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CONSTRUCTION AND VALIDATION OF A FORCED-CHOICE
OVER- AND UNDER-ACHIEVEMENT SCALE

DISSERTATION

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By

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The Ohio State University

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Approved by

A handwritten signature in cursive script, appearing to read "Francis B. Armon", written over a horizontal line.

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CHAPTER I

INTRODUCTION TO THE PROBLEM

Why do some students with relatively high ability "flunk-out" or do poorly in their college courses? Conversely, why do other students, whose measured academic ability is low, do as well as they do? The author faced these problems as an instructor for the course "Psychology of Effective Study and Adjustment," Psychology 411, at The Ohio State University during the academic years of 1956-57 and 1957-58. As remedial aids counselor the author also met students, freshmen through seniors, from many colleges of the university whose problems prompted similar questions. Recourse to the literature indicated that this problem of over- and under-achievement was of wide concern to many other workers in the field. The findings from this literature, to be reviewed later, indicated that further study was needed and that the construction of better instruments for predictive and diagnostic purposes in this area would prove a profitable undertaking.

It should be noted, at the outset, that this study is not interested in the whole field of academic prediction, but only in that limited aspect dealing with over- and under-achievement. The primary tools used to predict college success have been intellectual and scholastic ability tests.

These efforts have met with a fairly high degree of success. Wertz and Wilkinson (97) report that correlations between measures of scholastic ability and academic achievement vary from .30 to .70. Many studies report coefficients within this range (15, 26, 29, 30, 61, 64, 79, 91). Even if we assume an average correlation of .60, only about one-third of grade point variance is accounted for. It is with the remaining two-thirds of the variance that this study is concerned, since this is the proportion of total variance that is not accounted for by scholastic ability measures. This remaining variance can in part be attributed to unreliability of either the predictors or the grades. Most writers agree that these factors cannot account for all of the remaining variance. The most generally accepted view is that an important part of this variance is due to "non-intellectual factors," and numerous attempts have been made to measure one or more of these factors. To validate such a factor or factors, it is necessary to show (1) that they correlate nearly zero with intelligence or scholastic ability and correlate with over- and under-achievement, i.e., with school grades after scholastic ability has been partialled out.

Both the number of factors investigated and the means of measurement have varied widely. While the literature could be surveyed according to either basis of classification, the author has chosen the latter approach, viz., the type of

measurement variable employed. The categories chosen, in order of appearance, were objective measures, inventories, and projective techniques. It will be seen that a very extensive and conflicting literature is available on this field. After the literature is surveyed an attempt will be made to summarize the findings according to factors involved and to draw implications for the present study.

Review of Literature

Objective Measures

High school background. Swensen (89) compared the college performance of groups of 100 students each from the upper two-fifths, middle one-fifth, and lower two-fifths of their high school classes. The groups were matched on the American Council Psychological Examination (ACE) scores, high school quality and sex. The higher group was significantly superior to both other groups on grade point average and successful completion of college. No differences of a significant magnitude were obtained between the middle and lower groups. Krathwohl (53) found that industrious or indolent habits were carried over from high school to college at the Illinois Institute of Technology. Knaak (51) found that a group of freshmen women who achieved academic honors in college had also been superior in their high school work. Finch and Nemzek (26) found that the addition of high school grades to an IQ predictor of college grades increased the

correlation from .48 to .78. Correlations of .30 and .44 between high school grades and college point hour, with Ohio State Psychological Examination (OSPE) and Scholastic Aptitude Test (SAT) partialled out, were determined from data reported by Chahbazi (14) and Myers (64). It was reported by Bair (5) that significantly more flight training attrition cases had failed at least one course in college than those who completed the program. Shaw and Brown (81), in a comparison of collegiate over- and under-achievers, found that the over-achievers had reliably more high school recommending units.

Gilbert (34) studied the relation of high school curricular patterns to academic success in college. No relation was found for students with less than two years of college. For students who had completed more than two years of college, those with high school emphasis on math-social science and English-foreign language-math patterns were more successful in college when aptitude was controlled. Smith and Douglass (87) reported that when aptitude was controlled students who had taken Latin in high school received significantly higher grades in college than students who took other foreign languages in high school. Clark (18) found the amount of high school Latin correlated only .04 with college point hour when aptitude was controlled.

Orr (67) studied the persistence and point hour ratios of equal ability groups from fully accredited and lower rated

high schools. Entrants from fully accredited schools tended to remain in college longer, but no significant differences were found in grades. Shuey (85) compared the academic achievement of two groups of freshmen at Randolph-Macon, one from public and one from private high schools. These groups were matched on a number of biographical items and on academic aptitude as measured by the ACE. It was found that public school entrants obtained a significantly higher point hour average than entrants from private schools. Using the same technique, Shuey (86) found essentially equivalent results for groups of sophomores. The private school group, however, produced more athletes and campus leaders. Harris (40) stated that it had been found, in general, that public high school graduates received higher college grades than private school graduates of about equal ability.

Biographical data. Malloy (57) and Neidt and Malloy (66) have described the development of the Life Experience Inventory (LEI), covering school experience, self-appraisal, family relationships, and choice and type of friends. The final inventory contained 112 multiple-choice and 89 forced-choice items. Two scales were constructed, one based on a criterion of grades and the other on the variance in grades unpredicted by the ACE and an English placement test. The two scales were equally valid in predicting grades, but only the over- and under-achievement criterion scale contributed significantly in a multiple-regression equation. A composite

of the ACE-L and LEI (over- and under-achievement scale) correlated .55 with a grade point criterion. Myers (64) retained biographical items covering parents, home, interests, and hobbies if the items discriminated between over- and under-achievers at or beyond the .05 level of confidence. The resulting inventory correlated .26 and .17 with freshmen grade point average and past high school grades respectively. The inventory added .02 to a multiple of the SAT and high school grades. Asher and Gray (3) employed the Kentucky Personal History Inventory to obtain background data on 200 arts college students. The 15 items that correlated highest with a grade point persistence index were retained. Adding these items to an aptitude measure increased the correlation with grade point from .52 to .58 and the correlation with grade point persistence index from .40 to .52. A questionnaire was used by Scott (80) to obtain a wide variety of biographical and personal history data from 240 freshmen. Items were weighted according to their discriminating power on a grade point criterion. The weighted questionnaire correlated .37 with grades, .33 with the ACE and .20 with grade point when ACE was partialled out.

In a rather comprehensive report, Pickrel (73) described three methods of scoring biographical items and presented a large amount of data relating to the validity of these scoring methods for several military schools. He found that a unique pattern analysis generally provided the best

validity for the experimental group, but on cross-validation samples, a multiple-regression procedure for deriving scoring keys held up much better. Berkshire (10) found that a biographical inventory correlated as high with aptitude predictors as it did with a criterion of academic course grades in pre-flight training.

Weigland (96) interviewed two groups of college freshmen who differed in academic achievement, but were relatively homogeneous with respect to academic aptitude and high school grades. Types and breadth of experiences did not discriminate between the groups, but there was a notable difference in the way the two groups interpreted or felt about their experiences. The non-achievers expressed more negative feelings about school and home backgrounds. A study of the scholastic under-achievement of bright college students was done by Shaw and Brown (81). They found that from several biographical items only size of home town discriminated between achieving- and non-achieving groups.

Assum and Levy (4) compared the academic achievement of a group of 27 students who had previously visited the college counseling center for adjustment problems with an equal number of students who had not. Although the two groups did not differ in ability, the "counseling center" group scored lower on comprehensive course exams to a significant degree.

Miscellaneous indices. A representative group of 34 students were selected from a large psychology class after the first mid-term and interviewed in a study by Sherriffs (82). During the interview the students were rated on seven personality variables. A comparison of the interviewed groups with the rest of the class on subsequent course tests showed significant differences in favor of the interviewed group. These results were interpreted as showing the importance of individual attention. Chambers (16) obtained empathy scores on 55 college men and determined the relation of these to academic achievement. When ACE scores were partialled out, empathy scores correlated .35 with grade point average. Empathizing ability and academic aptitude correlated .16. The ratings of students' emotional steadiness by their friends were found to correlate .36 against an over- and under-achievement criterion by Taylor (90). Young (102) had freshmen rated according to how well they were liked or disliked at the end of the academic year by friends and acquaintances. These ratings were not significantly related to freshmen grade point. Schultz and Ricciuti (78) obtained experimental goal discrepancy measures which they interpret as level of aspiration indices. None of these measures correlated beyond chance with ACE scores. When aptitude was held constant, correlations of $-.10$, $.16$, $-.33$, and $-.23$ were obtained between level of aspiration scores and concurrent grade point average on four small samples. None

of these coefficients reach significance at the 5 per cent confidence level.

Krathwohl (52, 54) developed an "index of industriousness" from the difference between aptitude test and achievement test standard scores. He suggested that over- or under-achievement may be specific rather than general and showed that better prediction is obtained from aptitude measures on "industrious" samples than on "indolent" samples. Darley (22) found larger correlations between the ACE and point hour for adjusted women than for maladjusted women. This result did not hold for men, however. Maladjustment was defined as significant deviation on at least four scales on a combination of three personality and attitude inventories.

Using an activity check list, Gerberich (33) found that high point hour students reported spending more time sleeping, eating, attending classes and studying than low point hour freshmen of about the same level on the ACE. Low scholastic level students said they spent more of their time in movies and recreational reading. Furich (25) found that students who reported using the library facilities received significantly higher grades than those who did not use the library. In another study (56) students were given a library information test after sufficient time had elapsed for them to become familiar with the library and its use. Library test scores correlated .21 with concurrent semester grade point average when aptitude was partialled out. Grote,

reported in (40), found that students who lived at home made slightly higher grades than students of about equal ability who resided in dormitories. The study was conducted over a three-year period and involved about 1,200 students.

Andrew (2) studied the relation of academic load to academic achievement on a sample of 107 scholastically deficient freshmen. Coefficients of .24 and .17 were obtained between point hour and academic load attempted and completed respectively. Coefficients of .15 and .19 were found between grade point and clock hours attempted and completed respectively. The author rightly points out the lack of control of extraneous factors. Holtz and Trice (41) reported that students who increased or decreased their academic load in any given semester tended to make slightly higher grades than students who maintained their scheduled load. It may be that students who increase their load are ones who find they can handle more hours, and those who decrease their load recognize they can't handle their scheduled courses. Correlations from .11 to .32 were found between grade point and academic load at four quartiles of intelligence level. Trueblood (93) compared the academic achievement of 1,711 part-time employed students with all other students at the University of Indiana. There was no significant difference between the groups and no relation between the number of hours worked and point hours over a range of from 1 to 40 hours per week of employment. Stalnaker and Woellner (88)

reported that students registered at the placement bureau at the University of Chicago for part-time employment had higher point hours than non-registrants. A study by Mehus, reported in (40), found outside work had adverse effects on grades for female students, but for men the converse was true. Bateman (6) and Pauley (72) reported conflicting results on the effect of part-time employment on the grades of high school seniors. The former reported grade point decrements with employment, while the latter found no difference in grades between employed- and non-employed students. Harris (40), in a review of literature on factors influencing college grades, reported several studies which present conflicting results on the effect of work on college performance.

Inventory-Type Measures

Adjustment and personality. Several studies have been concerned with the relation of the Minnesota Multiphasic Personality Inventory (MMPI) and academic achievement. Frick (29) correlated the ACE and five clinical scales of the MMPI (Hs, Pd, Sc, Ma, and Pa) with grade point average on a sample of 267 freshmen women. A weighted composite of these tests correlated .64 with point hour. This was an improvement of .16 over ACE alone. The weighted composite of MMPI scales correlated .25 with the ACE. In a cross-validation study (30), the weighted composite of ACE and MMPI scales correlated .54 with point hour, which was only a .04

improvement over the predictive power of the ACE alone.

