THE PREDICTION OF SCHOLASTIC AND LEADERSHIP PERFORMANCE UTILIZING BIOGRAPHICAL DATA

by

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This follow-up study was designed to provide evidence of the value of developing non-cognitive and non-test trial predictors for the identification of talented individuals. An attempt was made to develop workable criteria for leadership performance which could be used in conjunction with a biographical inventory (BI). The objective of the study was to identify individuals with leadership potential and scholastic aptitude for college while still in high school. The major hypothesis tested was that there is a significant relationship between academic performance, leadership performance and biographical data.

BI scores served as independent variables to predict the two dependent variables operationally defined in terms of the first year GPA and leadership role occupancy. Leadership, while in college, was conceptualized as the role behavior of one elected or appointed to direct, coordinate, supervise, and perform the many functions required for achievement of group goals or tasks. The criterion or evaluative standard to measure a person's leadership was election to a position of leadership such as student body president or student council member.

An especially designed 300-item BI (Form M) was used for the twelfth grade in the North Carolina Talent Study (The Richardson Foundation, 1968). BI items for two empirically derived keys which measure leadership and academic performance were included.

The student sample was obtained from a follow-up of 6,105 twelfth grade students drawn from nine North Carolina Public School Administrative Units during the 1966-67 school year. Questionnaires soliciting follow-up data were mailed to the 6,105 subjects. A total of 1,736 (28.4 per cent) questionnaires were returned.

Positive, statistically significant correlations (Pearson product-moment) between objectively scored biographical data of individuals and subsequent scholastic performance were obtained. BI scores to predict GPA yielded cross-validities of .47 for men and .43 for women attending colleges and universities (N = 857). In six of the twenty samples, correlations between BI leadership scores and actual leadership performance were statistically significant at the .05 and .01 levels using the Kruskal-Wallis one-way analysis of variance by ranks technique. Variability of results from sample to sample makes the practice of using objectively scored biographical data on this BI for individual prediction of leadership performance questionable.

Correlations between BI scores to predict scholastic performance and cumulative GPA were higher than those between typical scholastic aptitude predictors and cumulative GPA. The degree of relationship between BI scores and scholastic performance, moreover, was generally comparable to that obtained with high school rank in class. There was a slight overall difference in the relationship between BI scores and scholastic performance for males and females in favor of the latter.

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CHAPTER I

INTRODUCTION

The prediction of scholastic ability at the college level has been of primary concern to many behavioral scientists. Little stress has been placed on the prediction of other equally important talent, such as leadership ability, in college students. Scholastic ability has been regarded, in the great majority of studies, as a function of cognitive variables such as verbal and numerical aptitude, general mental ability, etc. Numerous fruitful studies (Aiken, 1964; Anastasi, Meade and Schneiders, 1960; Cline, Richards and Abe, 1964; McClelland, 1969; Price, 1969; Reck, 1968; Szabo, 1969; Ward, 1958, 1965) in the area of academic prediction have yielded significant multiple correlations which range between .50 and .70. This means that approximately one-quarter to one-half of the variability in academic ability is accounted for by such prediction. Research to improve prediction on both academic and leadership ability has shifted toward the measurement of nonintellective and noncognitive factors in scholastic performance.

Lavin (1965), in a comprehensive review of nearly 300 sources between 1953 and 1961, cites three basic reasons for increased concern with prediction of academic performance during recent years: (1) the marked increase in the student population, a problem compounded by unparalleled growth in the number of highly qualified college applications, (2) the need to identify and support students

with outstanding talents in order to maintain and increase our national pool of highly trained manpower, and (3) the development within the social sciences of a serious, concerted research interest in the educational process.

CHAPTER II

RELATED RESEARCH

Around the turn of the last century James McKeen Cattell (Cattell and Farrand, 1896) made an effort to predict the academic performance of students at Columbia University. At that time no objectively scored standardized test of academic achievement of any description existed. Cattell's attempt resulted in failure. Since that time a vast literature on the prediction of scholastic success has developed. The most voluminous literature is found to involve studies in which a single index of ability is used to predict a single overall index of academic performance, usually a composite grade point average. Summaries of the literature by Cronbach (1949) and Henry (1950) suggest that college level ability tests correlate about .50 to .55 with grade point averages. Lavin (1965) cites thirteen similar research studies between 1954 and 1960 with correlations which average about .50, with a range of about .30 to .70.

In those studies in which a battery of predictors is used to predict an overall grade point average, Cronbach (1949) found multiple correlations to run from .60 to .70. Lavin (1965), in summarizing twenty recent studies, reached a similar conclusion with an average correlation of about .65. Thus, the predictive validity for multiple measures is higher than for single global measures.

Research studies and clinical observations have for some time demonstrated that a variety of specific nonintellective conditions and experiences are related to academic performance. Many of these variables such as motivation, attitudes, and environmental circumstance found their way into the omnibus biographical inventory.

One early biographical datum associated with academic performance was motivation. Weitz, Clarke, and Jones (1955) investigated the motivating influence of having chosen a major field of study before entering college on subsequent academic performance. They found that when scholastic aptitude was held constant, male students who reported selection of a major field of study before entering college performed better in college than those who reported no such choice. Dickason (1969) found that a nonintellective measure, self rating of awareness and commitment, improved the predictability of academic success in freshman engineers.

Another nonintellective variable associated with academic success is the differential influence exerted by the institutional form of secondary school experience on students. Davis and Fredericksen (1955) found that public school graduates performed better in college than did private school graduates when scholastic aptitude was held constant. Roe (1956) found that the occupational level of the father was an important predictor and indicated that higher family socioeconomic status was associated with better college performance in a school of architecture. Similarly, father's education was the best predictor of fourth year grades. College

performance was positively correlated with having attended secondary school out of state, having won honors in high school, having decided on a vocation early, and holding a part-time job in college. The father's occupation in business and selling negatively affected several criteria of success in a school of architecture. Biographic and interest correlates of performance in a school of architecture were examined by Lunneborg and Lunneborg (1969). They found that early interest in architecture, father employed in something other than selling or a technical occupation and mother not employed outside the home were positively associated with school success.

Lehrer (1968) found that nonintellectual variables contributed significantly and substantially to the prediction of achievement and scholastic attainment. The added precision in prediction, however, was thought to be of questionable practical significance. Marshall (1968) reported that selected noncognitive variables used in combination with selected cognitive variables increased correlation with college grades. Selected single cognitive variables were better predictors of college academic success than selected noncognitive variables.

A valued, yet tired, truism of behavioral science is that the best predictor of future behavior is past behavior. Those charged with evaluating and selecting college youth are typically called upon to make judgments about future scholastic behavior. They attempt to evaluate the relevant elements of past behavior with interviews, application blanks, scholastic records, letters

of reference and the like. The behavioral scientist has achieved a measure of success in his attempts to improve such evaluative procedures by adding tests, questionnaires, and rating scales.

One type of questionnaire which has become more useful as a predictor of future behavior is the omnibus biographical information inventory. The Biographical Inventory (BI), essentially a standardized paper-and-pencil interview, was initially developed by the Adjutant General's Office in World War II as a selection tool to select officers for the Regular Army (USA) from the temporary officers who served in World War II (Henry, 1966).

Goldsmith (1922) described the use of personal history data to predict the performance of salesmen. Perhaps the most notable use of the BI has been in business. The Standard Oil Company of New Jersey made an attempt, as early as 1955, to identify employees with high managerial potential early in their careers. The results of the Standard Oil Studies have been published in a monograph, Early Identification of Management Potential (Standard Oil Company, 1961). Properly adapted, the BI has been shown to be equally useful in several non-English speaking countries and cultures for a variety of behaviors.

Several advantages of the BI for the prediction of scholastic and leadership ability have been suggested. The following basic advantages for objective or scorable autobiographical data as inputs for predictive purposes are cited by Owens and Henry (1966):

1. The BI represents an extension and revision of the existing and widely accepted application blank.

2. The BI is another format for the traditional interview but in addition, every interviewee is asked the same questions in exactly the same way and the value judgments made by the "interviewer" are standardized, relevant and of known validity.
3. Impressive accuracy of reporting with correlations from .90 to .99 between BI information and that obtained from objective sources has been found (Mosel and Cozan, 1952; Keating, Paterson, and Stone, 1950). There is no evidence that validities found with the BI suffer because of "fakability."
4. BI items often encompass both predictors and criteria which may be used interchangeably.
5. The BI is an appealing exploratory device. It allows for empirical prediction and an examination of items makes it possible to achieve an understanding of biographical content related to commitment, motivation, and personality.
6. The empirical derivation of both BI items and scoring keys assures that only criterion-relevant questions will be asked, and that answers will be evaluated only in terms of their relationship to subsequent performance.
7. Lack of verbal skills or other test-taking abilities thought to discriminate against minority groups are minimized in the biographical approach. With properly constructed BI keys ethnic or cultural differences appear

to exert less influence on scores than typical scholastic ability measures. This may be attributed to those BI items which tap nonintellective and motivational factors.

8. Not only is the BI composed of more palatable face valid items but the instrument is free of attempts at "hidden exploration of the psyche" so recently belabored by Gross (1962) and Packard (1964).

To this list of advantages might be added that with biographical inventories, unlike objective test batteries for achievement or scholastic aptitude, reliance is not placed on maximum performance. Predictive validity for individual cases should be enhanced because one cannot have an "off" day in taking a BI. Vast swings in an individual's BI "test" performance should not occur because verbal and other cognitive abilities are not directly measured.

BI's are also typically less time consuming to administer and less expensive to obtain. In addition, both objective scoring keys and computerized scoring services have now become commercially available for the BI (Institute for Behavioral Research in Creativity, 1968; Schaefer, 1970). The potential advantage of the BI over other measures appears relevant for college placement and guidance personnel. Older students or adults returning to college, pursuing adult education courses or extension work, may be unduly penalized by having to meet ever increasing admission requirements based on typical scholastic aptitude tests. The BI circumvents

the test-taking necessity of recall of specific learned material, thus allowing older college applicants to be fairly evaluated without penalty for lack of exposure to more recent high school subject material. Finally, biographical data are thought to explain a portion of academic variability not accounted for by usual scholastic aptitude tests. Biographical data may contribute more when added to high school rank-in-class and high school grades for computation of multiple correlations at various institutions.

Criticism and limitations on the use of biographical data for prediction are also documented. Cattell and Butcher (1968) cite three potential weaknesses of biographical data for prediction:

1. Much biographical data are difficult to obtain accurately;
2. Biographical data may overlap with personality data;
3. Biographical items are likely to lose predictive value with change of locality and time.

The first limitation no longer constitutes a major problem because BI's have adopted a multiple choice format which can be answered accurately and easily. It would appear difficult to err on a biographical question which requires recalling the number of members in one's family. Nor would it readily occur to most examinees that the number of sisters one has would have any empirical relationship to academic or leadership criteria. Nor would the keyed answer about <u>where</u> or <u>when</u> one first learned the meaning of "pollenization" (e.g., see Institute for Behavioral Research

in Creativity, Alpha, 1968) appear susceptible to willful distortion in a controlled direction.

The second objection implies that current personality measures are vastly superior over other instruments in predictive power. Empirical evidence appears conflicted about the value of personality measures to predict college ability. Gough (1964) and Gough and Fink (1964) provided evidence that standard scales on the California Psychological Inventory (CPI) could be used to make relatively valid predictions of high school GPA. Equally compelling evidence of relatively low validity coefficients between CPI scales and college GPA were reported elsewhere (Holland, 1959; Jackson and Pacine, 1961; Griffin and Flaherty, 1964; Hase and Goldberg, 1967).

