting.

The information obtained from you and from other students at many different colleges and universities will provide new insight to administrators, faculty members, and others who provide the resources and shape the programs that are meant to be of benefit for student learning and development within the college experience.

At first glance you may think it will take a long time to fill out this questionnaire, but you will find that it can be answered quite easily, that you can do it in less than an hour and perhaps only 30 to 45 minutes. You will find, too, when you have finished it, that your answers provide a kind of self-portrait of what you have been giving and getting in your college experience.

The ultimate benefits in this or any other survey depend on the thoughtful responses and willing participation from those who are asked to help. Your willingness to participate is important and very much appreciated.

We do not ask you to write your name anywhere in this questionnaire; but we do need to know where the reports come from, and that is why each questionnaire has a number on the back page—certain blocks of numbers tell us that those questionnaires have come from your college.

And, as you will see on the next page, we need to know a few things about you and where you come from, so that we can learn how activities might be related to age, sex, year in college, major field, whether one lives on the campus, whether one has a job, etc.

The questionnaire responses will be read by an electronic scanning device. The machine can only read messages given to it with a soft, black lead pencil. Please be careful in marking your responses. Erase cleanly any response you wish to change.
BACKGROUND INFORMATION

DIRECTIONS: Indicate your response by filling in the appropriate space under each question.

Age
○ 22 or younger
○ 23-27
○ 28 or older

Sex
○ male
○ female

Are you single or married?
○ single
○ married

What is your classification in college?
○ freshman
○ sophomore
○ junior
○ senior
○ graduate student

Did you enter college here or did you transfer here from another college?
○ entered here
○ transferred from another college

Have you at any time while attending this college lived in a college dormitory, fraternity or sorority house, or other college housing?
○ yes
○ no

Where do you now live during the school year?
○ dormitory or other college housing
○ fraternity or sorority house
○ private apartment or room within walking distance of the college
○ house, apartment, etc. away from the campus
○ with my parents or relatives

At this college, up to now, what have most of your grades been?
○ A
○ A-, B+
○ B
○ B-, C+
○ C, C- or lower

Which of the following comes closest to describing your major field of study (or your expected major)?
○ Agriculture
○ Arts (art, music, theater, etc.)
○ Biological Sciences (biology, biochemistry, botany, zoology, etc.)
○ Business
○ Computer Science
○ Education (including physical education and recreation
○ Engineering
○ Health related fields (nursing, physical therapy, health technology, etc.)
○ Humanities (literature, languages, history, philosophy, religion, etc.)
○ Physical Sciences (physics, chemistry, mathematics, astronomy, earth science, etc.)
○ Social Sciences (economics, political science, psychology, sociology, etc.)
○ Other: What?

○ Undecided

Did either of your parents graduate from college?
○ no
○ yes, both parents
○ yes, father only
○ yes, mother only

When, or if, you graduate from college, do you expect to enroll for a more advanced degree?
○ yes
○ no

Are you going to school full-time or part-time?
○ full-time
○ part-time

During the time school is in session, about how many hours a week do you usually spend on activities that are related to your school work? This includes time spent in class and time spent studying.
○ about 20 hours a week or more
○ about 10 hours a week
○ less than 10 hours a week

- 2 -
During the time school is in session, about how many hours a week do you usually spend working on a job?

○ none. I am not employed during the school year
○ about 10 hours or less
○ about 15 hours
○ about 20 hours
○ about 30 hours
○ more than 30 hours

About how much of your college expenses this year are provided by your parents or family?

○ all or nearly all
○ more than half
○ less than half
○ none or very little

What is your racial or ethnic identification?

○ White, Caucasian
○ Black
○ Hispanic, Mexican-American, Puerto Rican
○ Oriental or Asian
○ Other: What?

How are you classified in the United States?

○ Citizen of the United States
○ Immigrant (permanent resident)
○ Non-immigrant

If you are not a citizen of the United States, in what country are you a citizen?

COLLEGE ACTIVITIES

DIRECTIONS: In your experience at this college during the current school year, about how often have you done each of the following? Indicate your response by filling in one of the spaces to the left of each statement.

Library Experiences

Veryoften

 ocas. usually

Never

Used the library as a quiet place to read or study materials you brought with you.

Used the card catalogue to find what materials there were on some topic.

Asked the librarian for help in finding material on some topic.

Read something in the reserve book room or reference section.

Developed a bibliography or set of references for use in a term paper or other report.