Altus (1) investigated the relation of the MMPI to academic achievement on two groups of 25 students each, one group composed of over-achievers and one group composed of under-achievers. Only one MMPI scale (Hy) significantly discriminated between the groups. An item analysis yielded 60 items that discriminated between the over- and under-achieving groups. These items indicated, according to the author, that the under-achievers were more feminine, immature, dependent on others, manic, and self-assertive than the over-achievers. On a new sample, this 60-item check list correlated .39 with psychology course grades, .23 with one semester point hour, and .15 with an aptitude test. A further item analysis of this check list yielded discriminating items, which correlated .40 with psychology course grades, .39 with point hour, and .21 with an aptitude test. No cross-validation of the 26 items was attempted. Owens and Johnson (70) administered a 300-item form of the MMPI, the Minnesota Personality Scale, and a personal check list devised by Owens to 164 college freshmen. On the basis of predicted and actual point hour, the students were divided into three groups: over-achievers, normals, and under-achievers. An item analysis of the 519 items from the three inventories yielded 38 items that discriminated the under-achieving group from the others. Over half of the discriminating items dealt with social adjustment. The authors concluded that the under-achievers were as

well adjusted socially and gave more extroverted responses than the other groups. In fact, the only areas in which the under-achievers did not evidence adequate adjustment were family relationships and neurotic-psychotic tendencies.

Morgan (60) found that a group of college sophomore over-achievers scored higher than under-achievers on special MMPI scales designed to measure dominance, social responsibility, and intellectual efficiency, while the under-achieving group had higher profile elevations on scales measuring psychopathic deviation and paranoia. Profile patterns failed to distinguish the groups.

Jensen (43) divided a population of 458 freshmen into four groups, comprising all combinations of two scholastic ability and two academic achievement levels. It was found that low ability non-achievers scored significantly higher on six of the MMPI scales. Differences between low ability achievers and non-achievers were obtained on the Schizophrenic (Sc) and Hypomania (Ma) scales. These scales and the Psychasthenia (Pt) and Psychopathic Deviate (Pd) scales discriminated between high and low ability non-achievers.

Yoemans and Lundin (101) administered the MMPI to the academic top and bottom quarters of the freshmen and senior classes at Hamilton College. Significant differences were obtained between top and bottom quarter students in the senior class on psychopathic (Pd) and hypomania (Ma) scales. These scales and the hysteria (Hy) scale discriminated top

and bottom quarter freshmen. These differences between top and bottom students were interpreted to mean that the lower students were more restless and overactive, less responsible, and higher in disregard for convention. The elevated Ma also suggested that the lower groups had too diversified or wrongly directed interests. Also, it was found that over-all freshmen scores were elevated above the over-all senior scores. This was attributed to the problems and frustrations of college adjustment. Kahn and Singer (45) compared the MMPI profiles of small upperclass groups of high and low academic achievement. Only the schizophrenic (Sc) scale discriminated between them.

Kirk (49) reported two kinds of MMPI profiles which have been found most often associated with poor academic cases at the University of California counseling center. The first she calls "psychoneurosis with compulsive and depressive tendencies." Roughly, it may be said to be a tendency to be pervasively or even unconsciously resistant to an externally imposed task. The other profile classification, "hysterical personalities," is characterized by a proneness to the repression and suppression of any emotional problems.

Shaw and Brown (81) compared a group of 30 freshmen achievers and 28 non-achievers, all of whom had scored high on the ACE, on the Allport-Vernon-Lindzey Study of Values, Bell Adjustment Inventory, and Bell Preference Inventory.

None of the six Study of Values scales or four Bell Adjustment Inventory scales revealed significant differences between the groups. Two scales, Economic and Social, of the Bell Preference Inventory yielded discriminating values.

Griffiths (38) found no differences on the Bell Adjustment Inventory between students of very high and very low academic standing. Neither were there differences in grade point average between a group with satisfactory and a group with unsatisfactory inventory records. Correlations were determined between scales on the Bell Adjustment Inventory and Wisconsin Scale of Personality Traits and a measure of over- and under-achievement by Drought (23). Only one scale, social passivity, had more than a chance relationship with the criterion. Darley (22) administered the Minnesota Scale for Survey of Opinions, Bell Adjustment Inventory, and the Minnesota Inventories of Social Attitudes to 543 students at the University of Minnesota. The several scales of these inventories correlated from .02 to .12 with grade point and .01 to .23 with the ACE.

Taylor (90) found that adding scores from the ACE Personality Report to an aptitude predictor raised the correlation with a grade point criterion from .67 to .71 at the University of Oregon.

Significantly higher scores on the Sociability scale of the Guilford-Zimmerman Temperament Survey by unsuccessful college women were found by Knaak (51). Women who had

earned academic honors, on the other hand, were elevated above the probationary group on the seriousness and reflectiveness scales. Reed (75) administered the Bernreuter, along with other tests to 258 freshmen. None of the correlations between Bernreuter scores and either grade point average or Henman-Nelson scores were significantly different from zero.

Gough (36, 37) described the development of a personality scale (Hr) to predict undergraduate grades. Thirty-two of an original 150 items were retained in the final scale. A mean correlation of .38 between this scale and course grades in 11 cross-validation samples was reported. Intellectual measures correlated with the Hr scale about .26. Klugh and Bendig (50) determined the predictive validity of the ACE, Gough's Hr scale, and the Taylor Manifest Anxiety Scale (TMAS) on a sample of 184 incoming freshmen. The predictors correlated .62, .32, and .01 respectively with a grade point criterion. All intercorrelations were negative. Bendig (7) in a later concurrent validity study found essentially the same relation between the Hr scale, TMAS, and grades. In another study by Bendig (8) intercorrelations and grade point criterion correlations were determined for the Cooperative Vocabulary Test (CVT), Gough's Hr scale, Edward Personal Preference Schedule (EPPS) Achievement scale, and the TMAS. All intercorrelations were positive except for those involving the TMAS. The CVT, EPPS

Achievement scale, and Gough's Hr scale all correlated near .20 with the criterion. A weighted composite of CVT and EPPS Achievement was the best predictor of grades; $R = .29$.

Christensen (17) evaluated the power of Borow's College Inventory of Academic Adjustment to discriminate between groups of over- and under-achievers. This inventory consists of 90 non-intellectual items encompassing curricular adjustment, maturity of goals, personal efficiency, study skills and use of time, mental health, and personal relations. The author reported that earlier work with the inventory had yielded a low positive relation to academic achievement and independence from intellectual factors. Significant differences between over- and under-achievers were found in this study on the total inventory score and the subtests covering curricular adjustment, maturity of goals, and personal efficiency. Furst and Fricke (31) described the Opinion, Attitude, and Interest Survey (OAIS), for which two scales were cross-validated for "academic personality." The predictive validity of the OAIS on a group tested six weeks prior to beginning freshmen classes was found to be .40 with first quarter grades. A correlation of .25 was reported between the OAIS and ACE.

College life orientation. Woodman (99) developed an instrument called "An Evaluation of Student Opinions" which was designed to reveal how students felt about and reacted to many aspects of the college situation. The test is

divided into three parts. Part I consists of a list of general statements that are filled out in three ways; for self-feelings, perceived parental feelings, and perceived friends' feelings. Part II is a list of more self-oriented statements and Part III is a list of handicaps to academic achievement, in which the student checks applicable items. A group of incoming freshmen were given this test and the ACE and their scores correlated with first-semester point hour. The ACE and opinions test correlated $-.02$ with each other and both correlated $.30$ with grade point. A composite of the two predictors raised the correlation to $.43$. Chahbazi reported two studies utilizing the Cornell Orientation Inventory (COI). In one (14), a weighted scoring key was developed for the COI on an over- and under-achievement criterion, and was included in a battery of tests given to a population of freshmen. The inventory scores were inversely (due to scoring procedure) and significantly related to point hour and relatively unrelated to aptitude measures. Items from the COI that discriminated over- and under-achievers were correlated with a number of other predictors and point hour on a cross-validation group (15). The inventory was more related to some of the other predictors than it was to point hour.

Schrader and Frederiksen (76) compared the worries of over- and under-achievers and found under-achievers were

characterized by more reported worries about getting to know people socially and getting adjusted to college.

Study Skills. Michael and Reeder (59) developed a study habits inventory by using an over- and under-achievement criterion to determine item indices from the responses of a population of 167 high school and 140 college students to a check list covering several aspects of study. The final scale contained 54 statements of the "usually-occasionally-never" type and 46 forced-choice pairs. On the college population, correlations of .10 and .32 were obtained between the inventory and a verbal aptitude measure and point hour respectively. The multiple R obtained between a composite of verbal aptitude and the study habits inventory and point hour was .56, a .10 increase over the zero-order correlation of verbal aptitude alone.

The development and use of the Survey of Study Habits and Attitudes (SSHA) were described in two studies. Holtzman, Brown, and Farquhar (42) report the development of this inventory and its cross-validation on 1,756 men and 1,118 women at ten colleges. Validity coefficients against a point-hour criterion ranged from .27 to .66 for men and from .26 to .65 for women. The mean coefficients were .42 and .45 for men and women respectively. When aptitude effects were partialled out of grade point, the mean correlations were about .33 for both sexes. In another study (12) the SSHA was administered to the senior class of a Texas high school.

Those members of the class that entered the University of Texas were followed up. The relation of the SSHA to final high school standing was about .49 on a class of 455 students and its relation to college freshmen point hour was reported as .50 for 143 students from the same class. High reliability coefficients were reported in both studies. Coefficients between test-retest after 11 weeks and high school-college administrations were all in the .80's.

Locke (55) described the development of a 56 item inventory covering note-taking, study, time budgeting, reading, examinations, and vocabulary. Correlations of .35 and .18 were reported between the inventory and point hour and an aptitude test respectively. A test-retest reliability of .80 is reported for a four month retest on 185 Hunter college freshmen. Gordon (35) administered the Wrenn Study Habits inventory to nurses at the beginning of school and again one month later. The inventory taken at entrance correlated .26 with grade point for academic subjects, while the one taken one month later correlated .58. The two administrations correlated .72. There was no significant relation to Army Alpha scores at either time. On another sample, the inventory taken at entrance yielded a .09 coefficient against grade point with aptitude held constant. The author suggested that students revise their estimates of their study habits after they have had an opportunity to know how well they are doing scholastically. Portenier (74) also found a

low positive relationship between the Wrenn Study Habits Inventory and aptitude measures. The inventory correlated .37 with introductory psychology course grades. Wrenn and Humber (1960) determined the discriminatory power of items on Wrenn's scale for differentiating high- and low-scholarship groups of males and females, who were matched on ACE scores, curricular major, and other extraneous variables. They found 27 items differentiated the male groups and 11 items the female groups. This may be due to the fact the scale was developed on a male population. Items that discriminated for women and not for men indicated high scholarship women tend to submit more typewritten reports, use sleep time for study, and participate more in class discussions.

Schutter and Maher (1979), concerned with the transparency of several existing inventories, constructed a forced-choice scale from study skill and attitude items for which "p" and "d" indices had been obtained from the responses of 50 over-achievers, and 49 under-achievers. The 30 item scale was cross-validated against a group of 100 students who ran the full range of over- and under-achievement. They found the scale correlated .07 with ACE, .36 with point hour, and added .12 to the correlation of ACE alone with point hour. The multiple was .53. Study skill and attitude parts of the scale correlated .59 with each other, indicating that they are not independent. Over-achievers were characterized by high motivation and good study techniques; under-achievers were characterized mainly by poor or misguided

motivation. Carter (13) constructed two "study methods" tests to cover motivation, as well as scholarly attitudes and study techniques. Test "A" correlated .33 to .51 with various measures of achievement in the validation group. On one cross-validation class, a correlation of .36 was found between test "A" and achievement. Cross-validation of test "B" yielded a correlation of .34 with achievement and .29 with achievement when aptitude was held constant.

Gerberich (33) divided University of Arkansas freshmen into groups defined by levels of aptitude and scholastic achievement and administered a questionnaire covering study habits, extracurricular participation, and reactions to the college situation. High scholastic achievement groups at all levels of aptitude evidenced better study habits and study environments than their low-achieving counterparts.