Bayes (1968) found that personality variables, defined by the Edwards Personal Preference Schedule (EPPS) added to intellective predictors (high school rank, College Entrance Examination Board scores) do not significantly increase the percentage of predicted variance in academic performance. Goodstein and Heilbrun (1962), used the EPPS to investigate college achievement at three levels. They found that personality factors were significantly related to academic achievement when the influence of academic ability was statistically removed but that the nature of the relationship was dependent upon the general ability level of the group being studied.

The third limitation cited by Cattell and Butcher (1968) stresses continued examination of validity coefficients. Predictive

validity coefficients may vary over time from group to group and from locality to locality but the extent of validity decrement with biographical data has not been empirically demonstrated. It would appear no less desirable to repeatedly check the predictive validity of all instruments, not just the biographical inventories, when important decisions are being based in part on scores obtained with such predictors. Sharp decreases in validity are more frequently reported in studies in which a limited number of discrete and often theoretically irrelevant biographical items are used rather than a total score derived from an omnibus inventory based on a sound theoretical rationale.

A potential problem is a tendency to select an excessively uniform and homogeneous group through use of the BI rather than a diverse group of people from a variety of backgrounds. There are dangers of social and organizational rigidity deriving from the institutionalization of standards, norms and values of the past embedded in instruments used today to predict behavior in the future. Yet it appears illogical that BI's used to predict scholastic success should lead to greater institutional rigidity of norms than scholastic aptitude tests currently in popular usage.

Several investigations have been specifically concerned with the value and utility of biographical inventories for the prediction of academic success. In early studies of biographical data with relatively restricted samples of college students, it was found that BIs correlated in the high .30s with grades and that they added relatively little to a multiple R when added to

objective tests of "general ability" (Asher and Gray, 1940; Scott, 1938). Lief (1940) found that high school grades, added to objective test scores to compute a multiple R, were better predictors of college achievement during the freshman year than scores obtained from biographical information. Similar conclusions were reached by Myers (1952), Myers and Schultz (1950), and Schultz and Green (1953).

The "Life Experience Inventory" is one particular BI designed to predict future academic grades. The instrument has been used in several studies (Malloy, 1955; Malloy and Ivanoff, 1964; Ivanoff, Malloy, and Rose, 1964) to predict academic success in various collegiate programs. Malloy and Ivanoff (1964) showed that high school average was, among female students, a better single predictor of sophomore GPA ($r = .56$) than their Life Experience Inventory ($r = .52$). Substantial improvement was obtained when the two variables were combined ($R = .65$). For male students, high school rank in class was not as good a single predictor as the biographical inventory and did not contribute significantly to a multiple R that included the inventory and ACE scores.

A somewhat unique form of BI that has proven to be a consistently good predictor of scholastic performance is the one that limits item content to study habits and attitudes toward school work. Fishman and Pasanella (1960) have reported a median r of .47 for investigations that utilized study habit inventories as predictors and various classroom achievements as the criteria. Various biographical inventories which focus exclusively on study habits

tend to be among the best predictors of scholastic achievement (Brown and Dubois, 1964; De Sena, 1964a, 1964b).

Another study-attitudes inventory for measuring background information, the Survey of Study Habits and Attitudes (Brown and Holtzman, 1955; Holtzman, Brown, and Farquhar, 1954), has yielded cross-validated rs in the .60's and .70's. Such instruments as the SSHA, combined with scholastic ability measures, yield multiple Rs in the 70's. Many studies (Holtzman and Brown, 1968; Khan, 1969; McGuire, Hindsman, King, and Jennings, 1961; Popham and Moore, 1960) attest to the value of the Survey of Study Habits and Attitudes for the prediction of academic prediction.

In a study which included cross-validation and two-item scoring techniques for a 200-item BI, Webb (1960) found negligible (although statistically significant) increases in a multiple R when the biographical data were combined with high school average and ACE test scores to predict freshmen grades.

Weitz and Wilkinson (1957) reported that background demographic data did differentiate between levels of scholastic achievement in groups of college students matched on the basis of aptitude and curriculum choice. Gerritz (1955) also demonstrated differentiation of grade achievement levels on the basis of demographic items obtained from application and personal data blanks.

Watson (1965) attempted to predict academic achievement with ability held constant. He found a virtual loss of predictive power for a BI when a composite aptitude test score (based upon tests of verbal abilities, math, and sciences) was partialled out. The

particular form of BI utilized by Watson consisted entirely of demographic items, e.g., number of siblings, birth order, and parental education. He neglected a wide range of biographical information concerning future plans, types of extracurricular activities, interests, hobbies, attitudes toward school, etc., which are thought to account for much of the variance in the BI that is common to scholastic achievement. Thus, motivational components of academic performance did not comprise the portion customary of the BI.

Denham (1966) investigated the prediction of success in the College of Education, University of Arkansas, by the use of biographical data and self-ratings given by students in reply to an 85-item multiple choice questionnaire called the Personal Data Inventory (PDI). In a sample composed of 139 freshmen, PDI scores alone accounted for 46.2 per cent of the predictable variance of GPA as compared to 17.9 per cent accounted for by SCAT. PDI scores, SCAT, and sex and curriculum information as a battery accounted for 54.4 per cent of the predictable variance of GPA with a multiple correlation coefficient of .738.

Szabo (1969) investigated the predictive power of intellective, personality, and biographical variables in relation to the criterion of academic success in an independent study course in biological sciences at the college level. Success in the course was defined by the final grade in the course and by the students' rating of the amount they learned. The best sets of counselor ratings, personality, intellective and biographical

predictors produced a significant correlation of .69 ($p < .01$) with the criterion of final grade and a correlation of .35 ($p < .01$) with the criterion of the subject's rating of the amount learned.

Russo (1969) found military veterans and active duty personnel more successful than non-veterans attending Arizona junior colleges. In attempting to predict GPA at junior college levels married students were more successful in achieving a higher GPA than students who were not married. Military experience and other biographical variables were predictive of academic achievement.

In a study of biographical data antecedents of ability change, Black (1969) found factors in background information which are valid predictors of future behavior and quite independent of each other. Some biographical factors had generality from sample to sample, but many factors were intrinsically situational and specific. Item responses were more predictive than factor scores even though factors on which scores were based were factors generated from demonstrably valid biographical items.

Reck (1968) evaluated a biographical inventory which had previously been found to differentiate between over- and under-achievers for increasing the predictability of college grades of 180 students in the School of Science at Purdue University. A 23-item BI significantly increased predictability in every case, all the differences between the multiple correlations with and without the BI were significant at the .01 level with the sample of men and at the .05 level with the sample of women. The BI

significantly increased predictability of college achievement (GPA) when added to either high school rank, Purdue Placement Tests - English and Mathematics, and Scholastic Aptitude Tests - Verbal and Quantitative (SAT).

Grady (1969) compared the relationship of various academic, personality and biographical factors to the academic achievement of 31 American and 31 Canadian male college freshmen. It was concluded that the American College Test and high school grade point average provided the best prediction of college achievement for the American freshmen. These variables were not useful in the prediction of college achievement for the Canadian male freshmen. Selected biographical data such as parental education, participation in intercollegiate athletics, size of home town, and size of high school graduating class were not significantly related to the college achievement of either the American or Canadian freshmen. A relatively brief Biographical Data Questionnaire was used rather than an omnibus biographical inventory.

Vraa (1969) studied the relationship between selected variables and first year undergraduate GPA in a random sample of 59 Canadian male freshmen enrolled at the University of North Dakota. The American College Test battery and high school grades were the best predictors of college grades. He concluded that personal background factors from a biographical data questionnaire did not serve as significant predictors of the college achievement of Canadian male freshmen.

Nuttall, Amith and Nuttall (1970) examined the reliability, validity, and relationships of a Spanish language adaptation of Schaefer's Child's Report of Parental Behavior Inventory (CRPBI) in a sample of 5,300 Puerto Rican adolescents. Background variables, especially socioeconomic status and college plans, were related to CRPBI factors. Background factors on the CRPBI predicted grades, especially among junior high school males. McClelland (1969) investigated twelve non-intellectual variables and their relationship to the academic achievement of 233 freshmen male students enrolled at Tri-State College, Angola, Indiana. Multiple correlations were derived to determine which variables would emerge as contributors to any increment in prediction of academic achievement. The subjects who had assumed a parental role were academically more successful. The amount of education and degrees held by the mother of the academically unsuccessful subject was significantly greater than that of the successful subject ($p < .05$). Inclusion of the twelve non-intellective variables to the rank in high school and the School and College Ability Test increased the multiple correlation from .30 to .56.

Worthington (1969) found first quarter college GPA at the University of Utah significantly ($p < .01$) related to high school grade average, high school attended, perceived importance of an academic goal, estimated family income, number of nonacademic high school achievements, and choice of future vocational role. Husemollor (1969) found that demographic data, specifically the variables of age and motivation, predictive of academic success for students at Eastern New Mexico University.

Lewis (1969) evaluated twenty-one intellective and non-intellective high school variables of 320 high school graduates who attended institutions of higher education and who attained a score of 50 or more on the Terman Concept Mastery Test. When subjects were high school students, they completed instruments which provided data about their extracurricular activities, plans and aspirations in intellective and personal-social areas. High school GPA and scores on five tests provided general academic, verbal, and quantitative performance data. From responses to the fourth year after high school follow-up questionnaire, it was concluded that forecasting the accomplishments of superior students four years after high school was not possible to a degree that was socially significant even when the voluminous data employed in the study were utilized.

Fitzpatrick (1969) investigated the relative effectiveness of two classroom teaching methods at the college level as related to selected measures of students' non-cognitive characteristics. The non-cognitive traits considered were those measured by the various scales of the Minnesota Multiphasic Personality Inventory (MMPI), the Survey of Study Habits and Attitudes (SSHA), and the Edwards Personal Preference Schedule (EPPS). These yielded a total of twenty-nine non-cognitive measures in a sample composed of fifty-two male freshmen. Findings supported the general conclusion that there are non-cognitive characteristics of college students which relate differentially under two methods of instruction, the conventional and small-group methods, to either their achievement,

measured by grades, or their expressed satisfaction in certain liberal arts courses.

Woodard (1969) administered two forms of a 300-item multiple-choice BI to 171 Ohio University graduate students enrolled in the department of Counseling, Guidance and Student Personnel and the department of Psychology. The inventories were scored on three empirically derived keys: (1) Creativity, (2) GPA - Female, and (3) GPA - Male. Other predictor variables examined in the study were undergraduate GPA, the Graduate Record Exam (GRE), Verbal and Quantitative Aptitude Tests, and the GRE Advanced Tests in Education and psychology. The criterion measures used in the study were graduate GPA and faculty ratings obtained on a semantic differential rating scale designed to assess differing dimensions of professional competence in the student's major area of concentration. The best predictor was the Advanced Test of the GRE; the next best predictor was the BI Form-Beta Creativity Key. The Male and Female BI Grade-Point-Average keys were found to be in most cases ineffective predictors across all criterion measures for the total sample and subgroups.

Lunneborg (1968) found biographical data more important in making differential predictions of GPA of college freshmen in various subject matter areas than in making absolute predictions. The best absolute predictors of scholastic ability consisted primarily of aptitude measures.