Found some interesting material to read just by browsing in the stacks.

Ran down leads, looked for further references that were cited in things you read.

Used specialized bibliographies (such as Chemical Abstracts, Psychological Abstracts, etc.).

Gone back to read a basic reference or document that other authors had often referred to.

Experiences with Faculty

Veryoften

 ocas. usually

Never

Talked with a faculty member.

Asked your instructor for information related to a course you were taking (grades, make-up work, assignments, etc.).

Visited informally and briefly with an instructor after class.

Made an appointment to meet with a faculty member in his/her office.

Discussed ideas for a term paper or other class project with a faculty member.

Discussed your career plans and ambitions with a faculty member.

Asked your instructor for comments and criticisms about your work.

Had coffee, coles, or snacks with a faculty member.

Worked with a faculty member on a research project.

Discussed personal problems or concerns with a faculty member.
DIRECTIONS: In your experience at this college during the current academic year, about how often have you done each of the following? Indicate your response by filling in one of the spaces to the left of each statement.

<table>
<thead>
<tr>
<th>Course Learning</th>
<th>Student Union</th>
</tr>
</thead>
<tbody>
<tr>
<td>Took detailed notes in class.</td>
<td>Had meals, snacks, etc. in the student union or student center.</td>
</tr>
<tr>
<td>Listened attentively in class meetings.</td>
<td>Looked at the bulletin board for notices about campus events.</td>
</tr>
<tr>
<td>Underlined major points in the readings.</td>
<td>Met your friends at the student union or student center.</td>
</tr>
<tr>
<td>Tried to see how different facts and ideas fit together.</td>
<td>Sat around in the union or center talking with other students about your classes and other college activities.</td>
</tr>
<tr>
<td>Thought about practical applications of the material.</td>
<td>Used the lounge(s) to relax or study by yourself.</td>
</tr>
<tr>
<td>Worked on a paper or project where you had to integrate ideas from various sources.</td>
<td>Seen a film or other event at the student union or center.</td>
</tr>
<tr>
<td>Summarized major points and information in your readings or notes.</td>
<td>Attended a social event in the student union or center.</td>
</tr>
<tr>
<td>Tried to explain the material to another student or friend.</td>
<td>Heard a speaker at the student union or center.</td>
</tr>
<tr>
<td>Made outlines from class notes or readings.</td>
<td>Played games that were available in the student union or center (ping-pong, cards, pool, pinball, etc.).</td>
</tr>
<tr>
<td>Did additional readings on topics that were introduced and discussed in class.</td>
<td>Used the lounge(s) or meeting rooms to meet with a group of students for a discussion.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Art, Music, Theater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talked about art (painting, sculpture, architecture, artists, etc.) with other students at the college.</td>
</tr>
<tr>
<td>Went to an art gallery or an art exhibit on the campus.</td>
</tr>
<tr>
<td>Read or discussed the opinions of art critics.</td>
</tr>
<tr>
<td>Participated in some art activity (painting, pottery, weaving, drawing, etc.).</td>
</tr>
<tr>
<td>Talked about music (classical, popular, musicians, etc.) with other students at the college.</td>
</tr>
<tr>
<td>Attended a concert or other music event at the college.</td>
</tr>
<tr>
<td>Read or discussed the opinions of music critics.</td>
</tr>
<tr>
<td>Participated in some music activity (orchestra, chorus, etc.).</td>
</tr>
<tr>
<td>Talked about the theater (plays, musicals, dance, etc.) with other students at the college.</td>
</tr>
<tr>
<td>Seen a play, ballet, or other theater performance at the college.</td>
</tr>
<tr>
<td>Read or discussed the opinions of drama critics.</td>
</tr>
<tr>
<td>Participated in or worked on some theatrical production (acted, danced, worked on scenery, etc.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Athletic and Recreation Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set goals for your performance in some skill.</td>
</tr>
<tr>
<td>Followed a regular schedule of exercise, or practice in some sport, on campus.</td>
</tr>
<tr>
<td>Used outdoor recreational spaces for casual and informal individual athletic activities.</td>
</tr>
<tr>
<td>Used outdoor recreational spaces for casual and informal group sports.</td>
</tr>
<tr>
<td>Used facilities in the gym for individual activities (exercise, swimming, etc.).</td>
</tr>
<tr>
<td>Used facilities in the gym for playing sports that require more than one person.</td>
</tr>
<tr>
<td>Sought instruction to improve your performance in some athletic activity.</td>
</tr>
<tr>
<td>Played on an intramural team.</td>
</tr>
<tr>
<td>Kept a record of your progress in some skill or athletic activity.</td>
</tr>
<tr>
<td>Played in any varsity sport or athletic event.</td>
</tr>
</tbody>
</table>