Interests and motivation. A number of studies have been carried out to determine the relation of the Kuder Preference Record to academic achievement. Crosby (21) found positive correlations in the high .60's between the Kuder Scientific scale and chemistry and biology grades; and between the Computational scale and accounting grades. It should be noted, however, that his subjects scored above the 90th or below the 10th percentile on each of the scales. Had the total distribution of interest scores been used, the relation would have undoubtedly been of less magnitude. Bolanovich and Goodman (11) found statistically significant

differences between successful and unsuccessful women in an engineering program. The successful students were characterized by high scores on the Computational and Scientific scales and low scores on the Musical and Clerical scales. The largest scale-grade point correlation was .18, with most of the coefficients between $\pm .10$. Hake and Ruedisili (39) correlated the Kuder profile scores of 528 freshmen with grades in five subject areas and over-all freshmen point hour. These authors found correlations between Computational (.10) and Scientific (.18) scales and grades in science courses. The Literary scale was found to correlate .25 with English grades, .13 with history grades, and was the best single scale predictor of over-all point hour ($r = .13$). A composite of weighted profile scores correlated .31 with over-all point hour. Knaak (51) found that the literary scale was the only one of the Kuder scales that significantly discriminated between successful (honor) and unsuccessful (probationary) freshmen women.

Frandsen and Sessions (28) investigated the relation between the pattern of Kuder profile scores and relative achievement in courses associated with each point on the profile on each of 187 senior high school students. A median rho of .27 was obtained.

Yum (104) obtained differences on the Kuder scales between physical, biological, and social science curriculum majors on the college level, and a low but positive

correlation with over-all grade point. Also, Voas (94) found the Kuder had low but significant validity for prediction of pre-flight and flight training criteria. However, when mechanical aptitude was controlled, no single or composite of scales showed significant validity.

Morgan (60) included the Strong Vocational Interest Blank (SVIB) for men in a battery of inventories given a group of college sophomores, who were divided into over- and under-achievers on the basis of the discrepancy between ACE predicted point hour and that obtained during the freshman year. He found that over- and under-achieving groups did not differ in the variety of well-developed interests, but did differ in types of expressed interests. More over-achievers had interests in the area of social service or welfare occupations, while more under-achievers had interests in business detail or business sales occupations. Also, achievers scored higher than non-achievers on the interest maturity scale.

A brief account of the development of a studiousness scale for the Strong was given by Young and Estabrooks (103). They reported the scale relatively independent of intelligence and rather descriptive of introverts. Mosier (62) used this scale and found correlations between it and grade point of .55, .29, and .19 for arts, technical, and commerce students, respectively.

Three studies have investigated the relation of scores on the Occupational Level (OL) key of the SVIB and

college achievement. Berdie (9) reported an essentially zero (.03) correlation between OL key scores and academic success of 43 college students. His results are not substantiated by two more recent studies using larger N's and aptitude control designs. Kendall (46) found that when academic ability as measured by the OSPE was held constant, three groups distinguished by differing levels of OL scores differed significantly in first semester academic achievement. His sample consisted of 100 men each of high, average, and low OL scores. Ostrum (69) subdivided a population of college freshmen into six groups, employing all combinations of two aptitude and three OL levels and compared point hour ratios for the groups. He found that both ability and OL effects were significant.

Myers and Schultz (65) developed a 328 item questionnaire to measure motivation for attending college, intellectual interests, teacher relations, and study habits. Three scoring keys were developed from the responses of 37 extreme over-achievers and 37 extreme under-achievers, determined from obtained point hour and SAT-V and M scores. All of the keys correlated essentially zero with the SAT, but yielded low (.10 to .14) coefficients with point hour. Adding any of the keys to the SAT increased the multiple R not more than .01. Schultz and Green (77) cross-validated all three keys against an over- and under-achievement criterion. None of them added to the validity of the SAT and high school grade point.

Sherwood (83) used a forced-choice scale to measure what he calls "goal orientation." The scale correlated .08, .47, and .37 with point hour in business, arts, and education curricula, respectively. This scale combined with the OSPE and an English test yielded a multiple of .60 for the combined curricular areas.

Kerns (47) reported the results of using a questionnaire to distinguish 66 over- and under-achievers. More under-achievers entered college because of social pressure while more over-achievers entered for academic reasons. Over-achievers tended to be more definite about their future plans. The gratifications from college life were reported by under-achievers as occurring from friends and social activities. Over-achievers reported their gratifications from academic success. Over-achievers felt lack of conformity was their greatest threat to success, while under-achievers considered study habits and social activities their most immediate threats. Finally under-achievers credited friends and social organizations for whatever success they had obtained in college. Over-achievers felt their own motivation for academic achievement and perseverance had contributed most to their success.

Erickson (24) used a paired-comparison technique to determine the importance of various reasons for getting good grades. These included such reasons as reputation eligibility, please family, respect of instructors, to graduate,

and to win honors. Low point hour students rated "to win honors" as the least important reason for good grades, while high point hour students rated "just to graduate" as least important. Jones (44) noted that at the University of Buffalo aptitude-grade point correlations have been increasing and this corresponds to administrative efforts to reward and encourage good scholarship.

Projective techniques. Munroe (63) worked out a 28 item check list which could be used with either the group or individually administered Rorschach. It is filled in by a protocol inspection method, and general adjustment was found to correlate negatively with the number of checks accumulated by the subject. Ratings from the Rorschach correlated higher with academic success than did ACE percentile ratings; coefficients of contingency were .43 and .36. Thompson (91) administered the Rorschach to college freshmen and picked out the 20 scoring items that correlated highest with grade point average and least with a verbal aptitude test. These items correlated .38 with grade point and .04 with verbal aptitude. When verbal aptitude was partialled out, the 20 Rorschach scoring items correlated .46 with grade point. Osborne, Sanders, and Greene (68) also found a high relation between an empirical scoring key and grade point, with ACE held constant, on the validation group. They found no relation between the usual scoring of the Harrower Ericksen multiple choice Rorschach and point hour. Clark

(19), using the Harrower Ericksen Multiple Choice Rorschach as a guide, developed a multiple choice Rorschach test. The test correlated .04 with ACE, -.23 with an English test, and .38 with grade point. A multiple of the three predictors yielded a coefficient of .91 with freshmen grades. The next year this check list was revised. The multiple composed of the same three predictors was .56. A year later an attempt was made to cross-validate the revised test. None of the coefficients with either other predictors or grade points were significant and the Rorschach test added nothing to the ACE and English test multiple.

Shoemaker and Rohrer (84) studied the relation of several predictors, including the Rorschach, to academic success in the first year of medical school. They found a negligible relation between Rorschach responses and academic success, but concluded on the basis of their data that black-white shock in the individual of high intellectual competence and deepseated anxiety to over-achieve were indicators of over-achievement. They also suggest that color or neurotic shock, as indicated by the Rorschach, tends to accompany lowered academic efficiency as measured by point hour. Individual Rorschachs were administered by McCandless (58) to two matched groups of Officer Candidates, who differed widely in academic achievement, in a highly motivated, wartime training program. The responses were analyzed by the conventional Rorschach categories, Munroe's check

list, and Beck's Z or organization score. None of these scoring methods differentiated high and low point hour men. The conventional scoring methods and the Z score concurred, however, in tending to picture high point hour men as being more controlled emotionally and somewhat less anxious on most criteria.

Kahn and Singer (45) and Cronbach (20), like McCandless (58), found essentially no relation between Rorschach responses and academic achievement. The former study, using small groups of high- and low-achieving school of commerce upper classmen, found a phi coefficient of .08 between adjustment as determined from Rorschach responses and academic success. Cronbach (20) compared the group Rorschach records of 200 students with grade point average at University of Chicago. Scoring by means of Munroe's check list yielded a .17 correlation with grades, while a subjective "degree of adjustment" rating correlated .25 with grades. Neither of these enhanced the multiple of a group of objective-type aptitude tests.

Other studies have attempted to relate picture interpretations to academic achievement. Morgan (61), using the Thematic Apperception Test (TAT), found achieving male college sophomores tended to show more "need for achievement" than non-achievers. Parrish and Rethlingshafer (71) had 48 college students who differed in academic achievement, but were matched on other variables, write stories about

four pictures that were presented to them. Neither of two scoring methods discriminated between high- and low-achieving students. Chahbazi (14) found correlations of .47 and .35 respectively between grade point average and need achievement scores derived from the responses of 224 students on two projective devices; the Sound Stimuli Test and the Picture Stimuli Test. Addition of these tests to a composite of objective tests raised the multiple correlation from .51 to .63. No cross-validation of these results was attempted. Triggs (92) reported a low but significant relationship between academic achievement and some personality variables measured by the Rosenzweig Picture Frustration Test.

Kimball (48) developed a sentence completion test designed principally to measure father relationship and aggression-guilt feelings. Responses to this test by twenty preparatory high school boys, who were under-achieving according to aptitude tests, were compared with an average-achieving population. The author reported that significantly more of the under-achievers revealed an essentially negative relationship with their fathers and were less able to give direct, effective expression to their negative feelings.

As suggested before the review of the literature, summarization will be undertaken in terms of topics or factors found to be important. It seems relatively safe to classify the above findings under five major topics --

Background

Prior school performance and parents and home life (primarily perception of parents) seem to be the two most relevant aspects for predicting point hour and over- and under-achievement. The former, as measured by high school grades, recommending units, and class standing, has increased prediction of point hour when aptitude has been controlled. The latter has been included in several scales which have shown evidence of validity for predicting over- and under-achievement. Some evidence that under-achievers have more negative feelings about home in general and father in particular has been cited. High school curricular patterns have been reported to be related to point hour. It has been demonstrated that public school entrants make higher grades in college than private school entrants of equal ability.

Type of Friends and Social Orientation

The most notable characteristic here is the paucity of data relating this material to over- and under-achievement. There is some evidence to show that low point hour students score high on measures of sociability. There is little evidence to show what effect this has on prediction of point hour or over- and under-achievement. Three scales include items on social relations. At least one of these has no predictive validity and the other two offer some slight relation to over- and under-achievement.

Adjustment

Investigators have attempted to relate a wide variety of personality instruments, both inventory and projective types, to college achievement with quite inconclusive results. In this area most of the work has been done with the MMPI and the Rorschach. In regard to the former, different writers have claimed that different scales have predictive validity. Several apparently predictive ones have fallen down on cross-validation. Several other standard personality scales have met the same fate. Inventories designed to measure curricular or academic adjustment have shown some evidence of moderate validity for the prediction of over- and under-achievement. Research on the Rorschach is quite inconclusive and conflicting. Apparently, regular scoring procedures have little predictive power but new scoring procedures claim some success. The best looking results have not been cross-validated and there are several studies which indicate the new scoring methods have little validity for the prediction of college grades.

Motivation

A number of investigators have used the Kuder to predict specific course grades and/or point hour. The three scales which seem to be most predictive of point hour are Scientific, Computational and Literary. Apparently the OL key of the Strong has some predictive validity when aptitude

is controlled. There is some indication that types of interests and motivating influences may be different for over- and under-achievers. The data relating derived "need for achievement" scores to academic achievement is inconclusive. It appears that there is some relation between academic load and point hour. The effects of college employment on point hour are not clear but generally they seem unrelated to achievement.

Study Habits

The data reported in this section seem to be more consistently related to over- and under-achievement than is true in the other sections. Several scales have used, in whole or part, items designed to measure study skills. With some consistency the correlations reported between these scales and over- and under-achievement is in the neighborhood of .30. Library usage and knowledge have been reported to be positively related to point hour. The data on use of time is conflicting.

These findings suggest the complexity of the problem of over- and under-achievement. Several considerations for scale construction were suggested by the survey --

1. Investigations indicate that the problem is a multi-factored one with many facets. This suggests that any instrument prepared should attempt to encompass and combine as many of these facets as possible.

2. Two approaches for combining several possible predictors were used in the studies reported: (a) they were combined into a weighted composite to yield a total score or (b) they were used to form a profile. It would appear profitable that any new scale use both approaches, i.e., a level score based upon a composite of factors and a profile yielding a pattern of causes.

3. A number of studies reviewed indicated the need of using a criterion of over- and under-achievement rather than uncorrected point hour ratio since several of the factors discussed showed correlation greater than zero with scholastic ability. It would seem desirable to partial academic aptitude out of academic achievement in the validation and cross-validation of an instrument.