Connolly (1969) administered a biographical inventory called the Background and Experience Questionnaire (BEQ) keyed to

predict a battery of aptitude and achievement tests (SCAT and STEP) to 600 seventh-graders in 1963. As ninth-graders in 1965, they were administered a test battery (SCAT, STEP). The BEQ responses were scored according to a "key" based on the results of cluster analyses. Findings indicated that some of the BEQ clusters show moderately high prediction of subsequent test performance. The best single predictor across all criterion tests and for both sexes was a scale interpreted as "Educational Motivation." Ward (1958, 1965) developed a BI with 689 alternatives for entering students at the University of Tennessee. This preliminary BI, administered to the freshman class in the fall of 1957, was cross-validated on a sample in the winter quarter of 1958. Although only fifty-eight alternatives met the two criteria for inclusion in the final inventory, a point-biserial correlation between BI scores and GPA yielded $r_B = .75$. The multiple correlation with GPA for weighted test scores and the BI score was .79. Retest reliability for one year later was .55, possibly low because of a change from the preliminary to the revised inventory form and possible changes in attitudes over a year. Test-retest reliability for the revised inventory, two to six months previously yielded a significant correlation of .80.

Aiken (1964) developed a 76-item multiple-choice BI which was administered to 1,006 women college students at The University of North Carolina at Greensboro. From those completing the first semester of college work, two randomly selected groups of one hundred each were studied. Correlations of .57 and .60 were

obtained between grade point average and BI scores for the two groups. Multiple correlations based on a combination SAT score, converted rank in high school class, size of high school class, and BI scores were .683 and .696 for the two groups. Correlations between SAT subscores and grade point average ranged from .31 to .50. Aiken also found biographical items which were predictive of academic failure and college withdrawal.

Hilton and Myers (1966) used a 169-item self-report BI designated the Background and Experience Questionnaire (BEQ) to predict high school graduation rank-in-class and twelfth grade objective test scores. Scales from the BEQ produced multiple Rs with objective test scores (STEP, SCAT) and rank-in-class which ranged from .57 to .64. The main weakness of this study was the use of only one criterion variable which was not an objective test. Other nontest criterion variables such as grades, teacher ratings, and awards received were not evaluated or included. Another limitation of the study was restriction of the sample to a homogeneous group of boys enrolled in college preparatory programs (N = 1206). In spite of sizeable multiple Rs, Hilton and Myers felt that biographical data added little useful information to that provided by a thorough battery of objective tests.

Cline, Richards and Abe (1964) keyed a biographical information blank to predict diverse criteria of success in high school science. Validity coefficients ranged from .56 to .87 in a group of 619 high school students. Cross validities ranged from .24 to .62 with two exceptions. The authors concluded that biographical

items were powerful predictors of high school science achievement. Biographical data have been equally effective for predicting scientific achievement in adult scientists and engineers (Taylor, Ellison, and Tucker, 1966; Taylor and Ellison, 1967).

Kraft (1968) found that biographical data such as sex, race, age, parent's residence, parent's profession, type of secondary school attended, year of secondary graduation and attendance at a coaching school did not contribute significantly to the prediction of either test performance or scholastic performance in the universities of Thailand. This study lacked an omnibus inventory and possibly suffered because of restriction on biographical item content.

Anastasi, Meade and Schneiders (1960) developed and validated a weighted scoring key for use with a Biographical Inventory which was administered to all entering freshmen at Fordham College in the class of 1958. Although academic achievement was considered, the criterion of college success emphasized non-intellectual factors and was shown to be differentiable from the usual GPA criterion. Three criterion groups of fifty students each were evaluated. Cases representing Positive, Average, and Negative criterion groups were selected by a committee of three judges on the basis of information assembled from nine criterion sources over the first three years of college. The Positive cases represented essentially "the type of person this college wants to develop." Faculty ratings for initiative and leadership were used, as were facts such as participation in an Honors Program of studies,

student government record of leadership characteristics, extra-curricular activities, honor society election plus records of disciplinary action by the administration and sources of information regarding maladjustment. Average cases were those making a satisfactory adjustment to college but showed no outstanding characteristics or abilities. The Negative cases gave concrete evidence of emotional maladjustment or anti-social behavior and were judged to be all-around unsatisfactory pupils.

Anastasi et al. found that neither the Scholastic Aptitude Test, the American Council on Education Psychological Examination, the Cooperative English Test, the Cooperative General Achievement Tests, the Gordon Personal Profile, the Kuder Preference Record nor the Bell Adjustment Inventory were able to differentiate as well as the Biographical Inventory among the three criterion groups. Criterion correlations as high as .548 were obtained in the cross-validation sample indicating the predictive validity of the adjustment and accomplishments of college students.

Bittner (1945) developed a scale based on biographical data for predicting college entrance for high school students. He developed a key which correlated .54 with the criterion. Sorenson (1950) developed a BI which would discriminate between over and under achieving high school boys as well as predict behavioral adjustment. When cross validated, the scale correlated in the sixties with achievement and in the forties with adjustment.

Price (1969) used the Alpha Biographical Inventory to predict first semester grades of freshmen at Wake Forest University.

The BI key as a single predictor of academic achievement proved superior to SAT verbal scores. Students have been admitted to college, however, on the basis of SAT scores and high school rank causing a decrease in variability of the intellective factors used in the study. A correlation of .41 was obtained for the total sample (N = 630) with correlations of .41 for men (N = 432) and .20 for women (N = 198).

The American College Test (American College Testing Program, 1963), widely used for scholastic prediction, has a Profile Section which utilizes demographic information not unlike items typically found in composite biographical inventories. The ACT, for example, has in addition to its composite score, questions about the number of dependents in the family, level of education expected, high school nonacademic achievement in science, in literature, in leadership, potential college-cocurricular activity in acting and in government, and college perception influenced by the advice of high school teachers or advice of parents.

The activity and interest of the much-used American College Testing Program and the College Entrance Examination Board (Anastasi, Meade, and Schneiders, 1960) in developing biographical predictors of academic success suggests the potential value and direction of needed research on the BI. Such interest suggests a possible shift from cognitive to non-cognitive predictors of scholastic achievement.

Holland and Nichols (1964) and Holland and Richards (1965, 1966) found various measures of academic achievement independent

of all real-life indices of creative achievement and leadership. Wallach and Wing (1969) also found talented accomplishments outside the classroom lacking substantial linkages with intelligence measures and grades. The latter researchers suggested that future statesmen should best be selected in terms of past evidences of social leadership. They further suggested that nonacademic talents or accomplishments are important because they indicate what a student does spontaneously rather than because of institutional demands (see Friendenberg, 1965; Nordstrom, Freidenberg and Gold, 1967). It appears that we ignore a large portion of leadership accomplishments which society could properly sustain and nourish among its college students.

CHAPTER III

NEED FOR STUDY

College and university enrollments are rapidly growing beyond the capacity of present institutions of higher education to absorb. Blanket acceptance of all applicants, therefore, becomes a numerical impossibility in spite of the desirability for full educational opportunity and development within the limits of every individual's capacity. Too often students apply for college with scant aptitude for advanced scholastic work. Unqualified applicants tend to heighten rather than alleviate the critical number of students evaluated for college admission. The need is apparent for tests and other predictors capable of identifying students who show both academic promise and leadership potential. There is a great need for better, more efficient, reliable and valid measures. The problem facing college admissions officers is two-fold: to identify the best possible predictors of college academic achievement and utilize these predictors to obtain maximal prediction.

A study of the literature concerning prediction of scholastic and leadership ability among college students revealed many approaches. A variety of designs, subject matter, and methodology has been used with varying degrees of success. This study was designed to provide evidence of the value of developing non-cognitive or "non-test trial predictors" (Bellows, 1961),

for the identification of talented individuals in terms of scholastic ability and leadership qualities. The use of biographical data to predict academic and leadership potential may help to bring the non-cognitive or "will do" type of measurement up to or above the level to which cognitive or "can do" measures have already been developed. With greater predictive efficiency, educators may salvage wasted time and effort of students ill-equipped for college work, stimulate and encourage those with latent or hidden talents toward educational self-fulfillment and help create a more equitable and humanistic approach to the process of college admission and selection.

CHAPTER IV

DESIGN AND SCOPE

Hypotheses

In this study an attempt was made to develop workable criteria of leadership and evaluate a biographical inventory for the identification of individuals with leadership potential and scholastic aptitude for college. The major hypothesis tested was that there is a significant relationship between academic performance, leadership performance, and biographical data (i.e., background data, personality characteristics, and specific abilities).

The two specific sub-hypotheses tested were:

1. There is a significant relationship between biographical inventory key scores secured on subjects in high school and subsequent academic performance in college.
2. There is a significant relationship between biographical inventory key scores obtained from high school subjects and positions of leadership held in college.

Thus, BI scores served as independent variables to predict the dependent variables of scholastic achievement and demonstrated leadership. The two dependent variables were operationally defined in terms of the first year GPA and leadership achievement. Leadership while in college was conceptualized as the role behavior

of one elected or appointed to direct, coordinate, supervise, or perform the many functions required for achievement of group goals or tasks. In comprehensive surveys of leadership studies, Stogdill and his associates (1948, 1968, 1970) found that the single most frequently used method for the identification of leaders was occupancy of leadership position. The criterion or evaluative standard to "measure" a person's leadership was election to a position of leadership such as student body president or student council.

Method

The criteria used in this study were extra-curricular leadership activities and college grades. A brief questionnaire was devised for obtaining follow-up data. In the absence of an ultimate or "true" criterion of leadership, defined as a theoretical and ideal criterion, a simple, pragmatic criterion of leadership suitable for a college freshman sample was utilized. Occupancy of an elective leadership role was assumed to be an appropriate measure of accomplishment at one moment in time, that is, during early college life. Peer elected leadership was thus chosen as a distal criteria because such data were obtained approximately two years after measurement on the predictor variable.

Leadership position was scored in terms of the occupancy of a leadership role: 0 = none, 1 = minimal or marginal leadership position, and 2 = definite leadership position. The following scoring schema was used:

0 Cheerleader, captain of the dorm basketball team, social chairman of a fraternity.

Requisite skills for directing an athletic effort were deemed sufficiently different from those directing abilities required to achieve more socially relevant leadership goals to merit arbitrarily different ratings.

1 Dorm treasurer, vice-president of the Baptist Student Union, officer of Girl's Service Club, Master Counselor of Demolay, publications chairman, English Club president.

2 Freshman Student Legislature Representative, Sophomore Consolidated Student Council, Student Legislature and Finance and Rules Committee, member of Student Council, President of Freshman Class, SGA Legislature, Freshman Cabinet member.

Those responses which failed to specify the exact leadership position were assigned a value of 1 rather than 2 because of the doubt element. It was deemed desirable to err conservatively to insure that individuals holding positions assigned a value of 2 were clearly in positions of leadership. It did not prove feasible to break leadership positions into additional categories because of lack of information regarding title and position uniformity from school to school.

The first year cumulative grade point average (GPA) was chosen as the criterion of scholastic ability. Grades reported

by questionnaire respondents were converted according to the following schema:

A	= 4.00	C-	= 1.67
A-	= 3.67	D+	= 1.33
B+	= 3.33	D	= 1.00
B	= 3.00	D-	= 0.67
B-	= 2.67	F+	= 0.33
C+	= 2.33	F	= 0.00
C	= 2.00		

Several studies have shown that such self-reported grades are highly correlated with grades reported by institutions (Davidson, 1963; Dunnette, 1952; Hanna, Bligh and Lenke, 1970; Holland and Richards, 1965; Hoyt, 1963; Kirk and Sereda, 1969; Richards and Lutz, 1965; Walsh, 1967).