**DIRECTIONS:** In your experience at this college during the current school year, respond true or false to each of the following. Indicate your response by filling in one of the spaces in the left of each statement.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Clubs and Organizations</th>
<th>Personal Experiences</th>
<th>Student Acquaintances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Looked at the student newspaper for notices about campus events and student organizations.</td>
<td></td>
<td>Told a friend why you rejected another person the way you did.</td>
<td>Made friends with students whose academic major field was very different from yours.</td>
</tr>
<tr>
<td>Attended a program or event put on by a student group.</td>
<td></td>
<td>Discussed with other students why some groups get along smoothly, and other groups don’t.</td>
<td>Made friends with students whose interests were very different from yours.</td>
</tr>
<tr>
<td>Read or asked about a club, organization, or student government activity.</td>
<td></td>
<td>Sought out a friend to help you with a personal problem.</td>
<td>Made friends with students whose family background (economic and social) was very different from yours.</td>
</tr>
<tr>
<td>Attended a meeting of a club, organization, or student government group.</td>
<td></td>
<td>Elected a course that dealt with understanding personal and social behavior.</td>
<td>Made friends with students whose age was very different from yours.</td>
</tr>
<tr>
<td>Voted in a student election.</td>
<td></td>
<td>Identified with a character in a book or movie and wondered what you might have done under similar circumstances.</td>
<td>Made friends with students whose race was different from yours.</td>
</tr>
<tr>
<td>Discussed policies and issues related to campus activities and student government.</td>
<td></td>
<td>Worked in some student organization or special project (publications, student government, social event, etc.).</td>
<td>Made friends with students from another country.</td>
</tr>
<tr>
<td>Worked in some student organization or special project (publications, student government, social event, etc.).</td>
<td></td>
<td>Discussed reasons for the success or lack of success of student club meetings, activities, or events.</td>
<td>Had serious discussions with students whose religious beliefs were very different from yours.</td>
</tr>
<tr>
<td>Discussed reasons for the success or lack of success of student club meetings, activities, or events.</td>
<td></td>
<td>Worked on a committee.</td>
<td>Had serious discussions with students whose political opinions were very different from yours.</td>
</tr>
<tr>
<td>Met with a faculty adviser or administrator to discuss the activities of a student organization.</td>
<td></td>
<td>Experience in Writing</td>
<td>Did serious discussions with students from another country.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Used a dictionary or thesaurus to look up the proper meaning of words.</td>
<td>Made friends with students whose academic major field was very different from yours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consciously and systematically thought about grammar, sentence structure, paragraphs, word choice, and sequence of ideas or points as you were writing.</td>
<td>Made friends with students whose interests were very different from yours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wrote a rough draft of a paper or essay and then revised it yourself before handing it in.</td>
<td>Made friends with students whose family background (economic and social) was very different from yours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spent at least five hours or more writing a paper (not counting time spent in reading or at the library).</td>
<td>Made friends with students whose age was very different from yours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asked other people to read something you wrote to see if it was clear to them.</td>
<td>Made friends with students whose race was different from yours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Referred to a book or manual about style of writing, grammar, etc.</td>
<td>Made friends with students from another country.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Revised a paper or composition two or more times before you were satisfied with it.</td>
<td>Had serious discussions with students whose religious beliefs were very different from yours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asked an instructor for advice and set a time to improve your writing.</td>
<td>Had serious discussions with students whose political opinions were very different from yours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Made an appointment to talk with an instructor who had criticized a paper you had written.</td>
<td>Had serious discussions with students from another country.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Submitted for publication an article, story, or other composition you had written.</td>
<td><strong>-5-</strong></td>
</tr>
</tbody>
</table>
CONVERSATIONS

DIRECTIONS: In conversations with other students at this college during the current school year, about how often have you talked about each of the following?