4. A number of studies showed that when items were selected or weighted on one sample, there might be considerable shrinkage on a second sample. Hence, it seems necessary that any claims for validity be based upon prediction in an independent sample of subjects.

5. The successful use of the forced-choice technique by a few earlier studies was noted. It was also apparent that most investigators did not take steps to reduce the fakability of their scales although this seems desirable. Cognizance was taken of these considerations in setting forth the writer's purpose.

Purpose

The purpose of this study is to predict over- and under-achievement by means of a multi-factored instrument of the forced-choice variety, constructed so as to yield a general level score and a profile score, and to validate the instrument upon an independent sample. It is hoped that this instrument will be valuable to persons engaged in counseling situations such as those in which the author was involved in teaching effective study and adjustment and as a remedial aids counselor.

CHAPTER II

THE CONSTRUCTION OF THE RESEARCH INSTRUMENT

This chapter describes the construction of a two-phase (level and profile) forced-choice instrument to be used to measure factors related to over- and under-achievement. In doing this several steps were necessary: procurement and classification of items, administration of check list, computation of item indices, factor analysis, and assembling the instrument.

Procurement of Items

In order to secure a large sample of items and to assure that these items could be couched in a fashion understandable to the prospective student users, it was decided to have college students supply the items. A sample of 200 students in elementary psychology classes was divided into two groups of 100 each. One group wrote essays entitled "Strengths and advantages which I have that will help me to make better grades," while the other group wrote on the topic "Weaknesses and disadvantages which I have that may hurt my grades."

From these essays, statements of strengths and weaknesses were extracted. Each statement was recorded

individually on a three by five card with a minimum of editing by the recorder. Statements concerned with intellectual capacity were discarded.

Five judges--the writer's adviser, two graduate students in counseling, an experienced statistician on the faculty, and the author--independently sorted the statements into separate categories. Each category was defined by the sorter. The following nine categories were retained because they were identified similarly by four of the five judges.

1. Adjustment	6. Motivation
2. Background	7. Relatives
3. Concentration	8. Study habits
4. Friends	9. Time usage
5. Interest	

Two new judges--graduate students in counseling psychology--and three judges who had participated in the original classifications sorted each statement into one of the nine categories. Statements were retained in a category if four of the five judges sorted the statement into that category. Three hundred and twenty-four statements that met the above criterion were chosen for further study by --

1. Selecting an equal number (36) of items from each category.
2. Equalizing strength and weakness items from each category.
3. Maximizing coverage of subtopics within each category.

Preparation and Administration of the Check List

The strength and weakness items were grouped separately and arranged alphabetically in check list form (Appendix I). This check list was administered to a new sample of 116 elementary psychology students who responded to the items on a five-point scale of self-applicability. The students were assured that their responses would be used only for research purposes. Additional information obtained for each student included name, sex, class, and cumulative point hour.

Computation of Item Indices

1. Discrimination index (DI): Ohio State Psychological Examination (OSPE) scores were secured for each student who had answered the check list. The correlation between cumulative point hour and OSPE, and the means and standard deviations of the two variables were computed. From these data, the regression equation for the prediction of cumulative point hour from OSPE scores was determined. The index of achievement (AI) was defined as the algebraic difference between actual point hour (PH) and OSPE predicted point hour, ($\overline{PH}$), viz.,

$$AI = PH - \overline{PH}$$

A biserial correlation was computed for each item against the AI and this coefficient was used as the item DI. These values appear in Appendix II.

2. Preference index (PI): This index for each item was defined as the mean response of the group on the five-point applicability scale of the check list. These values also appear in Appendix II.

3. Factor indices: The 324 items were factored by a modification of the Wherry-Winer method (98). The nine previously agreed upon sub-tests of 36 items each were scored separately. These nine category scores were inter-correlated. The intercorrelations are shown in the upper right hand side of Part A of Table 1. A factor analysis of this table of correlations yielded a general and five group factors. The loadings of each of the judged categories on these factors are shown in Part B of Table 1. The residuals after the extraction of these factors from the correlations are presented in the lower left hand corner of Part A, Table 1.

The 324 items were also correlated with each of the nine category scores. These correlations were biserial correlations derived from upper and lower halves of each category classification against the five-point item responses. These item-category correlations were then changed to factor loadings by means of a transformation matrix. The transformation matrix was obtained by post-multiplying the inverse of the category intercorrelation matrix by the factor loadings shown in Table 1. These item factor loadings are shown in Appendix II.

TABLE 1.—Intercorrelations, Residuals, and Factor Loadings of the 9 Category Scores (N = 116)

Part A. Intercorrelations and Residuals									
	A	B	C	F	I	M	R	S	T
A	-	.39	.57	.41	.60	.46	.46	.52	.58
B	.04	-	.32	.37	.34	.37	.40	.45	.36
C	-.01	-.03	-	.51	.64	.58	.32	.69	.67
F	-.02	.01	.05	-	.49	.57	.41	.42	.56
I	.00	.04	.02	-.01	-	.73	.33	.62	.55
M	-.01	-.02	-.01	.03	-.02	-	.34	.56	.60
R	.02	.02	.01	.00	.01	.00	-	.30	.44
S	-.04	.05	.00	-.04	.05	-.01	-.04	-	.69
T	.00	-.01	-.03	.00	-.02	.03	.03	.03	-

Part B. Factor Loadings and Communalities							
Variable	General	S	A	M	B	O	h^2
A		.67	.11	.47	.19	.04	.72
B		.46	.09	.14	-.14	.35	.39
C		.70	.36	.26	.17	-.05	.72
F		.69	.04	.04	-.31	.09	1.00
I		.77	.03	.10	.43	.03	.80
M		.78	.17	-.21	.29	.17	.81
R		.55	-.20	.17	-.22	.24	.49
S		.67	.38	.28	.10	.09	.69
T		.81	.23	.20	-.10	-.22	.81

The names of the factors were determined by inspection of the items with relatively pure loadings on each factor, i.e., items with loadings on only the general and one of the group factors. A few of these pure items are presented in connection with the naming of each factor.

Naming of the Factors

The General Factor (G) was so-named because almost all of the 324 items had significant loadings upon that factor. It is interpreted as primarily a bias of response-set tendency, rather than as a general tendency to over- or under-achieve. This interpretation seems justified by the fact that the AI index was loaded on this factor only to the extent of .08. The only use made of this factor was as an additional aid to the preference index (PI) in matching items on the forced-choice instrument.

The Study Skills factor (S) had the following positive pure items with significant loadings:

almost never cut classes because of my high interest
 always finish my studying before I do other things
 always try to find out why; take nothing for granted
 am able to study at any time of the day
 am able to study wherever I am
 am not the type to daydream when I study
 attack my books with nothing else on my mind
 can keep my mind from wandering even on a boring
 assignment
 can study anytime, any place
 do not allow my mind to travel off on other matters
 when I study
 don't cut classes unless I'm sick
 find attention doesn't wander when I study
 finish assignments even if they're too long
 finish one assignment without thinking of another
 get along well with students and instructors
 go over mistakes on returned tests
 have ability to say no to something that would
 interfere with my studying
 have developed a rapid reading speed
 have learned to settle down and start work quickly

have mastered the problem of getting to work
 immediately
 have more responsibilities than others so I'm more
 motivated to do well
 have regular times for study
 have skills in writing, spelling and grammar which
 make work easier
 keep my attention on what I'm doing
 look for mistakes carefully in work to be handed in
 think only about what I'm working on when I study
 use cards to help me learn formulas, definitions,
 foreign language etc.

The negative items follow --

am constantly looking forward to big social events
 in the future
 am easily distracted when I try to concentrate
 cannot force myself to do well on courses I don't
 like
 can't force myself to do well on courses I don't
 like
 can't study unless I'm under pressure
 day dream with the book propped up in front of me
 don't take notes because it takes so long
 feel that I get cheated where grades are concerned
 find it boring to review
 find that concentration is completely lacking
 never had any speech training
 I realize my background in English is not very good
 slack off for a while once I made a good grade

Persons high in this factor have mastered the tools of study
 and can apply them with the required degree of concentration
 under a variety of conditions. Persons low in this factor
 find taking notes, studying or reviewing not worth the
 effort, and seldom resort to such practices unless especially
 interested or under great pressure.

The Adjustment Factor (A) had significant loadings
 on the following, among other, positive items:

can adjust quickly to new situations
 feel I have an adequate social life
 feel that as a person I am alert and happy

have a wide variety of interests
 have no immediate crucial worries
 have some really true friends
 take any problem which arises in stride

Some of the items on the negative side follow --

am on the shy side
 find it difficult to catch up once I get behind
 have no really close friends
 have spells of depression and worry
 have very critical parents

Persons high in this factor see themselves as satisfactory in almost all areas of personal, social and academic life and hence are happy and confident. Persons low in the factor are dissatisfied, unhappy, shy and feel everyone is against them.

The Motivation factor (M) had significant loadings on, among other, the following positively toned items:

am in school because I want to be here
 am interested in all of my courses
 feel a sense of competition and a drive to keep up
 have a desire to graduate
 realize I must make a high point hour to get into
 field I wish to enter

The negative items follow:

can't finish work if it's boring
 don't care whether I graduate or not
 feel that I am licked before I start
 hadn't wanted to come to school in the first place
 just don't have my heart set on good grades

Students high in this factor know what they want, are determined to achieve it and enjoy their work. The students low in this factor aren't willing to try, find work boring and not worth the effort.

The Background factor (B) had the following positively loaded items:

grew up in a family which always used large vocabularies
 have parents who motivate me to do my best
 want my parents to be proud of me
 was required to use library a lot in earlier schooling
 went to a school where we were made to work hard

The negative items included the following --

am not a very good speller
 brought up in a home where English spoken was very poor
 don't care if my parents don't like what I'm doing
 don't get much encouragement from my parents
 found past schooling did not prepare me for my work here
 never learned to read properly

The Background factor includes good schooling, which is well mastered, and a home which provides both example and incentive for persons high in the factor. For persons low in the factor the example and incentive are both lacking in the home and this lack probably has led to poor achievement in earlier schooling as well.

The Orientation factor (O) included the following positively toned items with significant loadings:

have friends who'd rather discuss school subjects than regular chit-chat
 have friends who put grades before most other things
 live with people who are quiet when I want to study
 took a lot of science in my previous school work
 would rather be a good student than a good socializer

The negatively loaded items follow --

avoided numbers and mathematics in past education
desire to excel in extra-curricular activities
find it hard to turn down a date
have a lot of friends who like activities
run around with people who like sports a lot

Persons high in this factor are oriented toward academic achievement, have selected friends of the same bent and are not adverse to the harder more time-consuming subjects.

Persons low in this factor tend to avoid the harder courses and tend to see their achievement as falling in the activity, sports, or social side of college life and have picked their friends accordingly.

The loadings of the items on the above five factors were used in constructing both parts of the instrument to be developed.

Assembling Part I of the Forced-Choice Scale

Since the purpose of this portion of the instrument is to measure the probable level of over- and under-achievement, each set of items should be matched on desirability (preference index and general factor loading) but should contain items of varying validity (DI). To prevent getting a high or low score because of a liking or disliking of any of the five factors it seemed desirable to select the high and low discriminating items from each of the five factors with equal frequency. To keep the items in Parts I and II of the inventory alike in the number of choices, and

since there were five factors, it was decided to select two items with high DI and three with low DI in each set. A total of eight sets of positive items and eight sets of negative items were assembled.

Table 2, which summarizes the index values for all eight positive sets (Part I, Section A of the test) and all eight negative sets (Part I, Section B of the test), shows how well the above criteria were achieved. The table indicates that this portion of the instrument was successfully balanced with respect to PI and factor G and to a considerable extent with respect to factors A, M, B, and O as well. There was some failure to balance with respect to S, with the Study Skill items being slightly more highly loaded on the correct answers. There was very good differentiation in DI for both sections of Part I.