The 300-item Biographical Inventory, designated Form M, used in the North Carolina Talent Study with high school seniors, evolved from earlier studies with Form J for the identification of creative scientific talent (see Institute for Behavioral Research in Creativity, 1968; Taylor and Ellison, 1967). Form J of the BI was constructed to predict academic performance at the college freshman level. Items were revised for clarity and vocabulary level to make the instrument suitable for administration to students in grades 9 through 12. Results obtained with Form J administered to the entire freshman class at Ohio University in November, 1966 revealed cross validities of .60 (N = 1,111) for females and .58 (N = 1,047) for males for predicting academic performance.

The leadership key, based on the "Early Identification of Management Potential" (Standard Oil Company, 1961), evolved from studies conducted by Standard Oil Company, New Jersey during the late 1950's. In these studies biographical data were first used for the prediction of future performance of potential managers at an early point in their careers. More detailed information about the development of BIs for the prediction of scholastic and leadership ability is reported elsewhere (James, Ellison, McDonald, and Taylor, 1968).

The student sample was obtained from a follow-up of students who participated in the North Carolina Talent Study (Institute for Behavioral Research in Creativity, 1968), which was administered to 13,250 ninth and twelfth grade students from thirty-nine junior and senior high schools in nine North Carolina Public School Administrative Units during the 1966-67 school year. In the study, selection of schools was geared to provide a range of schools with respect to geographical region, size, percentage of graduates attending college, urban-rural location and racial composition (see Table 1). Stratified random sampling was used to insure a study population that approximated the total composition of the student bodies of the public school systems of the state in grades nine and twelve. The gathering of all predictor information was thus accomplished by teams of researchers as a part of the North Carolina Talent Study and stored for later retrieval.

In October, 1968 the questionnaire asking for follow-up data was mailed to all 6,105 twelfth graders who participated in

TABLE 1

SCHOOLS INCLUDED IN THE NORTH CAROLINA TALENT STUDY

Name of School	Number White	Number Negro	Total
Twelfth Grade			
Charlotte-Mecklenburg			
Harding High	222	31	253
Myers Park High	549	68	617
North Mecklenburg	325	98	423
Second Ward	0	261	261
Greensboro City Schools			
Dudley Street School	0	358	358
Page Senior High	440	17	457
Smith Senior High	302	30	332
Hendersonville City Schools			
Hendersonville Senior High	100	9	109
Kinston City Schools			
Adkin Senior High	0	158	158
Grainger Senior High	259	4	263
Moore County Schools			
North Moore Senior High	90	15	105
Union Pines Senior High	114	22	136
New Hanover County Schools			
New Hanover Senior High	704	15	719
Williston Senior High	0	272	272
Raleigh City Schools			
William G. Enloe Senior High	230	20	250
Wilkes County Schools			
East Wilkes Senior High	127	1	128
North Wilkes Senior High	104	1	105
West Wilkes Senior High	182	0	182
Winston-Salem/Forsyth			
North Senior High	513	12	525
Paisley Senior High	0	192	192
West High School	259	1	260
Total	4,520	1,585	6,105

the North Carolina Talent Study. Questionnaires returned as undeliverable at the first address were sent to an alternate address where students had indicated they could always be reached. A total of 1,083 questionnaires (17.7 per cent) were received in response to the first request. In December, 1968 a second questionnaire was sent to the 5,022 subjects who failed to respond to the initial request. Six hundred and fifty-three additional questionnaires were returned in response to the second request. This made a grand total of 1,736 respondents (28.4 per cent). The total response (see Table 2 for respondents obtaining education beyond high school) to the questionnaire was small, 28.4 per cent, compared to 68 per cent for twelfth graders in Project Talent (Flanagan and Cooley, 1966). Kerlinger (1965, p. 397), however, reports that return rates lower than 40 per cent are common.

Respondent comments suggested that many pupils felt captive in high school when predictor measures were obtained and, further, felt that they received inadequate preparation and explanation of the objectives of the North Carolina Talent Study. A few respondents wrote back with denunciation of the request for information and indicated that they had deliberately tried to fake all measures by random marking of tests. The vast majority of respondents, however, reacted favorably to the questionnaire and cooperated in the effort.

The limited response to the questionnaire was possibly due to a time lapse of approximately two years between obtaining the predictor measures and the follow-up study. Self preselection was

TABLE 2

QUESTIONNAIRE RESPONDENTS

Group	Questionnaires Received	Maximum N Available*
Colleges and universities		
University of North Carolina, Chapel Hill	125	
Appalachian State University	77	
University of North Carolina, Greensboro	76	
North Carolina State University	66	
Wilmington College	66	
East Carolina University	59	
University of North Carolina, Charlotte	41	
North Carolina A & T State University	36	
Wake Forest University	28	
Western Carolina University	19	
Duke University	15	
Guilford College	13	
Winston-Salem State College	13	
North Carolina College	12	
Salem College	11	
Johnson C. Smith University	10	
Atlantic Christian College	9	
Fayetteville State College	8	
Livingstone College	8	
Queens College	7	
Elon College	7	
Bennett College	7	
Catawba College	6	
Davidson College	6	
Greensboro College	6	
High Point College	6	
Meredith College	6	
Shaw University	5	
Campbell College	4	
Lenoir Rhyne College	4	
Louisburg College	4	
Mars Hill College	4	
Pfeiffer College	4	
Asheville-Biltmore College	3	
Meredith College	3	
St. Andrews Presbyterian College	3	

TABLE 2 (continued)

Group	Questionnaires Received	Maximum N Available*
Belmont-Abbey College	2	
Pembroke State College	2	
Miscellaneous (out of state)	170	
Total	951	866
Community colleges		
Central Piedmont Community College	70	
Lenoir County Community College	22	
Sandhills Community College	22	
Wilkes Community College	18	
Davidson Community College	3	
Gaston Community College	3	
Wayne Community College	3	
Rockingham Community College	2	
Isothermal Community College	1	
Surry Community College	1	
Total	145	118
Junior colleges		
Wingate Junior College	29	
Gardner Webb College	17	
St. Mary's College	14	
Brevard College	10	
Lees-McRae College	6	
Miscellaneous	28	
Total	104	99
Negro colleges		
North Carolina A & T State University	36	
Hampton Institute	14	
Winston-Salem State College	13	
North Carolina College	12	
Johnson C. Smith University	10	
Fayetteville State College	8	
Livingstone College	8	
Bennett College	7	
Shaw University	5	
Virginia State College	4	
Miscellaneous	6	
Total	123	75

TABLE 2 (continued)

Group		Questionnaires Received	Maximum N Available*
Technical institutes			
Guilford Technical Institute		22	
Forsyth Technical Institute		17	
Cape Fear Technical Institute		16	
W. W. Holding Technical Institute		4	
Asheville-Buncombe Technical Institute		2	
Randolph Technical Institute		1	
Gaston Technical Institute		1	
Alamance Technical Institute		1	
Miscellaneous		3	
	Total	67	45
Bible colleges			
Bob Jones University		6	
Piedmont Bible College		2	
Miscellaneous		4	
	Total	12	9
Trade schools			
Data Processing		18	
Beauty and Barber Schools		18	
Fashion Modeling and Art		9	
Airline Schools		8	
Miscellaneous		16	
	Total	69	58
Paramedical Training (Nursing, X-Ray, EKG, Lab. Tech., Dental Tech., Inhalation Therapy)		21	
	Total	21	20
Business schools	Total	75	57

* The maximum N is the final number of subjects for whom complete data were available. Missing predictor or criterion scores and erroneous ID numbers decreased the number of subjects available for statistical analysis in each sample.

another potential problem in that many students had less interest in voluntarily responding to a questionnaire thus causing biased samples (see Parten, 1950, p. 400). Response to a questionnaire by a poor student required admission of objectionable facts about himself while the student doing well scholastically could report favorable things about himself.

Follow-up surveys are necessarily concerned with the reliability of self reports. In the absence of empirical evidence there is little reason to place faith in criterion data which are possibly unreliable correlated with predictor variables. An effort was thus made to ascertain the extent of error or bias in self reported GPA. Three senior institutions with more questionnaire respondents were chosen for a reliability check. Objective GPA data were requested and obtained from registrar's offices at the University of North Carolina at Chapel Hill, North Carolina State University and East Carolina University.

Follow-up or criterion scores from returned questionnaires were key punched onto cards and processed by means of a computer in which predictor scores were stored. Means and standard deviations for self reported GPA, university reported GPA and all predictor and criterion variables were first computed. Pearson product-moment correlations were then computed between self reported GPA and university GPA for three subsamples and between predictor variables and criterion scores for all variables. Separate validities were computed for the male and female BI GPA keys, nine groups with different types of post-high school educational

interests and for eleven North Carolina institutions of higher education. Individual validities for each school were computed only when sample size appeared to warrant statistical analysis. Assigned numerical values for leadership role occupancy were essentially ordinal (0, 1, 2) and did not indicate absolute quantities or that the intervals between numbers were equal. Leadership data in this study did not meet requirements for Pearsonian analysis (Guilford, 1965, pp. 107-108). Leadership ratings were discontinuous in that a subject could only score 0, 1, or 2, i.e., he could not score .25, 1.5, etc. In addition, leadership ratings were markedly skewed (M = .33, SD = .65) for the total sample (N = 1227), thus violating a precondition for appropriate use of the Pearson product-moment coefficient of correlation. The Kruskal-Wallis one-way analysis of variance by ranks (Siegel, 1956, pp. 184-193), a nonparametric procedure for testing for the significance of differences among three or more samples, was used. This nonparametric test was uniquely suited for evaluating the relationship between ordinal data in the form of leadership ratings and leadership scores from the BI.

Table 3 (see Appendix) reveals a median correlation of .90 between self reported GPA and university reported GPA for the three subsamples. In the North Carolina State University sample the correlation was .98. Self reported grades were thus deemed to be of acceptable accuracy and reliability. Finally, an assessment was made of the difference in validity of coefficients due to error in self reports for the same three subsamples. The

median positive and negative change in predictive validity coefficients (see Table 4 and Table 5 in Appendix) was .05 and absolute change in validity coefficient magnitude ranged from .01 to .13. Respondents did not drastically alter overall validities by rounding off reported GPA's to the nearest tenth as most of them did. No attempt was made to obtain information regarding falsification or error in reported leadership positions. While such information may have been available from some student personnel administrators, it was not deemed to be readily obtainable because of the diversity of schools which respondents attended and the wide geographical dispersion.

CHAPTER V

RESULTS

The main findings in the study are reported in Tables 4 through 15 (see Appendix).

Criterion means and standard deviations for scholastic ability are reported in Table 4 (see Appendix). Correlations between predictors of scholastic ability and self reported GPA are given in Table 5 and Table 6 (see Appendix). Means and standard deviations for the BI keys, high school rank in class, SAT, SCAT and Otis IQ scores are reported in Tables 7 through 11 (see Appendix). Predictive validity for scholastic ability is reported in Tables 5, 6, and 12 (see Appendix).