<table>
<thead>
<tr>
<th>Topics of Conversation</th>
<th>Information in Conversations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very often</td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
</tr>
</tbody>
</table>

**Science/Technology**
- Memorized formulas, definitions, technical terms.
- Tried to express a set of relationships in mathematical terms.
- Tested your understanding of some scientific principle by seeing if you could explain it to another student.
- Read articles (not assigned) about scientific theories or concepts.
- Practiced to improve your skill in using some laboratory equipment.
- Showed a classmate how to use a piece of scientific equipment.
- Attempted to explain an experimental procedure to a classmate.
- Went to an exhibit or demonstration of some new scientific device.
- Worked on a paper or project where you used a computer.
- Used a computer to assist in course learning (language skills, math skills, etc.).
- Wrote a program to analyze data on a computer.
- Sought out-of-class instruction in ways to use computers.

**Dormitory or Fraternity/Sorority**
- Had lively conversations about various topics during dinner in the dining room or cafeteria.
- Went out with other students for late night snacks.
- Offered to help another student (with course work, errands, favors, advice, etc.) who needed some assistance.
- Participated in bull sessions that lasted late into the night.
- Asked others for assistance in something you were doing.
- Borrowed things (clothes, records, posters, books, etc.) from others in the residence unit.
- Attended social events put on by the residence unit.
- Studied with other students in the residence unit.
- Helped plan or organize an event in the residence unit.
- Worked on some community service or fund raising project with other students in the residence unit.

**Conversations**

DIRECTIONS: In your experience at this college during the current school year, about how often have you done each of the following?

<table>
<thead>
<tr>
<th>Very often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science/Technology</td>
<td>Dormitory or Fraternity/Sorority</td>
<td>Science/Technology</td>
<td>Dormitory or Fraternity/Sorority</td>
</tr>
<tr>
<td>Memorized formulas, definitions, technical terms.</td>
<td>Had lively conversations about various topics during dinner in the dining room or cafeteria.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tried to express a set of relationships in mathematical terms.</td>
<td>Went out with other students for late night snacks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tested your understanding of some scientific principle by seeing if you could explain it to another student.</td>
<td>Offered to help another student (with course work, errands, favors, advice, etc.) who needed some assistance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read articles (not assigned) about scientific theories or concepts.</td>
<td>Participated in bull sessions that lasted late into the night.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practiced to improve your skill in using some laboratory equipment.</td>
<td>Asked others for assistance in something you were doing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Showed a classmate how to use a piece of scientific equipment.</td>
<td>Borrowed things (clothes, records, posters, books, etc.) from others in the residence unit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attempted to explain an experimental procedure to a classmate.</td>
<td>Attended social events put on by the residence unit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Went to an exhibit or demonstration of some new scientific device.</td>
<td>Studied with other students in the residence unit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worked on a paper or project where you used a computer.</td>
<td>Helped plan or organize an event in the residence unit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used a computer to assist in course learning (language skills, math skills, etc.).</td>
<td>Worked on some community service or fund raising project with other students in the residence unit.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrote a program to analyze data on a computer.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sought out-of-class instruction in ways to use computers.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Reading/Writing

During the current school year, about how many books have you read? Fill in one space in each column.

- Textbooks or assigned books
  - Non-assigned books
    - None
    - Fewer than 5
    - Between 5 and 10
    - Between 10 and 20
    - More than 20

# Opinions About College

How well do you like college?
- I am enthusiastic about it.
- I like it.
- I am more or less neutral about it.
- I don't like it.

If you could start over again, would you go to the same college you are now attending?
- Yes, definitely
- Probably yes
- Probably no
- No, definitely

What is your opinion about the following statement: "If students expect to benefit from what this college or university has to offer, they have to take the initiative."
- Strongly agree
- Agree
- Disagree
- Strongly disagree

---

# THE COLLEGE ENVIRONMENT

Colleges differ from one another in the extent to which they emphasize or stress various aspects of students' development. Thinking of your own experience at this college, to what extent do you feel that each of the following is emphasized? The responses are numbered from 7 to 1, with the highest and lowest points described. Fill in the space of whichever number best indicates your impression on this seven-point rating scale.

## Emphasis on the Development of Academic, Scholarly, and Intellectual Qualities

<table>
<thead>
<tr>
<th>Strong emphasis</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Weak emphasis</th>
</tr>
</thead>
</table>

## Emphasis on the Development of Esthetic, Expressive, and Creative Qualities

<table>
<thead>
<tr>
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<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Weak emphasis</th>
</tr>
</thead>
</table>

## Emphasis on Being Critical, Evaluative, and Analytical

<table>
<thead>
<tr>
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<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Weak emphasis</th>
</tr>
</thead>
</table>

## Emphasis on the Development of Vocational and Occupational Competence

<table>
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<tr>
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<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Weak emphasis</th>
</tr>
</thead>
</table>

---

# Emphasis on the Development of Vocational and Occupational Competence

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<tr>
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<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Weak emphasis</th>
</tr>
</thead>
</table>
The next three ratings refer to relationships among people at the college. Again, thinking of your own experience, how would you rate these relationships on the seven-point scales?