Assembling Part II of the Forced-Choice Scale

Since the purpose of this portion of the scale is to yield a profile of strengths and weaknesses regardless of achievement level, the five items for each set in this portion of the scale should be matched on PI, DI, and G, but each item should have a high loading on one factor S, A, M, B, or O while having near zero loadings on the remaining four group factors. Each set should have an item for each of the five factors. Table 3 summarizes the actual averages for the above indices for the eight

TABLE 2.—Average Index Values for Valid and Invalid Positive and Negative Items in Part I of the Forced-Choice Instrument

Part I, Section A, Positively Toned Sets		
	2 Valid Items	3 Invalid Items
DI	.26	.02
PI	3.87	3.98
Factor Loadings		
G	.33	.30
S	.20	.07
A	.09	.13
M	.16	.06
B	.09	.03
O	-.02	.05
Part I, Section B, Negatively Toned Sets		
	2 Valid Items	3 Invalid Items
DI	-.27	-.04
PI	2.27	2.32
Factor Loadings		
G	-.36	-.35
S	-.19	-.11
A	-.17	-.10
M	-.11	-.05
B	-.01	.00
O	-.02	-.13

positive sets (Part II, Section A) and the eight negative sets (Part II, Section B).

Inspection of Table 3 shows that the matching was again relatively successful. For the positive sets the only deviations are the somewhat lower PI averages for the B and O items and the somewhat higher factor G values for

TABLE 3.—Average Index Values for Diagnostic Items for Each Factor (S, A, M, B, and O) for Positively and Negatively Toned Sets of the Forced-Choice Instrument

Positively Toned Sets					
Items for Factor	PI	DI	G	Own Factor	Other Factors
S	3.54	.08	.42	.28	.05
A	3.67	.08	.30	.30	.05
M	3.72	.07	.30	.30	-.02
B	3.43	.05	.28	.30	.00
O	3.40	.06	.28	.29	.00

Negatively Toned Sets					
Items for Factor	PI	DI	G	Own Factor	Other Factors
S	2.29	-.10	-.30	-.30	-.05
A	2.23	-.07	-.33	-.31	.03
M	1.58	-.19	-.31	-.31	.00
B	1.93	-.17	-.30	-.29	.00
O	2.21	.00	-.30	-.29	-.05

the S items. For the negative sets the only deviations are the lower PI values for the M items. The differences between own and other factor loadings was excellent for all types of items in both sections.

Final Assembly of the Forced-Choice Instrument

As indicated in the above discussion the final forced-choice instrument consisted of two parts with two sections each. Part I is designed to measure level of probable over- and under-achievement and is called Characteristic Preferences. Its two sections, A and B, are labeled Most Characteristic (strengths) and Least Characteristic (weaknesses) respectively. Part II is supposed to

disclose the individual's profile on factors S, A, M, B, and O and is labeled Diagnostic Ranking. It also has two sections labeled Strengths and Weaknesses, respectively. The entire instrument was given the innocuous name of Student Characteristics so as to yield as little response set as possible.

In Part I, the instructions in Section A asked the student to select the two items in each set most like himself and in Section B the two items from each set least like himself. In Part II the instructions were the same in both sections and consisted of a request to rank the five items in each set from 1 (most like you) through 5 (least like you).

Scoring for Part I consisted of summing up the number of high discrimination items selected in both Section A and in Section B, a higher score being indicative of over-achievement. Scoring in Part II consisted of adding the ranks in Section A for the items for each factor (S, A, M, B, and O) and subtracting this score from the sum of ranks assigned to each factor in Section B. Thus, if a person were equally strong in all areas he would receive a zero score for each factor. A positive deviation from zero is indicative of a relatively strong area, while conversely any negative deviation is indicative of a relatively weak area.

The complete instrument as administered is shown in Appendix III.

CHAPTER III

VALIDATION OF THE FORCED-CHOICE INSTRUMENT

The Experimental Hypotheses

The findings of the factor analysis and the methods used in constructing the instrument lead to certain specific predictions of test results. The statement of these hypotheses will make it possible to use one-tailed tests of significance in deciding whether the test has been validated.

There are four hypotheses with respect to the total score (hereafter called Level Score) of Part I of the instrument --

1. The level scores from Part I; Sections A and B, will each measure over- and under-achievement equally well. This general hypothesis leads to several explicit sub-hypotheses, viz.,
 - a. The two parts of the level score will correlate positively with each other.
 - b. The two parts will each individually correlate (1) positively with over- and under-achievement, and (2) zero with OSPE score; thus (3) when combined, adding significantly to the prediction of point hour ratio over the use of OSPE scores alone.
2. Since the responses are unrelated to intelligence because of the use of AI as the basis for scoring, the total scale for level should predict equally well

for either persons of lower than average or higher than average intelligence level.

3. Since for persons of very high intelligence the possibility of under-achievement is greater than that for over-achievement and since the reverse is true for persons of very low intelligence, it is posited that the Section A scores (Strengths) will be more valid for the low intelligence group and that Section B scores (Weaknesses) will be more diagnostic for the high intelligence group.

With respect to the profile scores derived from Part II of the instrument we can make the following hypotheses:

5. Since over- and under-achievement (DI) was controlled, the five part scores (S, A, M, B, and O) should all correlate zero with

- a. the level score of Part I, and
- b. the AI index.

6. Since the PI, G, and DI were all controlled, the means of all five factor scores should equal one another.

7. With DI controlled the profiles for over- and under-achievers and for low and high intelligence groups should yield similar profiles.

Any deviations from the above expectancies should parallel discrepancies in matching reported earlier.

The Validation Sample

The research instrument was administered to 151 elementary psychology students during the Autumn Quarter of 1958. Since the group contained 138 females and 13 males, it was decided to drop the 13 men. Of the 138 females, there were 12 cases for which OSPE was not available. Thus, 126 female undergraduates constituted the major validation sample. The colleges in which they were enrolled and their class standing are shown in Table 4.

TABLE 4.—College and Class Characteristics of the Validation Sample

Class	Home Ec.	Arts	College Com.	Dental Hyg.	Education	Total
Freshmen	11	32	2	10	52	107
Sophomore	1	7	1	4	6	19
Total	12	39	3	14	58	126

An analysis of variance showed that there was no statistically significant difference between classes or between colleges with respect to either point hour ratio or OSPE level. Hence, the sample was considered to be sufficiently homogeneous for analysis.

The criterion

The criterion was originally intended to be the same one used to determine the DI values. This AI (over- and under-achievement index) was computed by partialling OSPE score from the point hour ratio. The Pearson product moment correlation between OSPE and point hour ratio was .649. Predicted point hour scores were then subtracted from actual point hour to obtain an achievement index (AI). Observation of the scatterplot between OSPE and Point Hour, however, indicated a possible curvilinear relationship. Computation of column means indicated an ogive would give a good fit, so one was drawn free hand through the column means. (Note: this was probably due to the fact that raw scores for OSPE would have been linearly related to point hour but distances between percentiles were greater at the two ends and less in the middle of the distribution). When the correlation between the ogive (rather than a linear regression line) was computed the value rose to .674. Hence a corrected over- and under-achievement score (AI(C)) was computed and used as a second criterion score.

Tests of hypotheses

Test of hypothesis 1. a. When the level scores were computed separately for Section A (strengths) and Section B (weaknesses) of Part I, the resulting intercorrelation was only .148. This value is in the predicted

direction, and the t-test yields a value of 1.67 which is significant at the 5 per cent level (one-tailed test). While this supports the hypothesis the value is disappointingly low if viewed as an alternate test reliability coefficient.

Actually, agreement between the odd-even items in each section was no higher. The odd-even correlation for Strengths was only .016 while that for Weaknesses was .139. Using Brown-Spearman to step up this average of .078 would yield a reliability of only .252, which agrees very well with the estimate of .258 arrived at by treating strengths and weaknesses as parts of the same continuum. That the reliability of the total level score is higher than would be indicated by use of the Brown-Spearman prophecy formula, is shown by a test-retest reliability of .64 found over a seven-week period in a military study (95).

It would appear that odd-even reliability estimates are not proper estimates for this forced-choice scale. Although it was shown that Sections A and B of Part I measure the same thing it does not necessarily follow that because a person has a number of strengths he will have few or no weaknesses. Conversely, a person may be relatively weak and yet have some strengths. This is one possible explanation for the low split half reliability estimate. Another possible contributor to the low reliability coefficients may be found in the reduction of halo (constant

bias) due to the specificity and relative equality of attractiveness (PI) of the items. If the foregoing is correct we can conclude that test-retest estimates of reliability are more meaningful in the forced-choice situation.

Test of hypothesis 1. b. (1). This hypothesis stated that each Section of Part I would correlate positively with over- and under-achievement. When the two parts were correlated independently with the criteria AI and AI(C) the resulting coefficients were --

Criterion	Section A, Strengths	Section B, Weaknesses
AI	.342	.121
AI(C)	.372	.172

While all four values are positive as predicted, and while the Strength section (Section A) is significantly related beyond the 1 per cent level of confidence, the Weakness section (Section B) was not significant against the original criterion (AI), and managed to achieve only the 5 per cent level of confidence against the corrected criterion (AI.C). This relative failure of the weakness section suggested the appropriateness of an item analysis to see why the two sections varied so widely.

An item analysis of the two sections of the scale yielded the following correlations with the AI(C) scores for half of the cases chosen at random (N = 63) --

Set	Strengths	Weaknesses
1	.204	-.064
2	.129	-.032
3	.129	.024
4	.103	-.069
5	.048	-.014
6	.249	.040
7	.290	.348
8	-.033	-.152

While most (7 of 8) of the positively toned sets were at least positively related to AI(C) and six of them showed satisfactory validity; only three of the negatively toned items yielded positive correlations and only one of these was of a satisfactory level. The fact that this one item did show higher validity than any of the positive items does yield support of the hypothesis that strength and weakness items are, or can be equally valid. The writer has no adequate explanation for the low validity coefficients of the negative sets. In administering the instrument the author did note that students had some difficulty choosing weakness items "least like" them. This difficulty may have led to generally irrelevant descriptions. Since item indices were computed on a sample which included males and females, final judgment as to validity of these items should await validation against a mixed or an all male population.

Test of hypothesis 1. b. (2). This hypothesis stated that each section of Part I would correlate zero with OSPE. The correlations with OSPE were --

Section A, Strengths Section B, Weaknesses

-.030

.041

Both coefficients, as predicted, are quite close to zero. Neither approaches being significant.

Test of hypothesis 1. b. (3). This hypothesis stated that combined level scores from Part I would add significantly to the prediction of point hour ratio over the use of OSPE alone. The actual correlations were --

PH vs OSPE	OSPE alone	OSPE plus level scores
linear	.649	.702
ogive	.674	.734

The shrunken R table of the Wherry Test Selection method (32) indicated that each of these increases was statistically significant. In each case the additional variance explained was approximately 8 per cent.

Test of hypothesis 2. This hypothesis stated that the total level score would predict equally well for both high and low groups on the OSPE variable. The results were as follow against the two criteria --

Sample	Total vs AI	Total vs AI(C)
Upper OSPE group	.226	.325
Lower OSPE group	.394	.368

While the validity for the lower OSPE group remains higher, use of the corrected criterion measure makes the two values nearly alike, as was posited.

Test of hypothesis 3. This hypothesis stated that Part I, Section A scores (Strengths) would be more valid for the low intelligence group, while Part I, Section B scores (Weaknesses) would be more valid for the high intelligence group. The results against the two criteria were --

	High OSPE		Low OSPE	
	AI	AI(C)	AI	AI(C)
Strengths	-.099	.347	.690	.399
Weaknesses	.217	.472	.136	-.078

The hypothesis was completely confirmed. The four highest correlations attain significance at $p < .05$, one tail test of significance, while the .217 is significant at $p < .05$, two tail test.

Test for hypothesis 4. This hypothesis stated that over-achievement would be better predicted by strengths (Section A) while under-achievement would be better predicted by weaknesses (Section B). The actual correlations were --

Sample	Against AI		Against AI(C)	
	Strengths	Weaknesses	Strengths	Weaknesses
Over-achievers	.208	.290	.207	.238
Under-achievers	.233	-.150	.291	-.099

Apparently the hypothesis was completely wrong. Actually the degree of over-achievement is better predicted by the absence of weaknesses, while the degree of under-achievement is better predicted by the absence of strengths.