An examination of the validities in Table 6 (see Appendix) revealed that the BI GPA keys for males and females were superior to high school rank in class, SAT, SCAT and Otis IQ scores for the prediction of scholastic achievement in the total sample. The second best predictor following the BI was high school rank in class. Among four-year college and university students, BI GPA keys were decidedly better than either SAT or SCAT scores but little better than high school rank in class. All predictors, cognitive and noncognitive alike, were significantly correlated at the .01 level with college grades at senior colleges and universities. This, however, was not true for community colleges

where only two predictors, the BI GPA key for females and high school rank in class, were significantly ($p < .01$) related to grades.

At junior colleges all predictors except the male BI GPA key and SCAT scores were significantly ($p < .01$) related to grades. At predominantly Negro colleges the BI GPA key for females and high school rank in class were the only measures significantly correlated with grades. The female BI GPA key correlated .36 ($p < .05$) with grades while high school rank in class correlated .32 ($p < .01$) with grades.

Correlations between SAT-Total scores and self reported GPA ranged from .02 to .56 with a median r of .35. Validities obtained in three subsamples with the BI GPA key for males ranged from .35 to .60 with a median r of .40. The BI GPA key for females correlated (see Table 4, Appendix) from .31 to .60 with self reported GPA. The median r was .48.

Table 5 (see Appendix) shows that the validity coefficient between high school rank in class and grades increased from .26 ($p < .05$) to .39 ($p < .01$) in the East Carolina University subsample when comparisons were made between self reported GPA and university reported GPA. East Carolina University also had the largest mean discrepancy between self reported GPA and university reported GPA (Table 3 in Appendix). Very small changes in predictive validity coefficients, however, were obtained for the University of North Carolina at Chapel Hill and the North Carolina State University

samples when correlations were computed between high school rank in class and the two GPA sources.

Table 6 (see Appendix) shows that the median correlation between high school rank in class and self reported GPA was .49 when an arbitrary minimum N of 30 was adopted for all school samples. The eight coefficients ranged from .21 to .63. Examination of the table further reveals that validities obtained with high school rank in class as the predictor of scholastic ability in eight different educational groups were more variable than those obtained with senior college and university samples. A median correlation of .33 was obtained and coefficients ranged from .14 to .46 for the eight comparison groups. Low validity coefficients of .14 and .17 were obtained between high school rank in class and grades obtained by pupils enrolled in North Carolina technical institutes and trade schools.

Means and standard deviations for scores on the BI leadership key and leadership ratings for role occupancy are given in Table 13 (see Appendix). Sample distributions for leadership ratings are reported in Table 14 (see Appendix). An examination of Tables 13 and 14 (see Appendix) reveals that all samples had distributions skewed to the right. The analysis of leadership scores as computed by the Kruskal-Wallis one-way analysis of variance by ranks is given in Table 15 (see Appendix). Although the three levels of rated leadership performance differed significantly with respect to average on BI leadership scores in six of the twenty samples, they did not differ in fourteen samples.

Statistically significant differences at the .001 level were obtained in three samples: Senior colleges and universities (N = 164), Trade schools (N = 39), and the University of North Carolina at Chapel Hill (N = 125). BI leadership scores varied significantly at the .02 level with student leadership performance ratings in samples from Central Piedmont Community College (N = 67) and the University of North Carolina at Charlotte (N = 41). A difference which was statistically significant at the .05 level was obtained with the Wake Forest University sample (N = 27). In fourteen of twenty samples the relationship between BI leadership scores and ratings of leadership performance failed to attain statistical significance at the .05 level.

CHAPTER VI

DISCUSSION

The major hypothesis under investigation in this study, that significant relationships exist between academic performance, leadership performance, and biographical data (i.e., personality characteristics, personal background, and specific abilities) was generally supported. The first sub-hypothesis which postulated a significant relationship between biographical inventory key scores secured on subjects in high school and subsequent academic performance by subjects in college was supported in this study. Results generally indicated that BI data and high school rank in class were the most valid predictors of scholastic ability. Neither BI data nor high school rank in class appeared to be consistently or markedly superior for the prediction of scholastic ability across samples. The finding that high school rank in class was valuable for predicting future scholastic performance was consistent with former studies (Lavin, 1965; Mercer, 1969).

Unlike other investigations which have reported concurrent validity data, this study demonstrated that predictive validity coefficients similar to those found with high school rank in class could be obtained with biographical data. Results supported those of similar studies suggesting that there are biographical antecedents which predict scholastic ability. At Ohio University the GPA key

developed on the freshman class yielded split half cross-validities of .58 for men and .60 for women. In this study the same keys yielded cross-validities of .47 for men and .43 for women attending colleges and universities (N = 857). Results obtained with the BI keys generally supported the position suggested by Nunnally (1959) and Dailey (1960) that biographical information is potentially the most valid measure of certain human talents that we possess.

It has been suggested that nonintellective measures often fail to cross-validate in predicting academic success in new settings (Super and Crites, 1962, p. 48). The present findings suggest the superiority of nonintellective measures across many samples. Results in this study also contrast with those of Marshall (1968) who found that single cognitive variables were better predictors of college scholastic ability than single noncognitive variables. The noncognitive variables constituting the BI key generally proved superior to cognitive variables utilized in this follow-up study and equal to high school rank in class for prediction. The crucial difference in findings, however, may have been due to the use of a limited number of discrete biographical items versus a comprehensive 300-item BI which is composed of items related to personality, personal background, motivation, interests and demographic characteristics.

It is possible that larger cross-section samples at various institutions would have produced more definite results, however, the Wake Forest University data by Price (1969), viewed in light

of this study, would not support such an interpretation. With the same BI key for the prediction of scholastic ability of the Wake Forest freshmen class (N = 630), Price obtained a correlation of .41. A validity coefficient of .41 was obtained for male freshmen (N = 432) and a validity of .20 for Wake Forest University freshman women (N = 198). In the present study validities at Wake Forest University reached .53 for men (N = 53) and .45 for women (N = 9). The latter coefficient for women students failed to obtain significance at the .05 level in such a small sample but the direction and magnitude of coefficients in the two studies were in agreement in spite of differences in sample sizes utilized. Wake Forest University female students possibly constituted a more homogeneous group due to admission restrictions which severely curtail the number of entering female freshmen and severely restrict the range of scholastic performance among those admitted.

Until much more is known about validity across schools and validity decrement with the passage of time, local cross-validation data should be obtained at suitable intervals. Expectancy tables for converting BI scores of very low and very high scoring applicants into GPA probabilities may then be profitably constructed.

Several interesting and unanticipated relationships emerged from this study. In seven out of eleven instances (see Table 5, Appendix) in which sample size permitted direct comparison, validities were higher between scholastic predictors and university reported GPA than between scholastic predictors and self reported GPA. But validities were higher for self reported GPA than for

the objective or accurate GPA in four notable instances. BI GPA keys, contrasted with cognitive predictors, more often correlated higher with self reported grades than with objective grades. In the East Carolina University sample, for example, where reported GPA was more discrepant from actual GPA and objectively less reliable (see Table 3 in Appendix), validities indicated that BI keys were more valid than cognitive variables for prediction. One possible interpretation of this finding is that perceived or self-assessed academic ability was more strongly related to motivational and interest variables measured by the BI than to real or objective measures of scholastic ability. In any event the two sets of data correlated highest were derived from the same subjective source - the respondent himself. Torrance (1951) found very little relationship between self-predicted grades and measured ability or achieved grades in a study of 1,215 Kansas State College freshmen. Over-evaluation was related to sex (male), complaints of headaches and nervousness, low level of education of parents, low social prestige of father's occupation and dismissal for academic failure. Many such characteristics overlap with data obtained in the BI. The low relationships between self-estimates of scholastic aptitude and actual standing reported in Torrance's study were obtained with freshmen who had received minimal feedback about their level of scholastic achievement in college. In the present study respondents had at least one year of information about their actual level of achievement in college.

Results obtained from business schools, trade schools, technical institutes, paramedical schools, and Bible schools were of particular interest because of their relative absence from research dealing with scholastic prediction. Although interpretation was complicated by small sample sizes, the best predictors of grades obtained in business schools were high school rank in class ($r = .46$, $p < .01$) and the BI GPA key for females ($r = .41$, $p < .01$). For trade schools the only satisfactory predictor of grades was the BI GPA key for females which yielded a correlation of .39 ($p < .05$). Most other predictors appeared to be negatively related to scholastic ability among trade school pupils. All coefficients failed to attain statistical significance.

Predictive validities for technical institutes, paramedical schools and Bible schools proved difficult to interpret because of extremely small sample sizes which yielded unreliable coefficients. The only noteworthy correlation among these small samples was -.98 ($p < .05$) between SAT-M and scholastic ability in Bible school students. High scholastic performance among Bible scholars appeared antithetical to mathematical aptitude. Generally, when validities obtained with the BI GPA keys are compared with other predictors in this study, biographical data were almost invariably better. This was especially true with the female BI GPA key. Predictive validities obtained with the BI GPA key for males, although more often equal or superior to those obtained with cognitive predictors, were generally lower than those obtained with the BI GPA key for females.

How well did scholastic predictors do at various schools? Table 6, page 83, reveals a median r of .47 for eleven school samples with the BI GPA key for males but several samples with insufficient Ns were included. For three schools of satisfactory sample size, the median r was .40 with validities which ranged from .35 to .60. A median r of .45 was obtained for eleven school samples with the BI GPA key for females. The median r for four school samples with sufficient Ns was .48 with a range of .31 to .60. Thus, validities as high as .60 were obtained at the University of North Carolina at Chapel Hill and at the University of North Carolina at Greensboro, while coefficients no lower than .31 were obtained with the two BI GPA keys in the seven colleges with adequate samples. By comparison, the median r for high school rank in class for eight schools of adequate sample size was .49 and validities ranged from .21 to .63.

Validity coefficients between SAT scores and GPA were possibly depressed due to admission preselection with the instrument at ten of the eleven institutions reported in Table 6, page 83. With the exception of Central Piedmont Community College, all schools utilize the SAT to some extent for admissions. A visual comparison was made between the magnitude of validity coefficients rank ordered and a rank ordering of the eleven school samples on both GPA variability and SAT-Total variability. No obvious relationship existed between the magnitude of validity coefficients obtained for the eleven samples and variance in either predictor or criterion scores. It was noted, moreover, that the lowest SAT

validity was obtained in the East Carolina University sample which also had the greatest discrepancy between the self-reported GPA and actual GPA (see Table 3 in Appendix). This suggests that decreased criterion reliability in some few instances may have influenced validity coefficients.

The wide range of validity coefficients obtained from school to school may reflect different grading practices (see Lavin, 1965, p. 19). The range of validity coefficients between the BI GPA key and first year grades at various institutions of higher education reflects variance on a number of variables. Validity coefficients may also reflect the low reliability of the GPA criterion for scholastic ability across schools. A myriad of independent variables probably affect the cumulative GPA during the first college year and decrease criterion reliability.

Although statistically significant relationships were obtained for six of the twenty samples with the BI leadership key, it did not appear to be a particuarly helpful key in terms of predicting individual leadership performance. In spite of findings difficult to interpret the leadership key worked best with Trade school pupils at larger four-year institutions (e.g., University of North Carolina at Chapel Hill, Wake Forest University) and in educational facilities located near metropolitan areas (e.g., University of North Carolina at Charlotte, Central Piedmont Community College). The leadership key did not yield significant results at North Carolina State University which stresses the physical sciences and engineering. A leadership key developed on

scientists might reasonably be expected to predict satisfactorily in such a sample.