<table>
<thead>
<tr>
<th>Relationship with other students, student groups, and activities</th>
<th>Friendly, Supportive, Sense of belonging</th>
<th>Competitive, Uninvolved, Sense of alienation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approachable, Helpful, Understanding, Encouraging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationships with faculty members</td>
<td></td>
<td>Remote, Discouraging, Unsympathetic</td>
</tr>
<tr>
<td>Relationships with administrative personnel and offices</td>
<td>Helpful, Considerate, Flexible</td>
<td>Rigid, Impersonal, Bound by regulations</td>
</tr>
</tbody>
</table>

**ESTIMATE OF GAINS**

**DIRECTIONS:** In thinking over your experiences in college up to now, to what extent do you feel you have gained or made progress in each of the following respects? Indicate your response by filling in one of the spaces to the left of each statement.

- Very much
- Much
- Some
- Little
- Not at all

- Vocational training — acquiring knowledge and skills applicable to a specific job or type of work.
- Acquiring background and specialization for further education in some professional, scientific, or scholarly field.
- Gaining a broad general education about different fields of knowledge.
- Gaining a range of information that may be relevant to a career.
- Developing an understanding and enjoyment of art, music, and drama.
- Broadening your acquaintance and enjoyment of literature.
- Writing clearly and effectively.
- Acquiring familiarity with the use of computers.
- Becoming aware of different philosophies, cultures, and ways of life.
- Developing your own values and ethical standards.
- Understanding yourself — your abilities, interests, and personality.
- Understanding other people and the ability to get along with different kinds of people.
- Ability to function as a team member.
- Developing good health habits and physical fitness.
- Understanding the nature of science and experimentation.
- Understanding new scientific and technical developments.
- Becoming aware of the consequences (benefits/hazards/dangers/values) of new applications in science and technology.
- Ability to think analytically and logically.
- Quantitative thinking — understanding probabilities, proportions, etc.
- Ability to put ideas together, to see relationships, similarities, and differences between ideas.
- Ability to learn on your own, pursue ideas, and find information you need.

Since the electronic scanning device can only read pencil marks, please fill in the grid corresponding to the number printed above. This number tells us the name of your college and that you are one of the students from that college.

Thank you for your participation in this survey.
APPENDIX B:

Results of Sample-Population Comparisons
and Sample-Sample Comparisons
Table B-1

Results of One-sample T-tests for Personal Goals Scale

<table>
<thead>
<tr>
<th>Group</th>
<th>Population</th>
<th></th>
<th>Sample</th>
<th></th>
<th>Std. err.</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>White males</td>
<td>7.60</td>
<td>1.48</td>
<td>1648</td>
<td>7.69</td>
<td>1.50</td>
<td>104</td>
</tr>
<tr>
<td>White females</td>
<td>7.99</td>
<td>1.34</td>
<td>918</td>
<td>8.04</td>
<td>1.20</td>
<td>72</td>
</tr>
<tr>
<td>Black males</td>
<td>8.13</td>
<td>1.27</td>
<td>230</td>
<td>8.00</td>
<td>1.41</td>
<td>7</td>
</tr>
<tr>
<td>Black females</td>
<td>8.42</td>
<td>1.13</td>
<td>249</td>
<td>8.56</td>
<td>0.89</td>
<td>27</td>
</tr>
<tr>
<td>Group</td>
<td>Population</td>
<td>Sample</td>
<td>Std. err.</td>
<td>t</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>------------</td>
<td>---------</td>
<td>-----------</td>
<td>-----</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White males</td>
<td>4.81</td>
<td>0.96</td>
<td>1648</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White females</td>
<td>5.05</td>
<td>0.95</td>
<td>918</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black males</td>
<td>4.88</td>
<td>0.98</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black females</td>
<td>4.91</td>
<td>1.03</td>
<td>249</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table B-2
Results of One-sample T-tests for Social Goals Scale
Table B-3
Results of One-sample T-tests for Educational Aspiration Level