Test for hypothesis 5. This hypothesis stated that the five part scores (S, A, M, B, and O) from Part II would correlate zero with the level score of Part I and the AI index. The resulting coefficients were --

	L	AI	AI(C)
S	.200*	.016	.101
A	-.092	-.057	-.043
M	.379*	.152	.079
B	-.200*	-.147	-.217*
O	-.188*	-.073	.072

*significant at $p < .05$.

Hypothesis 5 was not supported since four of the five correlations between the diagnostic factors and the level score were significant. Only one of the correlations with the criteria was significant, however, which indicates that although the diagnostic profile bears a significant relation to level it is relatively independent of over- and under-achievement. Matching indices offer little indication of why profile factors and level scores are related. Perhaps, the higher loadings of the valid items in the level part of the scale on S and M may explain the positive relation between these factors and level scores.

Test for hypothesis 6. This hypothesis stated that the mean scores on all five areas should be equal. Actual computation of area scores yielded the following statistics--

Area	S	A	M	B	O
Means	-1.67	0.50	6.77	0.66	-6.26
Sigmas	7.23	7.79	7.72	7.51	6.91

If all areas had been equally attractive as postulated, all means would have been equal to zero. Actually three of the area means (S, A, and B) turn out as hypothesized but the mean for area M is significantly greater than zero while that for area O is significantly lower than zero.

Inspection of the matching values in Table 3, Chapter II, throws little light upon why these two areas should have been so out of line. It is true that the M items in the Weakness Section (Section B) did have a lower PI average and hence may have been avoided, but there seems to be little evidence as to why the respondents should have shifted to admitting faults primarily in area O unless it could be that these items had a nearer zero validity, as indicated by the DI average.

Test for hypothesis 7. This hypothesis stated that the profiles for over-achievers and under-achievers would be similar and that the same would hold for the profiles of high and low OSPE groups. The actual statistics (means) were --

Sample	S	A	M	B	O
Over-achievers	-1.41	-0.57	8.72	-0.24	-6.50
Under-achievers	-1.90	1.42	5.08	1.45	-6.05
High OSPE	-1.64	0.16	8.27	0.44	-6.52
Low OSPE	-1.66	0.97	5.16	0.88	-5.89

All Sigmas lie between 6.65 and 8.27.

While the general shape of all profiles remained the same it is true that both under-achievers and low OSPE groups obtained significantly lower scores on the Motivation factor than did over-achievers and high OSPE groups. No ready explanation is available from an inspection of the data in Table 3, Chapter II. The shift to other areas was rather widespread in both groups--the under-achievers and low OSPE groups were higher (not to a significant degree) on A, B, and O area scores and were also (but not significantly) lower on S scores.

To make the profiles indicative of relative standing to others it seemed desirable to set up norms by sex. The present sample of 126 females was given tentative norms for that group. The norms are shown in Table 5.

TABLE 5.—Tentative Female Norms for Profiles Yielded by Part II of the Forced-Choice Instrument*

Decile	S	A	M	B	O
10	41-64	44-64	49-64	45-64	37-64
9	38-40	40-43	47-48	40-44	33-36
8	35-37	38-39	46	37-39	30-33
7	33-34	36-37	42-45	35-36	28-29
6	31-32	34-35	40-41	32-34	27
5	29-30	30-33	38-39	30-31	25-26
4	27-28	27-29	36-37	28-29	23-24
3	24-26	25-26	32-35	26-27	21-22
2	21-23	20-24	28-31	23-25	17-20
1	0-20	0-19	0-27	0-22	0-16

*A value of 32 was added to each profile score.

Best Prediction of Over- and Under-Achievement

We finally come to the question of just how well the instrument as a whole is predicting over- and under-achievement. It would appear that here we could consider various possibilities of predicting our original and corrected criteria. Table 6 gives the pertinent information. It can be seen from the table that Section A predicted both criteria better than the total Part I. This was because equal weights were assigned to each section although Section A predicted the criteria better than Section B. The fourth set of coefficients in Table 6 shows the resulting correlations when proper weights were assigned each section. The latter part of Table 6 shows the correlation of each scoring formula with both criteria on the sample (original) used to determine the item validity coefficients and the cross-validation sample. In general, cross-validation resulted in shrinkage of the original coefficients from approximately .43 to approximately .33. The fact that the cross-validated scoring formula-criteria correlations are somewhat lower than the Section A, AI and AI(C) correlations was probably due to the reduction of criterion variance in the smaller cross-validation samples.

It appears that the results of this test compare favorably with those reported by such investigators as Chahbazi (15), Myers (64), Scott (80), Chambers (16), Taylor (90), Woodman (99), Holtzman, Brown, and Farquhar

TABLE 6.—Overall Validity of the Forced-Choice Instrument Against Two Criteria for Various Scoring Systems

Scoring System	AI	AI(C)	N
Original Scoring of Part I, Total	.288	.345	126
Part I, Section A only	.342	.372	126
Part I, Section B only	.121	.172	126
Best Weighted Multiple of Section A and Section B of Part I	.349	.390	126
Rescoring of Part I, Total, on Basis of Item Analysis*			
Scoring Formula 1			
Original	.423	.442	63
Cross-validation	.309	.341	63
Scoring Formula 2			
Original	.423	.436	63
Cross-validation	.343	.345	63

*Scoring formula 1 equals the sum of scores on cells 1, 2, 3, 4, 6, and 7 of Section A and cell 7 of Section B.

Scoring formula 2 equals scoring formula 1 minus the score on cell 8 of Section B.

(42), Gordon (35), and Schutter and Maher (79). Indeed this test is as good or better than other more restricted scales or other omnibus scales with many more items than occur in Part I of this scale. We may safely conclude that this scale has been successfully validated.

In order to determine the fakability of the instrument a second administration of the scale was given to the validation sample with directions to try to obtain as high a score as possible. Two further hypotheses were posited --

8. Since the level score from Part I is based upon forced-choice, an attempt to bias the outcome should not result in a near-perfect score and in fact should not be significantly different from that obtained in a non-bias situation.

Test of hypothesis 8. The findings are mixed. When the same sample of individuals filled in a form trying to bias the results immediately after completing a non-bias report, the mean level score did increase from 12.913 ± 2.627 to 15.064 ± 2.325 . With a correlation of .053, between bias and non-bias level scores, the t value was 6.87, which is significant at the .001 level of confidence. However, when we consider that the possible score ranged from 0 to 32 with an expected chance score of 12.8, we see that the unbiased group made almost exactly the chance expectancy and that the biased group gained only $(15.1 - 12.8)/(32.0 - 12.8)$ equals $2.3/19.2$ equals .120 or 12 per cent of the possible improvement. This would indicate that the test still had very good disguise. This hypothesis is confirmed in that a near-perfect score is not possible by bias but refuted in that the bias sample was significantly better than the non-bias sample.

9. Prediction as to change in profile due to bias is harder to make. Since all items were matched on PI, DI, and G it would appear that bias would have little effect. Therefore the means of these factors should not differ significantly from the means of the non-bias profile.

Test for hypothesis 9. The prediction of no change from the non-bias profile was definitely not supported for the bias group as shown below:

		S	A	M	B	O
Non-bias	M	-1.67	0.50	6.77	0.66	-6.26
	SD	7.23	7.79	7.72	7.51	6.91
Bias	M	6.77	-7.23	12.77	-6.10	-6.21
	SD	6.42	7.59	7.11	6.58	5.45

In the non-bias test Motivation was significantly higher and Orientation was significantly lower than zero. In the bias group, the value of Motivation was again significantly increased (and again it is the highest factor) as was that for Study Skills, while Adjustment and Background became significantly lower and Orientation retained its original lowness.

Suggestions for Future Research

1. Since material for the construction of other items is available in Appendix II, the writer would like to construct further items for tryout as substitute items for the one positive and seven negative items that failed to

work in the original scale. Since the sixteen original sets did not seem excessive in terms of time, the writer would like to extend the scale to sixteen or more usable sets since this would probably further increase the validity of the scale.

2. The usefulness of Part II of the scale has not been demonstrated as yet, but potentially several lines of investigation are evident.

a. Research to validate the various scales as such would be desirable. Some studies which might accomplish this might include the following --

1. The correlation of the S (study skills) scores with say the Wrenn Study Habits scale.
2. The correlation of the A (adjustment) scores with ratings on emotional steadiness (See Taylor (90)).
3. The correlation of the M (motivation) scores with a study in which students ranked such items as a college degree, a 3.50 Point-Hour Average, etc. against other types of goals (say presidency of a fraternity, a letter in football, a life long friend, a cadillac car, etc.)
4. The correlation of B (background) scores with an independent ranking of High Schools from which they graduated and possibly against a socio-economic ranking of their homes with emphasis upon library facilities, newspapers and journals available, parents' education, etc.
5. The correlation of O (orientation) scores against the relative ranks assigned to Scholastic Achievement and Social Acceptance on Florence's Student Behavior Description form (27).

b. Also desirable would be "blind" interviews to see whether the same profile would be assigned by the interviewer as was claimed by the student in Part II of this test.

3. The writer hopes to conduct or encourage a number of other studies, possibly on an improved scale as suggested in (1) above, on students of both sexes in a number of different localities to assure general validity and to determine better norms for both parts I and II. If and when this is accomplished the writer will try to have it published so others may use it more readily.

CHAPTER IV

SUMMARY AND CONCLUSIONS

While scholastic ability tests predict academic performance quite well, they do not do so perfectly. Many writers have dealt with the problem of over- and under-achievement. Past studies have shown the importance of background, type of friends and social orientation, adjustment, motivation and study habits in predicting this variable by means of biographical information, inventories, and personality tests of both the regular and of the projective variety. The present study was designed to create a forced-choice instrument including all dimensions of the problem which would yield both a level score, predicting the extent of over- and under-achievement and a profile showing areas of relative strength and weakness.

A series of 324 items covering nine judged categories (adjustment, background, concentration, friends, interest, motivation, relatives, study habits and time usage) were selected from essays concerning academic strengths and weaknesses. These items were presented in check-list form to determine their applicability to students whose over- and under-achievement could be ascertained from point hour ratio and OSPE scores. A factor analysis indicated a general and

five group factors (study skills, adjustment, motivation, background, and orientation). These six sets of factor loading plus discrimination and preference indices were used to construct 32 sets of 5 items each. The first 16 items (Part I) yielded a level score (over- and under-achievement), while the second 16 items (Part II) yielded a profile of relative strength or weakness on the five factors.

To validate Part I of the instrument it was hypothesized and demonstrated that (1) strengths and weaknesses both measure the same tendency, are unrelated to intelligence, and do predict over- and under-achievement; (2) that the scale works equally well for both low and high OSPE levels; and (3) that the scale is equally valid for both over-achievers and under-achievers. For part II of the scale it was demonstrated that type of profile is (1) unrelated to intelligence level or (2) to over- and under-achievement level. As to over-all validity, it was shown that a weighted composite of Section A and Section B of Part I would yield a correlation of .390 with over- and under-achievement. This validity coefficient is equal to or better than any other scale discussed in the literature. The profile has not been validated, but a program of future research has been proposed.

APPENDIX

APPENDIX I

ORIGINAL CHECK-LIST INSTRUMENT OF 324 ITEMS

Strengths and Weaknesses

On the pages that follow you will find a list of 324 phrases which students have used to describe themselves. The first 162 phrases cover strengths while the remaining ones cover weaknesses.

Each phrase on the following pages should be marked from 1 to 5 according to how well it applies to you. For each phrase, ask yourself this question: this phrase applies to me:

1	2	3	4	5
very poorly?	poorly?	moderately well?	well?	very well?

Always mark an item 5 if it is an excellent description of you or 1 if it is a very poor description, using numbers in between (2,3,4) to indicate the various degrees of description.

The phrases should be marked only on the answer sheet you have been given. Write the number you choose on the line following the item number. Each phrase has its corresponding number on the answer sheet. There are 324 phrases. Thus, you are to write one number by each of the 324 numbered positions on the answer sheet. Even if you are not sure of an answer rate each phrase.