The BI leadership key utilized in this study, formerly designated the EIMP key, was based on the responses of 443 male managers employed by Standard Oil Company (New Jersey). Sample composition ranged from Chairman of the Board and President of the parent company to first or lowest level supervisors. The BI key was developed from data collected in 1955 and 1956 on managers in the New York area. Techniques applicable for the identification of potentially successful business executives in general rather than for Jersey specifically were sought. There remains a question about a BI key developed for managers of an oil company, chemists, and engineers with a mean age of 47 years, being applied to a group of college students, age 18 to 20 years, with diverse educational and vocational interests.

At least two interpretations of variable results with the BI leadership key across samples may be offered. First, it is theoretically possible that the total sample of 1,227 subjects pursuing post-high school education in the study constituted a homogeneous group. This would account for the lack of variability on BI leadership key scores across samples. The marked lack of variability on leadership scores across all sub-samples, however, seemed scarcely attributable to homogeneity because subjects were not similar on other predictor or criterion measures. BI leadership key scores thus failed to meet the basic requirement for variability with regard to measurement (Jensen, Coles and Nestor,

1955). Whatever hypothetical leadership constructs are measured by the BI leadership key, mean scores obtained by various groups of different mental and scholastic ability as well as diverse educational and occupational aspiration patterns lack demonstrable variation which lends itself to predictiveness.

Secondly, interpretation of results obtained with the key proved difficult because of the possibility of unreliable leadership criterion data. Criterion unreliability may have resulted from lack of comparability of leadership positions in spite of similar or identical description titles at different colleges and universities. Ideally, differential weights would have to be assigned or developed for leadership roles titled identically across schools. To be president of the student body at a small community college is quite different from being president of the student body at a large, prestigeous university where much higher scholastic standards are maintained and only those with outstanding leadership abilities get elected. It is equally plausible that a vast number of potential leaders were not so identified because they did not feel it necessary nor important to express themselves by seeking college leadership status.

Findings generally supported the second sub-hypothesis only in some samples. Scores obtained on an objective BI from students while in high school are significantly related to leadership held in college. The Kruskal-Wallis one-way analysis of variance by ranks revealed that the relationship between BI scores for leadership and leadership performance was statistically

significant at the .05 level or better in six of the twenty samples. Results suggest the limited utility of this BI leadership key in an area of leadership identification which has been largely neglected. Variable results obtained with the instrument with different samples left much room for improvement in terms of individual prediction. The statistically significant relationships obtained in six samples suggested the possible measurement of global or generic leadership abilities when the limitations of age, sex, and curriculum or vocational differences are considered. If, in fact, the relationships obtained with the BI leadership key in this study were attenuated and deflated due to criterion unreliability and key inapplicability, there is every reason for further exploration and development of such keys with additional groups against other leadership criteria.

Variable results across samples suggest that the new key may be used for group interpretation or for formulating rather than testing hypotheses regarding individuals. Certainly selections for college admission or enrollment in special leadership training programs could not be based solely on such results for individual assessment. The question remains as to the suitability of a BI key developed for oil company managers being applied to a college population to predict leadership ability. What little work has been done in the area of leadership psychometrics has been more concerned with leadership style or type rather than the prediction of individual leadership ability or leadership performance. The BI is, therefore, unique in its approach to leadership identification.

An interpretative note of caution is suggested by the utilization of predictive validity coefficients which are often effected by preselection. Colleges typically select students on various talent indices thus restricting the range of talent among those in college. Even less variability is found at the beginning of the sophomore year due to attrition or other factors. Humphreys (1968) found evidence of increasing restriction in the range of talent or decreased heterogeneity among college students up through the final semester. Not only is restriction in range possible on criterion variables but also on predictors.

While slight restriction may have occurred in the range of grades in some samples, resulting in attenuated correlations, legitimate comparisons between predictors still proved possible. The relative rank order in the magnitude of validity coefficients for various predictors should have remained stable because range restriction on the scholastic criterion variable was as severe for one predictor as another. As Table 4 (see Appendix) reveals, GPA means and standard deviations proved reasonably consistent across schools. Restriction in range on the scholastic criterion measure was thus deemed to be inconsequential. Marked restriction in range on one predictor variable, the BI leadership key (see Table 13 in Appendix) was notable. Restriction of range probably did lead to reduced or attenuated validity coefficients which underestimated the true validity of biographical data as predictors of leadership ability. Results obtained with the BI key for leadership in this study were likely to have been lower limit

estimates of true validity. Validity coefficients may have approached higher levels if greater score separation of individuals were obtained with the BI leadership key. Taylor and Russell (1939) have suggested that even moderate correlations may be useful if extreme scores, e.g., plus and minus one standard deviation, are used as cut-off points for classification of successful or unsuccessful students.

One further note of interpretative caution regarding results is related to the use of BI keys generally and the BI scholastic key specifically. Advocates of the biographical approach may interpret the lack of differences between Negroes and other groups as evidence of the lack of cultural or ethnic bias. But the mere fact of similar or identical group means does not mean that validities obtained with BI key scores will be similar for all ethnic groups. It is more plausible to examine BI key validities obtained in different ethnic groups rather than group means for evidence of cultural fairness. If the same empirically keyed BI items failed to predict equally well with different ethnic groups then separate keys for race might be constructed without the possibility of unfairly discriminating against any group in terms of language deficits, test taking skills or lower socio-economic and educational opportunities.

Wilson (1968) has emphasized the need for local prediction studies. Based on data obtained from college freshmen attending a predominantly Negro southern institution of higher education, he suggested that the relationship found between predictors of

academic achievement in one institution do not necessarily obtain in similar sources of study in other institutions.

Thomas and Stanley (1969) reviewed previous studies and concluded that high school grades do not consistently make the greatest contribution in predicting college grades of black students. High school grades appeared particularly poor for selection of black male students.

Moore (1968) analyzed biographical information obtained from Negro and white samples matched on age and reported educational attainment. The BI consisted of sixty-seven items which were analyzed for ethnic differences and relationship with cognitive test performance. Significant differences in mean scores occurred for all five cognitive variables and the BI between Negro and white samples. Removal of BI alternatives associated with ethnic classification eliminated the mean score difference but differential prediction of battery performance remained. High BI scores were equally predictive of Negro and white success but low BI scores predicted a lower battery score for Negroes than whites.

Majesty (1967) found that 47 per cent of the biographical data items on a 295-item BI discriminated on the basis of race, sex or religion in a sample of 1,036 subjects on six college campuses. He concluded that life history data commonly found in most employment application blanks and certain tests which measure preferences and opinion may be associated with race, sex or religion. Aronson (1967) investigated the BI to see whether the

instrument penalizes members of one cultural group by measuring their job potential by inappropriate standards. A 105-item questionnaire was analyzed for 98 Negroes and 98 whites matched for length of service, age, and education. He found that the use of both the white key and the joint key to score all subjects resulted in lower validities than the use of specific keys for each racial subgroup or the use of the moderator scale to determine which of the two culturally oriented keys yielded higher validities. It was concluded that it is inappropriate to score BI responses of most Negroes with keys developed with white criterion groups or criterion groups composed of both Negro and white subjects.

It is of interest to know the extent to which scholastic and leadership ability are related and the amount of variance which they share among college students. Harrington (1967) found correlations of .21 and .17 between GPA and EIMP (leadership) scores for 746 male and 780 female freshman students at Ohio University. Slightly higher relationships of .24 and .30 were found between EIMP scores and high school rank in class. Correlations of .13 and .12 were obtained between EIMP scores and composite scores on the American College Test (ACT). His findings suggested a low but statistically significant relationship between BI leadership key scores and global scholastic success while in high school but even lower correlations between leadership scores and either college GPA or ACT scores.

Sherron (1969) explored the relationship between selected personality, demographic, and intellective variables among the Morehead Scholars at the University of North Carolina at Chapel Hill. A sample of 267 subjects was selected which included the entire classes of Morehead Scholars from 1965 to 1970. College nonacademic achievements were not significantly related to high school nonacademic achievements, but were positively related to SAT scores and cumulative GPA. The addition of high school nonacademic achievements to SAT scores increased the predictability of freshman and senior cumulative GPA for all groups. Similar conclusions about the minimal relationship between scholastic ability and nonacademic or extracurricular achievement have been reached by other investigators (Holland and Richards, 1965, 1966, 1967; Hoyt, 1965, 1966; Richards, Holland and Lutz, 1966, 1967; Wallach and Wing, 1969).

As Hoyt (1965, p. 3) suggested, few research studies have been concerned with measures of academic success other than the omnipresent GPA. Leadership ability, for example, has not been linked with grades nor have college grades been strongly related to other indices of life accomplishment. Pallett (1965) found that eight elements of "success" in general business including rating of leadership and creativity were not significantly correlated with college GPA in a sample composed of 184 graduates of the University of Iowa. Criterion definition and measurement, even of multi-dimensional and complex criteria, remains a serious problem in the areas of scholastic ability and leadership.

CHAPTER VII

CONCLUSIONS AND IMPLICATIONS

Data from this study supported both hypotheses. However, biographical information predicted scholastic performance better than leadership performance. Evidence supports the use of BI keys for the prediction of scholastic ability. Further investigation is needed on the relationship between biographical data and leadership ability. A significant contribution could be made in leadership identification and enhancement and measurement theory generally by continued longitudinal follow-up of subjects from the North Carolina Talent Study. It would be especially informative to follow those currently in college after graduation and entrance into adult life where other tools of investigation might be utilized. Continued longitudinal follow-up would allow for further validation of these measures against other leadership criteria such as peer or supervisor ratings or situational tests administered under the auspices of an assessment center.

The use of an objectively scorable biographical data blank as a selection device for college admission purposes seems worthy of consideration. The instrument can also be utilized to provide supplementary information to that provided by typical standardized test scores used for predictive purposes. There is evidence that other useful information, such as potential leadership ability,

can be derived from the past history as well as background information useful for counseling and guidance purposes. As Freeberg (1967) has noted in a summary of BI literature, the instrument works best and surpasses other predictors when the criteria utilized embody a range of complex performances. Longitudinal research would provide evidence to determine the extent to which student leaders in college later become successful executives and managers. Later, more satisfactory real life criteria such as ratings by superiors or peers and actual social accomplishments may be used. Very few acceptable leadership criteria are available by survey means with college student samples.

Practical applications of these findings may be made. Those interested in identifying students who will do well scholastically in college should consider biographical information as contained in the omnibus BI. If one also wishes to identify college students with leadership potential then the BI approach offers a key in need of further study. Results further suggest that past academic accomplishment in the form of high school rank in class remains equal to or better than all other single predictors of academic success. Scholastic aptitude tests which are thought to do a reasonably adequate job of predicting grades often leave much to be desired in terms of predictive validity.

Weaknesses in this study were the poor return of mailed questionnaires, respondent bias and the reliability of self reports. Poor return of questionnaires limits the making of valid generalizations. Because of financial limitations and

geographical dispersion of nonrespondents in this study, a large-scale follow-up was not feasible. Respondent bias was, therefore, impossible to estimate accurately. Other studies, however, suggest typical response bias found in similar survey efforts. Reuss (1943) found, for example, that respondents ranked higher in intelligence, reported better grades in college and were more likely than nonrespondents to stay in college. Marked bias was also found in Project Talent (Flanagan and Cooley, 1966), when comparisons were made between the post-high school activities of respondents and a sample of nonrespondents. Respondents were more likely than nonrespondents to graduate from high school, enter a four-year college and remain in college during the first year. Respondents were more likely than nonrespondents to choose the natural sciences as their major in college, more likely to choose professional jobs as careers and less likely to be married one year after high school.