<table>
<thead>
<tr>
<th>Group</th>
<th>Population Mean</th>
<th>Population SD</th>
<th>Population n</th>
<th>Sample Mean</th>
<th>Sample SD</th>
<th>Sample n</th>
<th>Std. err.</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>White males</td>
<td>2.63</td>
<td>0.72</td>
<td>1648</td>
<td>2.67</td>
<td>0.72</td>
<td>104</td>
<td>0.07</td>
<td>0.57</td>
</tr>
<tr>
<td>White females</td>
<td>2.73</td>
<td>0.77</td>
<td>918</td>
<td>2.86</td>
<td>0.74</td>
<td>72</td>
<td>0.09</td>
<td>1.44</td>
</tr>
<tr>
<td>Black males</td>
<td>2.70</td>
<td>0.67</td>
<td>232</td>
<td>3.00</td>
<td>0.82</td>
<td>7</td>
<td>0.31</td>
<td>0.97</td>
</tr>
<tr>
<td>Black females</td>
<td>2.86</td>
<td>0.78</td>
<td>251</td>
<td>2.63</td>
<td>0.57</td>
<td>27</td>
<td>0.11</td>
<td>-2.09*</td>
</tr>
</tbody>
</table>

*p < .05.
Table B-4
Results of One-sample T-tests for Certainty about Major and Career Choice

<table>
<thead>
<tr>
<th>Group</th>
<th>Population</th>
<th>Sample</th>
<th>Std. err.</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean  SD  n</td>
<td>Mean  SD  n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White males</td>
<td>4.62 1.08 1648</td>
<td>4.69 1.07 104</td>
<td>0.11</td>
<td>0.64</td>
</tr>
<tr>
<td>White females</td>
<td>4.55 1.18 918</td>
<td>4.58 1.08 72</td>
<td>0.13</td>
<td>0.23</td>
</tr>
<tr>
<td>Black males</td>
<td>4.89 1.11 232</td>
<td>4.43 0.79 7</td>
<td>0.30</td>
<td>-1.53</td>
</tr>
<tr>
<td>Black females</td>
<td>4.90 1.10 251</td>
<td>5.33 1.04 27</td>
<td>0.20</td>
<td>2.15*</td>
</tr>
</tbody>
</table>

*p < .05.
Table B-5

Results of One-sample T-tests for SAT Quantitative Scores

<table>
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<tr>
<th>Group</th>
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<th></th>
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<th>Sample</th>
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<th></th>
<th>Std. err.</th>
<th>t</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White males</td>
<td>577</td>
<td>77</td>
<td>1659</td>
<td>592</td>
<td>74</td>
<td>104</td>
<td>7.26</td>
<td>2.07*</td>
</tr>
<tr>
<td>White females</td>
<td>533</td>
<td>79</td>
<td>923</td>
<td>550</td>
<td>63</td>
<td>72</td>
<td>7.43</td>
<td>2.29*</td>
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<tr>
<td>Black males</td>
<td>465</td>
<td>85</td>
<td>232</td>
<td>497</td>
<td>55</td>
<td>7</td>
<td>20.79</td>
<td>1.54</td>
</tr>
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<td>83</td>
<td>251</td>
<td>417</td>
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<td>27</td>
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*p < .05.
<table>
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<th></th>
<th>Sample</th>
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<th></th>
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<th>Std. err.</th>
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<tr>
<td></td>
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<td>SD</td>
<td>n</td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White males</td>
<td>494</td>
<td>78</td>
<td>1659</td>
<td></td>
<td>508</td>
<td>86</td>
<td>104</td>
<td></td>
<td>8.43</td>
<td>1.66</td>
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<tr>
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<td>78</td>
<td>923</td>
<td></td>
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<td>232</td>
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<td>399</td>
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<td></td>
<td>29.10</td>
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<td>370</td>
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Table B-7

Results of One-sample T-tests for Parents' Education

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<th>Std. err.</th>
<th>t</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>White males</td>
<td>9.77</td>
<td>2.69</td>
<td>1635</td>
<td></td>
</tr>
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<td>White females</td>
<td>9.75</td>
<td>2.57</td>
<td>894</td>
<td></td>
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<td>8.15</td>
<td>3.17</td>
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<td>7.81</td>
<td>2.77</td>
<td>210</td>
<td></td>
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<td></td>
<td>9.78</td>
<td>2.59</td>
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<td>0.25</td>
</tr>
<tr>
<td></td>
<td>10.11</td>
<td>2.67</td>
<td>72</td>
<td>0.32</td>
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<td>0.37</td>
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</table>