1. almost never cut classes because of my high interest.
2. always finish my studying before I do other things.
3. always try to find out why; take nothing for granted.
4. am able to keep studying for relatively long periods of time.
5. am able to persevere despite obstacles or distractions.
6. am able to study at any time of the day.
7. am able to study wherever I am.
8. am able to talk to teachers and find out what I'm doing wrong.
9. am acquainted with different types of tests and know how to go about answering them.
10. am always striving to better my grades.
11. am bothered when I don't do as well as I can.
12. am from a family which was always English conscious.
13. am in school because I want to be here.
14. am interested in all my courses.
15. am more mature than most students.
16. am not afraid to speak up and answer questions in class.
17. am not the type to daydream when I study.
18. am not the type who loves to sit and chat.
19. am very determined because of the responsibility I feel upon myself.
20. am very interested in learning.
21. ask a friend to explain something to me if I don't understand it.
22. attack my books with nothing else on my mind.
23. believe my concentration powers are good.

24. can adjust quickly to new situations.
25. can keep my mind from wandering even on a boring assignment.
26. can study anytime, any place.
27. can take most any kind of test.
28. come from a happy home.
29. definitely have the will to do better in my studies.
30. desire strongly to complete preparation for my chosen career.
31. discuss material with my friends before a test.
32. do my very best even if I don't like a course.
33. do not allow my mind to travel off on other matters when I study.
34. do not have any religious problems.
35. do not have other responsibilities which keep me from studying.
36. don't cut classes unless I'm sick.
37. don't get frightened or excited when taking an examination.
38. don't let people's talking bother me when I study.
39. feel a sense of competition and a drive to keep up.
40. feel I have an adequate social life.
41. feel that as a person I'm alert and happy.
42. find all my courses interesting so don't mind studying assignments.
43. find attention doesn't wander when I study.
44. find every subject interesting.
45. finish assignments each night so as not to get behind.
46. finish assignments even if they're too long.

47. finish one assignment without thinking of another.
48. finish work even if it's boring.
49. get along well with other people.
50. get along well with students and instructors.
51. get a lot of moral support from my parents.
52. get everything done by keeping an accurate list of "what I must do today."
53. glance over headings in a chapter before reading the assignment.
54. go over mistakes on returned tests.
55. grew up in a family which always used large vocabularies.
56. had a good foundation for my school work here.
57. had a good math department in previous schooling.
58. had a lot of required outside reading to do in earlier schooling.
59. had an excellent English department in my past school.
60. have ability to say "no" to something that would interfere with my studying.
61. have a close relationship with people in my family.
62. have a family which encourages me.
63. have a family whose understanding of what I'm trying to do is a big help.
64. have a good background in foreign language.
65. have an extensive background in math, history and science which helps me in my present education.
66. have a place in which I always study and which I use for nothing else.
67. have a sound knowledge of English grammar.
68. have a wide variety of interests.

69. have closest friends who are all good students.
70. have comfortable, but not too comfortable place to study.
71. have confidence in myself.
72. have developed a rapid reading speed.
73. have few distracting objects and it's relatively quiet where I study.
74. have friends who'd rather discuss school subjects than regular chit chat.
75. have friends who put good grades before most other things.
76. have friends who respect my privacy when I need to study.
77. have good health.
78. have had past experience in speaking which helps me in class discussion.
79. have had work experience which has broadened me.
80. have high interest in subjects which enables me to learn more easily.
81. have immediate relatives who went to college.
82. have learned to settle down and start work quickly.
83. have learned to start studying well in advance of an examination.
84. have learned to use my time efficiently.
85. have many friends who help me with my lessons.
86. have mastered the problem of getting to work immediately.
87. have more responsibilities than others so I'm more motivated to do well.
88. have no financial worries.
89. have no immediate crucial worries.

90. have no physical handicaps or defects which would limit what I want to do.
91. have parents who encourage me to make my own decisions.
92. have parents who motivate me to do my best.
93. have parents who put my work before things they want done.
94. have parents who really care about me.
95. have parents who've always expected me to perform at a high level.
96. have parents who would be willing to help me with my assignments.
97. have people offering help and advice in almost any way I turn.
98. have people where I live who are interested in my doing well.
99. have regular times for study.
100. have relatives who realize this school is harder than earlier schooling.
101. have skills in writing, spelling and grammar which make written work easier.
102. have someone who'll help me if I don't understand something.
103. have some really true friends.
104. have strong enough determination to reach a goal when I want to.
105. have the desire to graduate.
106. have the will power to attend classes.
107. have time for rest and relaxation by budgeting my time for study.
108. have to get good grades because my parents did.
109. have tried to budget my time.

- 110. help to support myself which makes me more serious about my work.
- 111. ignore radio and TV when I study.
- 112. just jot down important words, not sentences when I read.
- 113. keep my attention on what I'm doing.
- 114. know certain people believe in me.
- 115. know how to use the library.
- 116. know what I want to do when I finish my education.
- 117. know what speed or kind of reading certain types of material require.
- 118. learned to be a good speller back in elementary school.
- 119. like to succeed.
- 120. listen intently in class.
- 121. live with people who are quiet when I want to study.
- 122. live with several others about my own age and we can compare ideas and study together.
- 123. look for at least one idea in each paragraph I read.
- 124. look for mistakes carefully in work to be handed in.
- 125. look up words I don't know.
- 126. make a logical organization of any thoughts before I write a paper.
- 127. outline and keep notes which makes it easy for me to review.
- 128. plan how much work I have to finish before I start.
- 129. put all attention on subject and teacher when I go to class.
- 130. put studying before social life.
- 131. realize I must make a high point hour to get into field I wish to enter.

- 132. realize study must come before many other things.
- 133. realize that the education I'm getting now will benefit me in the future.
- 134. realize what college is costing my parents and this keeps me hard at work.
- 135. review my work as often as possible.
- 136. set my goals high and strive hard to reach them.
- 137. spend most of my time with people who really like school.
- 138. take any problems which arise in stride.
- 139. take breaks between studying different subjects.
- 140. take good notes in class.
- 141. take subjects which cover the things I'm interested in.
- 142. think of my parents who are paying for my education and if I am messing around, I then want to do as good as I can.
- 143. think only about what I'm working on when I study.
- 144. took a lot of science in my previous school work.
- 145. try to figure out what a teacher will ask when I'm studying for a test.
- 146. use a quick review after reading.
- 147. use a system of underlining.
- 148. use cards to help me learn formulas, definitions, foreign language, etc.
- 149. use every free hour of the afternoon for study.
- 150. want my family to know I'm working hard because they're very important to me.
- 151. want my parents to be proud of me.
- 152. want to be accepted into a special field and this motivates me to make better grades.

- 153. want to do my best if I know friends who are doing better than I am.
- 154. want to do well for my parents' sake.
- 155. want to learn as much as possible about many things.
- 156. want to make good grades so I'll be accepted in a certain organization.
- 157. want to make good grades to please my parents.
- 158. was required to use the library a lot in earlier schooling.
- 159. went to a school where practically everybody worked to get good grades.
- 160. went to a school where we were made to work hard.
- 161. went to a school where we were required to write quite a few reports.
- 162. would rather be a good student than a good socializer.
- 163. actually don't know how to study.
- 164. always available and willing for other things than study.
- 165. always get stuck with least interesting teachers and courses.
- 166. always got good grades, but it was due to simple subject matter.
- 167. am biased against some subjects.
- 168. am burdened by my personal problems.
- 169. am confused about religious beliefs.
- 170. am constantly looking forward to big social events in the future.
- 171. am distracted by phone and television when studying.
- 172. am easily distracted when I try to concentrate.
- 173. am in school only because it beats working.

- 174. am late with some of my homework.
- 175. am not a very good speller.
- 176. am not proud of my parents, so I don't care what they think of me.
- 177. am on the shy side.
- 178. am under no pressure to please my parents; I'm on my own as far as they are concerned.
- 179. avoided numbers and mathematics in past education.
- 180. become restless after a short period of study.
- 181. brought up in a home where the English spoken was very poor.
- 182. budget my time poorly.
- 183. cannot force myself to do well on courses I don't like.
- 184. cannot stay up late to study since I have to get up early.
- 185. can't concentrate on what I'm doing for worrying about all I have to do.
- 186. can't decide on what I really want to do in life.
- 187. can't finish work if it's boring.
- 188. can't organize materials for exams.
- 189. can't settle down to work immediately.
- 190. can't settle on a field to major in.
- 191. can't study unless I'm under pressure.
- 192. can't work hard for a grade even if I like the course.
- 193. could make good grades without studying before I came here.
- 194. daydream with the book propped up in front of me.
- 195. desire to excel in extra-curricular activities.

196. didn't particularly want to come to school, but didn't know what else to do.
197. didn't take much foreign language in high school.
198. discover too many other desirable activities going on to study much.
199. dislike courses where you have to memorize things.
200. do just bare essentials if I don't like a course.
201. do much better on some kinds of tests than others.
202. do not feel badly about receiving a poor grade.
203. do not have anyone to study with.
204. do not usually review my notes until just before an exam.
205. don't care if others do better than I do in a course.
206. don't care if parents like what I'm doing.
207. don't care whether I get good grades.
208. don't care whether I graduate or not.
209. don't finish assignments if they're too long.
210. don't get much encouragement from my parents.
211. don't have a good relationship with people in my family.
212. don't have any relatives who went to college.
213. don't have any special place where I do my studying.
214. don't have enough time to study.
215. don't know how to find the important points when reading.
216. don't like the subjects I'm taking.
217. don't make good grades because the school puts too much emphasis on activities.
218. don't mind if I do a poor job if I know a friend who has done poorly in a class.

- 219. don't take notes because I end up copying the book.
- 220. don't take notes because it takes so long.
- 221. don't think getting a good grade average is very important.
- 222. don't worry about grades because my parents never did very well.
- 223. drawn away from study by a great deal of social pressure.
- 224. easily get talked out of studying by a friend.
- 225. feel that courses are not practical enough.
- 226. feel that I am licked before I start.
- 227. feel that I get cheated where grades are concerned.
- 228. feel too homesick to study sometimes.
- 229. find assignments too long.
- 230. find ever so many things I would rather do than study.
- 231. find favorite television programs cutting into my study time.
- 232. find it boring to review.
- 233. find it hard to express myself on paper.
- 234. find it hard to go to teachers for help.
- 235. find it hard to sit still and relax; have to be on the move.
- 236. find it hard to study with too much activity near by.
- 237. find it hard to turn down a date.
- 238. find it quite a problem to really stick to my work.
- 239. find it very difficult to catch up once I get behind.
- 240. find my mind wandering when I sit down to study.
- 241. find that concentration is completely lacking.

- 242. found past schooling did not prepare me for my work here.
- 243. get scared when I take a test.
- 244. get telephone calls from friends during hours reserved for study.
- 245. had it too easy in my early schooling.
- 246. hadn't wanted to come to school in the first place.
- 247. have a difficult time concentrating when someone is talking or rattling papers.
- 248. have a difficult time starting to study.
- 249. have a family that treats me like a child.
- 250. have a family who won't bother to sacrifice for me so why should I work hard.
- 251. have a fear of flunking out.
- 252. have a great many extracurricular activities.
- 253. have a lot of friends who like activities.
- 254. have a lot on my mind.
- 255. have folks who disregard my school duties when they want something done.
- 256. have given up trying to figure what my teachers will ask when it comes to exams.
- 257. have lost interest in my choice of vocation.
- 258. have never had much experience in writing reports.
- 259. have no really close friends.
- 260. have no suitable place to study where I live.
- 261. haven't quite learned how to study yet.
- 262. have outside interests which win out over my studying.
- 263. have parents who'd like to live my life for me.

- 264. have parents who don't particularly care about how I do in school.
- 265. have people in my family who think I'll never make it.
- 266. have people who would rather not give a penny for my education.
- 267. have relatives who don't realize it's harder to make good grades here than it was in my earlier schooling.
- 268. have relatives who don't see the importance of an education.
- 269. have spells of depression and worry.
- 270. have to "force" myself to study some courses.
- 271. have too many hours of courses.
- 272. have too many other obligations not connected with education.
- 273. have trouble concentrating where there is a lot of activity going on.
- 274. have very critical parents.
- 275. have very little curiosity about any new subject.
- 276. hear everything that goes on; noises distract me.
- 277. join friends when they are doing something more interesting than study.
- 278. just don't have my heart set on good grades.
- 279. just skip over words I don't know in reading.
- 280. know family opinion is against my going to school.
- 281. know many people who don't put a high premium on studying.
- 282. lack money so must work when I should be studying.
- 283. lack power of concentration.
- 284. lack self confidence.