An additional problem encountered in survey research is the inability to check the responses given. A check of cumulative GPA made against self reported GPA for three of the largest respondent subsamples did reveal satisfactory reliability.

Boulger (1969) made a comparison of two methods of obtaining factual and subjective data in follow-up studies. Two groups of 30 Ss submitted to an interview and filled out a questionnaire, both dealing with life history items. Validation data were obtained from a number of public agencies. Regardless of the method of data collection, structured interview or questionnaire,

certain types of item and content domains elicited less consistent and valid information. Item domains sampled which demonstrated reliability and validity were those which are primarily factual, demographic and socially desirable. Unreliable items required discrimination by the S of time, frequencies and ages and dealt with opinions, attitudes, beliefs and judgments. The two methods were equally powerful for obtaining reliable and valid life history information. Boulger suggested that a mailed questionnaire be utilized in lieu of a personal interview in view of the tremendous saving of both time and money.

This study differed from similar studies in that an omnibus computer-scorable form of the BI was utilized rather than discrete biographical facts taken from the application sheet or from other admissions data. Another major difference between this study and former investigations with biographical data was that pupil samples represented a wide range of post-high school educational endeavors.

The development of criteria remains a problem. Researchers are now beginning to examine criteria other than the usual scholastic or academic measures and predictors. A major task remains in the search and implementation of the best mix of predictors for admission into academia. Additional cross-validation studies are needed to ascertain whether or not validity coefficients will hold up with new samples. Such studies, however, may be of limited value since validities reported in this study were obtained across various schools and many subsamples. Validities reported in this study with the BI key to predict GPA were essentially cross-validities

using a BI key developed earlier in a sample of midwestern college students. An attempt was made to validate a BI leadership key on college students which was originally developed on "leaders" in a major petrochemical company.

If the educational process is defined in broader terms than academic knowledge, participation in nonacademic areas becomes more relevant and significant for the college student. As higher education becomes more concerned with the development of the whole student, participation in extracurricular activities exemplified in leadership behavior becomes a more meaningful and valuable part of the total educational experience. New and valid predictors will undoubtedly evolve and biographical data will play an increasing role in the prediction of both scholastic and leadership ability.

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APPENDIX

TABLE 3

CORRELATIONS BETWEEN SELF REPORTED GPA AND UNIVERSITY REPORTED GPA, MEAN DISCREPANCY SCORES AND STANDARD DEVIATIONS

Sample	N	Correlation Coefficient	N	Mean Discrepancy	Standard Deviation
University of North Carolina, Chapel Hill	97	.90**	121	.046	.226
North Carolina State University, Raleigh	56	.98**	56	.029	.107
East Carolina University, Greenville	54	.85**	54	.176	.351

**All coefficients are significant at the .01 level.

TABLE 4

MEANS AND STANDARD DEVIATIONS FOR SELF REPORTED GPA AND UNIVERSITY REPORTED GPA

Group	Self Reported GPA N	M	SD	University Reported GPA N	M	SD
Total Sample	1215	2.40	.62	207	2.23	.66
Senior colleges and Universities	857	2.36	.61	207	2.23	.66
Males	414	2.29	.63	151	2.24	.66
Females	443	2.41	.58	56	2.19	.63
Community colleges	118	2.37	.68			
Junior colleges	98	2.49	.54			
Negro colleges	75	2.32	.55			
Business schools	49	2.75	.71			
Trade schools	34	2.53	.66			
Technical Institutes	33	2.49	.59			
Paramedical schools	18	2.94	.66			
Bible schools	8	2.39	.30			
University of North Carolina, Chapel Hill	121	2.33	.62	97	2.27	.66
University of North Carolina, Greensboro	73	2.36	.58			
Appalachian State University	71	2.26	.58			
North Carolina State University	61	2.42	.57	56	2.38	.58
East Carolina University	59	2.15	.59	54	2.00	.68
Central Piedmont Community College	57	2.45	.73			
Wilmington College	46	2.43	.66			
University of North Carolina, Charlotte	38	2.26	.68			
Wake Forest University	26	2.21	.54			
Wingate Junior College	28	2.77	.43			
North Carolina A & T State University	13	2.32	.58			

TABLE 5

VALIDITY COEFFICIENTS FOR SELF REPORTED GPA
AND UNIVERSITY REPORTED GPA IN
SELECTED INSTITUTIONS

Institution	Predictor	N	Correlation Coefficient for Self Reported GPA	N	Correlation Coefficient for University Reported GPA
University of North Carolina, Chapel Hill	Male BI GPA key	89	.60**	71	.61**
	Female BI GPA key	32	.39*	26	.38*
	High school rank in class	119	.63**	96	.62**
	SAT - total	113	.49**	90	.54**
	SCAT - total	27	.28	17	.52*
	Otis IQ	43	.31*	33	.39*
North Carolina State University, Raleigh	Male GPA key	57	.35**	53	.34*
	Female GPA key	4	.29	3	.52
	High school rank in class	60	.21	55	.24
	SAT - total	55	.33*	50	.44**
	SCAT - total	13	.00	12	-.06
	Otis IQ	20	-.04	18	.02
East Carolina University	Male BI GPA key	27	.47**	27	.42*
	Female BI GAP key	32	.31	27	.26
	High school rank in class	58	.26*	53	.39**
	SAT - total	58	.02	53	.11
	SCAT - total	12	.00	11	.29
	Otis IQ	21	-.05	19	-.12

* Significant at the .05 level.
** Significant at the .01 level.

TABLE 6

CORRELATIONS BETWEEN PREDICTORS AND SELF REPORTED GRADE POINT AVERAGE

Group	Male BI-GPA Key	Female BI-GPA Key	HS Rank in Class	SAT V	SAT M	SAT Total	SCAT Total
Total Sample	(565) .30**	(650) .31**	(1182) .28**	.22**	(995) .15**	.20**	(256) .16**
Senior colleges and universities	(414) .47**	(443) .43**	(835) .40**	.32**	(782) .22**	.29**	(193) .26**
Community colleges	(66) .20	(52) .52**	(112) .44**	.02	(62) -.09	-.04	- -
Junior colleges	(39) .27	(59) .47**	(98) .35**	.33**	(91) .34**	.37**	(17) .20
Negro colleges	(31) .24	(44) .36*	(74) .32**	.12	(66) .17	.16	(26) -.19
Business schools	(10) .18	(39) .41**	(48) .46**	.10	(22) .09	.11	(15) .11
Trade schools	(7) -.72*	(27) .39*	(34) .17	-.36	(10) -.43	-.41	(9) -.26
Technical institutes	(24) -.11	(9) .39	(31) .14	.47	(11) -.09	.19	(16) .43
Paramedical schools	- -	(18) .05	(17) .18	-.27	(11) -.11	-.24	(3) 1.00
Bible schools	(5) .52	(3) .97	(7) .39	.52	(6) -.98**	-.62	(2) -1.00

TABLE 6 (continued)

Group	Male BI-GPA Key	Female BI-GPA Key	HS Rank in Class	SAT V	SAT M	SAT Total	SCAT Total
University of North Carolina, Chapel Hill	(89) .60**	(32) .39*	(119) .63**	.43**	(113) .41**	.49**	(27) .28
University of North Carolina, Greensboro	(6) .67	(67) .60**	(72) .45**	.59**	(70) .22	.51**	(16) .55*
Appalachian State University	(28) .49**	(43) .57**	(69) .61**	.50**	(59) .37**	.56**	(5) .33
North Carolina State University	(57) .35**	(4) .29	(60) .21	.29*	(55) .25	.33*	(13) .00
East Carolina University	(27) .47**	(32) .31	(58) .26*	.20	(58) -.17	.02	(12) .00
Central Piedmont Community College	(32) .40*	(25) .61**	(54) .53**	.22	(32) .07	.15	-- --
Wilmington College	(25) .32	(21) .58**	(44) .59**	.36*	(41) .22	.34*	(38) .34*
University of North Carolina, Charlotte	(24) .69**	(14) .03	(38) .44**	.45**	(36) .14	.36*	-- --
Wake Forest University	(17) .53*	(9) .45	(26) .65**	.45*	(26) .11	.40*	-- --
Wingate Junior College	(18) .29	(10) .33	(28) .65**	.13	(27) .16	.17	(4) -.71
North Carolina A & T State University	(6) -.04	(7) .66	(13) .35	.12	(11) .13	.15	-- --

NOTE: Sample sizes in parentheses.
* Significant at the .05 level.
** Significant at the .01 level.

TABLE 7

MEANS AND STANDARD DEVIATIONS FOR BI SCORES TO PREDICT GPA

	Male BI-GPA Key			Female BI-GPA Key		
	N	M	SD	N	M	SD
Total Sample	596	107.4	15.8	682	109.8	17.6
Senior colleges and universities	421	112.4	14.2	445	115.5	16.1
Community colleges	67	97.9	14.7	57	99.2	15.9
Junior colleges	40	95.3	11.1	59	102.5	15.1
Negro colleges	31	109.8	10.6	44	107.9	14.4
Business schools	10	89.5	9.0	47	97.2	15.0
Trade schools	17	96.0	12.6	41	95.8	15.9
Technical institutes	33	91.4	9.9	12	102.0	14.8
Paramedical schools	2	91.5	12.0	18	96.2	10.3
Bible schools	6	106.2	17.8	3	117.7	4.5
University of North Carolina, Chapel Hill	89	117.7	12.5	32	122.2	15.6
University of North Carolina, Greensboro	6	123.3	17.0	67	121.1	14.9
Appalachian State University	29	106.8	12.7	43	111.1	14.7
North Carolina State University	57	116.0	13.9	4	133.2	5.1
East Carolina University	27	107.0	11.3	32	103.8	12.7
Central Piedmont Community College	32	97.9	13.2	27	100.0	14.2
Wilmington College	28	105.2	14.3	21	117.1	13.8
University of North Carolina, Charlotte	24	107.6	14.5	14	112.8	12.5
Wake Forest University	17	119.0	11.6	11	123.5	15.5
Wingate Junior College	18	98.7	10.7	10	99.9	15.8
North Carolina A & T State University	6	110.2	7.1	7	104.0	13.9

TABLE 8

MEANS AND STANDARD DEVIATIONS FOR
HIGH SCHOOL RANK IN CLASS

Group	N	M	SD
Total Sample	1244	549.5	89.7
Senior colleges and universities	844	581.0	69.6
Males	408	565.2	76.6
Females	436	595.8	58.7
Community colleges	118	485.9	88.5
Junior colleges	99	492.3	91.7
Negro colleges	74	566.9	80.8
Business schools	55	497.2	92.5
Trade schools	58	457.7	83.9
Technical institutes	43	443.3	93.4
Paramedical schools	19	512.8	85.2
Bible schools	8	559.0	67.0
University of North Carolina, Chapel Hill	119	605.6	48.8
University of North Carolina, Greensboro	72	618.5	36.5
Appalachian State University	70	579.5	62.6
North Carolina State University	60	591.1	76.9
East Carolina University	58	544.1	58.6
Central Piedmont Community College	56	487.8	88.4
Wilmington College	47	554.2	72.8
University of North Carolina, Charlotte	38	566.5	57.5
Wake Forest University	28	615.5	46.9
Wingate Junior College	28	463.2	83.0
North Carolina A & T State University	13	581.5	62.7

NOTE: High School Rank in class is position divided by class size converted.