*<p < .05.
Table B-8

Results of T-tests Comparing Mean Scores of Males and Females on Background Characteristics and Motivational Factors: Sample

<table>
<thead>
<tr>
<th>Variable</th>
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<th></th>
<th>Black sample</th>
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<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td></td>
<td>Mean  SD n</td>
<td>Mean  SD n</td>
<td>Mean  SD n</td>
<td>Mean  SD n</td>
</tr>
<tr>
<td>Personal goals</td>
<td>7.69  1.50  104</td>
<td>8.04  1.20  72</td>
<td>-1.65 .50</td>
<td>8.00  1.41  7</td>
</tr>
<tr>
<td>Social goals</td>
<td>4.72  0.94  104</td>
<td>5.08  0.90  72</td>
<td>-2.56* .01</td>
<td>5.29  0.76  7</td>
</tr>
<tr>
<td>Educational</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aspirations</td>
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<td>2.86  0.74  72</td>
<td>-1.69 .09</td>
<td>3.00  0.82  7</td>
</tr>
<tr>
<td>Certainty</td>
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<td>4.58  1.08  72</td>
<td>0.65 .52</td>
<td>4.43  0.79  7</td>
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<tr>
<td>SAT quantitative</td>
<td>592  74  104</td>
<td>550  63  72</td>
<td>3.96* .00</td>
<td>497  55  7</td>
</tr>
<tr>
<td>SAT verbal</td>
<td>508  86  104</td>
<td>495  75  72</td>
<td>1.02 .31</td>
<td>399  77  7</td>
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<tr>
<td>Parents' education</td>
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<td>10.11  2.67  72</td>
<td>-0.82 .41</td>
<td>8.26  1.86  7</td>
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</table>
### Table B-9

Results of T-tests Comparing Mean Scores of Males and Females on Background Characteristics and Motivational Factors: Population

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<tr>
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<th>Black population</th>
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<tbody>
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<td>Females</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td></td>
<td>Mean  SD  n</td>
<td>Mean  SD  n</td>
<td>Mean  SD  n</td>
<td>Mean  SD  n</td>
</tr>
<tr>
<td>Personal goals</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>7.60  1.48  1648</td>
<td>7.99  1.34  918</td>
<td>-6.82* .00</td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>8.13  1.27  230</td>
<td>8.42  1.13  249</td>
<td>-2.62* .01</td>
<td></td>
</tr>
<tr>
<td>Social goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>4.81  0.96  1648</td>
<td>5.05  0.95  918</td>
<td>-6.08* .00</td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>4.88  0.98  230</td>
<td>4.91  1.03  249</td>
<td>-0.32 .75</td>
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<tr>
<td>Educational aspirations</td>
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<td></td>
</tr>
<tr>
<td>Males</td>
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<td>2.73  0.77  918</td>
<td>-3.30* .00</td>
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</tr>
<tr>
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<td>2.70  0.67  232</td>
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<tr>
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<td>4.55  1.18  918</td>
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<td>4.90  1.10  251</td>
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Table B-10

Results of T-tests Comparing Sample Mean Scores of Males and Females on CSBQ Experience and Growth Dimensions

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<tr>
<th>Variable</th>
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<th>Black sample</th>
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<td>Males</td>
<td>Females</td>
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<td>Mean    SD   n</td>
<td>Mean    SD   n</td>
<td>Mean    SD   n</td>
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<td>Experience dimensions</td>
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<td>Personal-interpersonal</td>
<td>86.96 16.54 104</td>
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<td>93.29 23.13 7</td>
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<td>96.14 15.65 7</td>
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<tr>
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<td>14.10 2.93 72</td>
<td>-3.16  .00</td>
<td>13.57 2.15 7</td>
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<td>Intellectual</td>
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<td>10.93 2.14 72</td>
<td>-1.96  .05</td>
<td>10.57 2.15 7</td>
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Table B-11
Means, Standard Deviations, and Intercorrelations for White Sample
(n=176): Motivational Factors and Background Variables (race excluded)