TABLE 9

MEANS AND STANDARD DEVIATIONS FOR SAT SCORES

Group	N	SAT - V M	SAT - V SD	SAT - M M	SAT - M SD	SAT-Total M	SAT-Total SD
Total Sample	1021	471.6	103.9	491.3	103.7	962.9	190.9
Senior colleges and universities	790	491.8	101.9	509.7	102.1	1001.5	185.9
Males	377	493.4	102.9	534.2	101.1	1027.6	187.0
Females	413	490.3	101.1	487.4	97.9	977.7	182.0
Community colleges	65	401.5	84.0	428.2	89.9	829.7	159.3
Junior colleges	91	416.0	70.8	439.0	75.9	855.1	130.5
Negro colleges	66	362.0	73.6	369.7	81.2	731.7	139.0
Business schools	24	389.9	84.8	418.0	81.2	807.9	151.1
Trade schools	22	388.3	74.1	398.4	93.3	786.7	147.2
Technical institutes	12	350.9	86.8	402.9	85.3	753.8	142.1
Paramedical schools	11	406.4	81.0	438.1	55.4	844.5	117.9
Bible schools	6	406.8	46.3	446.3	64.3	853.2	62.6
University of North Carolina, Chapel Hill	113	547.7	86.8	571.2	84.2	1118.9	147.5
University of North Carolina, Greensboro	70	517.1	90.5	534.0	76.1	1051.1	137.4
Appalachian State University	59	453.4	68.2	467.0	70.5	920.4	107.4
North Carolina State University	55	526.8	74.2	591.2	77.2	1118.0	123.9
East Carolina University	58	481.8	79.4	487.6	76.7	969.4	134.8
Central Piedmont Community College	33	407.4	72.2	439.2	87.6	846.6	146.3

TABLE 9 (continued)

Group	N	SAT - V M	SAT - V SD	SAT - M M	SAT - M SD	SAT - Total M	SAT - Total SD
Wilmington College	44	458.3	78.4	494.6	74.6	952.9	131.1
University of North Carolina, Charlotte	36	462.7	80.2	487.2	72.5	949.9	129.2
Wake Forest University	28	535.7	75.3	563.3	44.5	1099.0	99.1
Wingate Junior College	27	414.4	65.7	440.1	63.7	854.5	113.1
North Carolina A & T State University	11	359.4	69.6	363.5	59.3	722.9	113.8

TABLE 10

MEANS AND STANDARD DEVIATIONS FOR SCAT SCORES

Group	SCAT Total N	SCAT Total M	SCAT Total SD	SCAT - Whites N	SCAT - Whites M	SCAT - Whites SD	SCAT - Negroes N	SCAT - Negroes M	SCAT - Negroes SD
Total Sample	270	588.1	30.1	223	596.0	24.9	47	550.4	23.8
Senior colleges and universities	196	596.4	27.1	165	603.6	21.3	31	558.6	23.1
Males	88	600.5	28.0	78	606.7	20.9	10	552.7	31.1
Females	108	593.1	25.9	87	600.8	21.3	21	561.4	18.4
Community colleges	1	600.0	-	1	600.0	-	-	--	--
Junior colleges	17	581.2	22.8	17	581.2	22.8	-	--	--
Negro colleges	26	553.3	20.0	-	--	-	26	553.3	20.0
Business schools	17	561.7	21.4	13	571.1	14.3	4	531.2	4.3
Trade schools	12	567.7	28.7	10	574.0	27.1	2	536.0	8.5
Technical institutes	21	552.5	26.9	13	564.8	22.4	8	532.5	21.8
Paramedical schools	4	566.5	21.9	2	584.5	7.8	2	548.5	9.2
Bible schools	2	586.0	11.3	2	586.0	11.3	-	--	--
University of North Carolina, Chapel Hill	27	613.5	19.1	27	613.5	19.1	-	--	--
University of North Carolina, Greensboro	16	607.6	17.0	16	607.6	17.0	-	--	--
Appalachian State University	5	599.2	4.9	5	599.2	4.9	-	--	--
North Carolina State University	13	606.3	11.4	11	607.0	12.3	2	602.5	3.5

TABLE 10 (continued)

Group	SCAT Total N	SCAT Total M	SCAT Total SD	SCAT - Whites N	SCAT - Whites M	SCAT - Whites SD	SCAT - Negroes N	SCAT - Negroes M	SCAT - Negroes SD
East Carolina University	12	592.6	12.5	12	592.6	12.5	-	--	--
Central Piedmont Community College	-	--	-	-	--	-	-	--	--
Wilmington College	40	590.8	18.4	39	591.7	17.7	1	556.0	--
University of North Carolina, Charlotte	1	541.0	-	1	541.0	-	-	--	--
Wake Forest University	3	619.3	4.5	3	619.3	4.5	-	--	--
Wingate Junior College	4	576.2	23.9	4	576.2	23.9	-	--	--
North Carolina A & T State University	8	548.0	21.6	-	--	-	8	548.0	21.6

TABLE 11

MEANS AND STANDARD DEVIATIONS FOR OTIS IQ SCORES

Group	N	M	SD
Total Sample	352	112.3	11.6
Senior colleges and universities	242	115.2	10.5
Males	127	115.9	10.1
Females	115	114.4	10.9
Community colleges	54	105.4	10.4
Junior colleges	15	115.4	8.3
Negro colleges	17	106.0	10.6
Business schools	8	103.4	11.1
Trade schools	11	103.1	12.2
Technical institutes	12	97.8	12.5
Paramedical schools	5	104.6	8.8
Bible schools	5	110.0	4.7
University of North Carolina, Chapel Hill	43	122.8	8.2
University of North Carolina, Greensboro	10	118.9	6.6
Appalachian State University	26	113.1	7.8
North Carolina State University	20	116.3	9.4
East Carolina University	21	113.6	8.4
Central Piedmont Community College	0	-	-
Wilmington College	47	112.0	8.6
University of North Carolina, Charlotte	0	-	-
Wake Forest University	1	122.0	-
Wingate Junior College	4	114.5	8.8
North Carolina A & T State University	2	115.0	1.4

TABLE 12

CORRELATIONS BETWEEN OTIS IQ AND SELF REPORTED GPA

Group	N	r
Total Sample	336	.11*
Senior colleges and universities	238	.15*
Males	123	.11
Females	115	.22*
Community colleges	51	-.02
Junior colleges	15	.29
Negro colleges	17	.31
Business schools	8	.49
Trade schools	7	.69*
Technical institutes	8	-.04
Paramedical schools	5	.08
Bible schools	4	-.01
University of North Carolina, Chapel Hill	43	.31*
University of North Carolina, Greensboro	10	.73**
Appalachian State University	26	.34
North Carolina State University	20	-.04
East Carolina University	21	-.05
Central Piedmont Community College	0	--
Wilmington College	44	.34*
University of North Carolina, Charlotte	0	--
Wake Forest University	1	1.00
Wingate Junior College	4	.95**
North Carolina A & T State University	2	1.00

* Significant at the .05 level.
** Significant at the .01 level.

TABLE 13

MEANS AND STANDARD DEVIATIONS FOR BI LEADERSHIP SCORES AND LEADERSHIP ROLE OCCUPANCY RATINGS

Group	BI Leadership Key Score N	M	SD	Leadership Rating N	M	SD
Total Sample	1278	103.1	3.1	1227	.33	.65
Senior colleges and universities	866	103.6	3.0	863	.35	.66
Males	421	103.6	3.1	419	.32	.64
Females	445	103.6	3.0	444	.37	.68
Community colleges	124	101.6	3.5	120	.22	.56
Junior colleges	99	102.1	3.0	99	.40	.65
Negro colleges	75	103.9	2.7	75	.41	.68
Business schools	57	102.0	2.5	49	.20	.46
Trade schools	58	102.0	2.7	34	.15	.50
Technical institutes	45	101.2	2.7	33	.36	.78
Paramedical schools	20	101.1	2.3	20	.65	.88
Bible schools	9	103.2	2.8	9	.22	.44
University of North Carolina, Chapel Hill	121	104.8	3.2	121	.40	.66
University of North Carolina, Greensboro	73	104.1	2.9	73	.38	.72
Appalachian State University	72	103.2	3.2	72	.17	.50
North Carolina State University	61	103.1	2.8	61	.13	.39
East Carolina University	59	102.7	2.8	59	.32	.71
Central Piedmont Community College	59	101.5	3.4	59	.20	.55
Wilmington College	49	103.1	2.5	47	.13	.40
University of North Carolina, Charlotte	38	102.9	2.6	38	.45	.80
Wake Forest University	28	105.2	3.3	27	.22	.58
Wingate Junior College	28	101.9	2.7	28	.18	.39
North Carolina A & T State University	13	104.8	2.9	13	.23	.44

TABLE 14

SAMPLE DISTRIBUTIONS FOR LEADERSHIP RATINGS

Group	N	Ratings 0	1	2
Senior colleges and universities				
Sample #1	164	116	28	20
Sample #2	111	75	20	16
Negro colleges	121	87	23	11
Junior colleges	75	45	21	9
Business schools	64	53	10	1
Technical institutes	49	39	0	10
Trade schools	39	35	2	2
Paramedical schools	21	12	3	6
University of North Carolina, Chapel Hill	125	92	21	12
University of North Carolina, Greensboro	74	56	8	10
Appalachian State University	76	67	5	4
North Carolina State University	66	59	6	1
East Carolina University	61	50	3	8
Central Piedmont Community College	67	58	5	4
Wilmington College	64	57	5	2
University of North Carolina, Charlotte	41	30	3	8
Wake Forest University	27	23	2	2
Lenoir County Community College	20	12	4	4
Western Carolina University	18	14	3	1
Duke University	15	11	2	2

NOTE: Discrepancies between sample sizes reported in Table 13 and Table 14 were attributable to the use of computer-stored scores for Pearsonian analyses vs raw data sheets for information included in the Kruskal-Wallace one-way analysis of variance by ranks.

TABLE 15

ANALYSIS OF LEADERSHIP SCORES AS COMPUTED BY KRUSKAL-WALLACE ONE-WAY ANALYSIS OF VARIANCE BY RANKS

Group	N	H Value Corrected for Ties	P
Senior colleges and universities			
Sample #1	164	13.03	.001
Sample #2	111	2.51	NS
Negro colleges	121	3.92	NS
Junior colleges	75	1.78	NS
Business schools	64	2.13	NS
Technical institutes	49	1.20	NS
Trade schools	39	30.21	.001
Paramedical schools	21	2.03	NS
University of North Carolina, Chapel Hill	125	14.26	.001
University of North Carolina, Greensboro	74	1.03	NS
Appalachian State University	76	1.07	NS
North Carolina State University	66	1.37	NS
East Carolina University	61	5.69	NS
Central Piedmont Community College	67	9.14	.02
Wilmington College	64	.49	NS
University of North Carolina, Charlotte	41	9.12	.02
Wake Forest University	27	6.87	.05
Lenoir County Community College	20	2.92	NS
Western Carolina University	18	5.78	NS
Duke University	15	.30	NS

NOTE: Subjects (N = 275) attending senior colleges and universities, four-year institutions of higher education other than those analyzed separately, were randomly assigned to either Sample 1 or Sample 2 to facilitate statistical analysis (Siegel, 1956, pp. 184-193).