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<tr>
<th>Variable*</th>
<th>PEROALS</th>
<th>SOCGOALS</th>
<th>EDUCASP</th>
<th>CERTNTY</th>
<th>PARENTED</th>
<th>SAT</th>
<th>GENDER</th>
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<td>.04</td>
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<td>.18</td>
<td>.04</td>
<td>.04</td>
<td>.13</td>
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<tr>
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<td>-.06</td>
<td>.18</td>
<td>1.0</td>
<td>-.14</td>
<td>.14</td>
<td>-.05</td>
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<tr>
<td>PARENTED</td>
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<td>.04</td>
<td>.04</td>
<td>-.14</td>
<td>1.0</td>
<td>.13</td>
<td>.06</td>
</tr>
<tr>
<td>SAT</td>
<td>-.18</td>
<td>-.11</td>
<td>.04</td>
<td>.14</td>
<td>.13</td>
<td>1.0</td>
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<tr>
<td>GENDER</td>
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<td>.19</td>
<td>.13</td>
<td>-.05</td>
<td>.06</td>
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</table>

*PERGOALS--personal development goals scale, range 4 to 9.
SOCGOALS--social goals scale, range 2 to 6.
EDUCASP--educational aspiration level, range 2 to 4.
CERTNTY--certainty about major and career choice, range 2 to 6.
PARENTED--father's and mother's educational attainment, range 3 to 15.
SAT--combined SAT quantitative and verbal scores, range 750-1490.
GENDER--male coded 1, female coded 2.
Table B-12

Means, Standard Deviations, and Intercorrelations for White Population (n=2509): Motivational Factors and Background Variables (race excluded)

<table>
<thead>
<tr>
<th>Variable</th>
<th>PERGOALS</th>
<th>SOC GOALS</th>
<th>EDUCASP</th>
<th>CERTNTY</th>
<th>PARENTED</th>
<th>SAT</th>
<th>GENDER</th>
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<tr>
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<tr>
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<td>1.0</td>
<td>.15</td>
<td>.16</td>
<td>.11</td>
<td>.06</td>
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<tr>
<td>CERTNTY</td>
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<td>-.07</td>
<td>.15</td>
<td>1.0</td>
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<td>.14</td>
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<td>-.07</td>
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<td>-.13</td>
<td>.11</td>
<td>.14</td>
<td>.16</td>
<td>1.0</td>
<td>-.19</td>
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<tr>
<td>GENDER</td>
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<td>.11</td>
<td>.06</td>
<td>-.03</td>
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*PERGOALS--personal development goals scale, range 4 to 9.
SOC GOALS--social goals scale, range 2 to 6.
EDUCASP--educational aspiration level, range 2 to 4.
CERTNTY--certainty about major and career choice, range 2 to 6.
PARENTED--father's and mother's educational attainment, range 3 to 15.
SAT--combined SAT quantitative and verbal scores, range 750-1490.
GENDER--male coded 1, female coded 2.
Table B-13

Regression Equations for Effects of Background Characteristics on Motivational Factors:
White Sample (n=176)

<table>
<thead>
<tr>
<th>Motivational factors</th>
<th>PERGOALS</th>
<th>SOCGOALS</th>
<th>EDUCASP</th>
<th>CERTNTY</th>
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<tbody>
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<td>SE</td>
<td>Beta</td>
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<td>.040</td>
<td>.081</td>
<td>.016</td>
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<td>-</td>
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<tr>
<td>GENDER</td>
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Table B-14

Regression Equations for Effects of Background Characteristics on Motivational Factors:
White Population (n=2509)

<table>
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<tr>
<th>Motivational factors</th>
<th>PEROALS</th>
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<th>EDUCASP</th>
<th>CERTNTY</th>
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</thead>
<tbody>
<tr>
<td>Variable</td>
<td>b</td>
<td>SE</td>
<td>Beta</td>
<td>b</td>
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<tr>
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<td>.000</td>
<td>-.174</td>
<td>-.001</td>
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<td>.175</td>
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</tbody>
</table>
The vita has been removed from the scanned document
Dear Professor Pace,

This letter is a request for your permission to include a photocopy of the College Student Experiences questionnaire in my doctoral dissertation.

The photocopy will appear in an appendix along with another instrument used to collect data for a study entitled "An Investigation of the Influences of College Students' Goals on Quality of Effort and Growth during the Freshman Year."

The dissertation has been approved by my committee and will be submitted to the Graduate School of Virginia Polytechnic Institute and State University in Blacksburg.

An abstract of the dissertation accompanies this request.

Yours truly,

Mary Ann Kaufman

Permission granted:

C. Robert Pace

July 28, 1987