285. leave my assignments till the night before they are due.
286. let my thoughts wander when I read.
287. like to play cards with my friends.
288. love to sit and talk with my friends.
289. majored in sports or activities in earlier education.
290. make careless mistakes due to rushing.
291. make careless mistakes on work.
292. make errors in grammar which hurt my written work.
293. missed some courses I needed for those I'm taking now.
294. miss important little details when I read.
295. must get more sleep than most because of health.
296. never bother with tests after I get them back.
297. never had any speech training.
298. never learned to read properly.
299. never learned to say no to anyone who needs my help.
300. put off study until just before a test.
301. put off till tomorrow what I should do today.
302. realize my background in English is not very good.
303. realize my real problem is laziness.
304. resent required courses out of major field which I will never use again.
305. run around with people who like sports a lot.
306. slack off for a while once I make a good grade.
307. socialize too much.
308. forced to take some subjects which give me a pain.

- 309. spend a lot of time talking with the opposite sex so I'll have enough dates.
- 310. spend too much time with activities other than studying.
- 311. start studying without planning what I have to do.
- 312. study only the subjects that interest me.
- 313. take a very long time to read my assignments.
- 314. tend to daydream rather than study.
- 315. usually don't outline before I begin to write.
- 316. usually go along with what others are doing.
- 317. was never made to think in high school, just memorize.
- 318. was not required to do enough reading in past schools.
- 319. went to a school in past where you weren't liked as well if you studied too much.
- 320. went to a small school before coming here.
- 321. worry about other lessons while studying on one subject.
- 322. worry about whether people will like and accept me.
- 323. would do better if I could relax more.
- 324. would rather read books of my own choosing than assigned ones.

APPENDIX II
PREFERENCE, DISCRIMINATION, AND FACTOR INDICES
FOR THE 324 ITEMS

TABLE 7.—Preference, Discrimination and Factor Indices
for the 324 Items*

Item	PI	DI	G	A	B	S	M	O
1	357	21	47	-14	-04	32	12	-04
2	296	01	46	12	-12	21	-15	13
3	316	09	21	07	-03	23	16	-10
4	327	08	42	25	-01	35	08	03
5	292	01	30	28	-05	40	-03	12
6	379	12	31	-02	-05	24	05	03
7	285	16	27	15	09	29	07	05
8	391	19	25	21	-03	-18	20	-10
9	372	20	-05	30	28	18	11	-05
10	440	11	38	-02	06	12	21	-08
11	461	37	40	-07	-05	15	11	00
12	347	13	26	18	32	04	-13	-01
13	458	18	28	-18	03	-03	34	-15
14	354	01	57	10	-06	-08	42	16
15	334	-07	26	04	-14	11	17	-09
16	348	21	17	12	02	-12	30	00
17	294	-10	27	05	-08	29	08	04
18	195	08	17	04	07	22	-02	22
19	378	28	36	-14	19	14	09	05
20	409	07	36	11	13	-01	35	01
21	421	-06	35	13	05	-03	-15	22
22	299	19	45	14	00	36	-06	16
23	332	18	40	21	17	37	06	20
24	381	03	35	26	03	-01	19	00
25	238	07	41	06	-08	36	17	02
26	266	20	30	11	02	37	15	08
27	353	26	13	26	27	26	23	-09
28	441	10	36	25	21	00	-12	09
29	449	20	40	-02	04	17	29	-16
30	448	13	28	-14	08	08	32	18
31	359	-01	22	28	-24	-13	-18	34
32	366	20	52	-02	-04	11	12	05
33	298	12	46	23	-07	50	00	15
34	404	18	33	14	-16	10	03	-11
35	310	08	13	04	-03	-20	-19	11
36	379	14	42	-19	02	24	-08	-07
37	335	11	12	22	25	-04	26	06
38	258	01	21	22	-01	37	-02	15
39	393	29	39	02	18	17	30	-14
40	406	-03	35	32	-13	02	06	-15

TABLE 7 (Contd.)

Item	PI	DI	G	A	B	S	M	O
41	423	12	41	44	-04	16	23	-14
42	325	04	52	10	-10	12	35	07
43	284	14	53	21	-04	41	12	12
44	278	07	33	03	12	06	22	10
45	289	13	49	19	-30	19	-18	01
46	319	03	54	00	-12	26	-03	11
47	297	12	42	07	-16	31	07	-08
48	351	10	59	04	06	30	20	-01
49	448	04	30	30	-21	03	10	-11
50	449	02	27	01	-13	28	-08	-17
51	413	09	37	17	23	-20	-15	-01
52	300	05	32	27	00	25	04	-18
53	332	14	21	30	-06	39	-02	-02
54	408	27	31	06	06	31	05	-15
55	316	09	35	16	35	15	-05	06
56	349	17	37	30	35	12	05	00
57	324	09	24	15	18	01	06	-09
58	278	-02	19	18	32	16	-22	-21
59	315	06	20	23	33	19	-11	-28
60	321	00	40	03	02	28	-08	13
61	420	03	38	08	12	-07	-12	05
62	429	11	34	01	35	01	-19	-01
63	402	05	40	21	28	03	-22	00
64	283	04	16	33	14	21	00	-16
65	278	14	25	07	23	16	23	02
66	243	09	24	-06	-25	11	-06	01
67	360	02	06	20	29	13	00	-16
68	413	01	19	23	-06	06	03	-10
69	359	-16	27	18	20	00	-24	06
70	377	07	25	18	-02	06	14	-18
71	364	21	40	34	-13	17	27	-10
72	317	14	29	19	17	34	05	-01
73	312	04	33	20	-28	18	-05	02
74	265	01	26	04	09	01	-07	25
75	323	13	25	08	07	07	-09	27
76	361	11	36	18	-02	15	04	10
77	459	01	27	-02	02	-01	00	07
78	350	03	18	21	08	04	01	09
79	409	09	25	06	14	15	13	-14
80	384	28	40	09	21	20	27	16
81	367	-15	22	17	08	-11	-16	06
82	336	11	54	10	-21	40	14	-08

TABLE 7 (Contd.)

Item	PI	DI	G	A	B	S	M	O
83	297	03	37	22	-06	26	-09	21
84	315	20	46	22	-11	38	10	05
85	224	-18	24	17	-21	11	-34	19
86	294	23	34	13	-11	44	16	03
87	284	15	22	09	04	23	-03	07
88	321	04	28	05	11	-19	-04	-08
89	373	30	38	24	13	-09	15	-16
90	467	-05	17	15	-16	03	00	-09
91	467	13	33	17	22	07	-04	-13
92	436	11	44	19	22	-15	-06	-01
93	422	07	33	15	11	-12	-04	08
94	469	-07	25	15	02	-04	-09	01
95	426	10	19	06	16	07	-15	-12
96	382	06	12	13	16	-16	-40	-03
97	353	-14	03	01	-01	-10	-21	-08
98	402	01	08	25	13	06	-13	42
99	326	03	36	10	17	25	-01	04
100	417	-21	21	-03	12	12	01	-08
101	340	02	22	08	-08	30	-19	-18
102	350	03	19	21	15	08	01	16
103	454	-09	26	27	09	07	04	11
104	441	16	40	04	08	26	27	03
105	457	07	21	-18	12	11	38	23
106	459	02	42	-23	-03	15	12	-01
107	348	06	30	25	-16	06	-02	03
108	203	04	07	-04	-05	13	-20	10
109	377	16	28	13	09	10	-03	-10
110	284	03	-06	-15	-10	21	25	18
111	373	21	33	08	-10	30	20	08
112	284	14	08	23	09	07	-03	-09
113	332	14	46	12	-05	41	18	03
114	451	15	36	05	20	-01	05	07
115	394	-14	25	46	03	28	-16	15
116	423	07	47	12	-23	12	24	18
117	358	18	30	20	22	29	15	-09
118	375	01	02	19	13	10	01	-02
119	475	03	33	-02	11	13	18	05
120	395	09	35	06	-15	30	30	29
121	320	02	37	11	-11	10	-22	32
122	297	-11	27	06	-02	-16	-19	16
123	326	02	25	21	05	25	-02	14
124	396	39	31	-02	15	20	14	-03

TABLE 7 (Contd.)

Item	PI	DI	G	A	B	S	M	O
125	353	02	32	-23	08	16	21	07
126	391	23	28	21	17	25	15	-08
127	413	32	20	-04	16	13	00	10
128	376	09	27	11	10	16	06	-14
129	372	00	38	03	-05	28	31	00
130	348	07	34	00	-12	13	-08	29
131	396	01	33	-18	00	05	24	13
132	425	-02	39	-09	06	00	15	16
133	476	08	27	04	10	03	16	00
134	390	18	34	22	17	-04	-24	10
135	320	06	42	22	-16	28	-03	-03
136	403	19	49	-03	12	26	33	-16
137	368	-03	26	09	08	00	12	13
138	367	06	35	33	-05	14	21	-07
139	428	05	21	10	-07	11	17	-14
140	384	19	35	33	01	20	12	-13
141	390	-05	32	22	01	-03	25	19
142	372	12	26	10	25	-26	-30	08
143	324	14	49	17	-03	33	12	15
144	304	09	30	00	15	18	09	26
145	418	09	22	11	23	23	-02	14
146	299	15	31	29	-09	42	-10	18
147	359	-08	20	15	06	-02	-13	00
148	192	08	36	05	-15	30	07	07
149	230	05	34	-11	-17	09	-05	17
150	419	13	41	07	08	07	-04	05
151	476	-04	21	16	22	-13	-14	04
152	389	07	31	-17	-09	04	20	22
153	421	05	07	-06	21	00	-08	-05
154	420	-01	20	07	21	01	-22	-07
155	430	01	31	-08	15	08	28	02
156	308	-01	08	-05	-02	01	-10	-03
157	424	00	15	-03	22	-07	-10	-02
158	296	-05	17	18	29	15	-15	-09
159	299	04	23	13	33	03	-19	-01
160	275	-12	24	09	31	07	-15	-02
161	284	-06	22	09	22	17	-34	-12
162	328	17	26	-01	09	04	-11	31
163	250	-40	-39	-27	05	-24	02	-06
164	253	-19	-30	-04	-21	-16	01	-15
165	217	05	-15	-22	00	11	-19	-19
166	230	-07	-28	01	05	-06	-11	00
167	284	06	-19	-02	06	11	-12	-26
168	203	-22	-43	-29	02	-04	-11	-09

TABLE 7 (Contd.)

Item	PI	DI	G	A	B	S	M	O
169	178	00	-30	-23	25	-01	04	-17
170	232	-02	-09	-07	-03	-20	-11	-14
171	269	00	-33	-04	09	-17	-16	-13
172	278	-26	-36	-24	-01	-41	-14	02
173	138	-21	-26	-03	-15	00	-13	-04
174	191	-26	-33	-12	03	-18	-06	19
175	218	15	-01	-03	-23	-10	-03	07
176	122	-05	-28	03	-12	-06	-13	14
177	232	09	-18	-49	19	-07	-06	09
178	222	-09	-21	-17	-21	03	18	-16
179	241	05	-34	06	-11	00	04	-20
180	234	-30	-46	-21	09	-27	-13	-02
181	147	-23	-33	02	-35	02	12	22
182	236	-23	-45	-20	07	-35	03	18
183	241	-40	-21	-11	02	-24	-16	-14
184	254	12	-26	-09	-01	-02	-01	-10
185	221	-05	-60	-22	03	-29	-23	-02
186	203	-05	-42	-18	21	-24	-20	-09
187	216	-26	-55	-11	-18	-09	-29	-04
188	191	-30	-51	-33	-14	-24	-27	01
189	252	-31	-55	-26	-09	-33	-16	-10
190	178	00	-42	-07	27	-15	-20	-09
191	200	08	-58	-12	19	-22	-06	-12
192	138	-30	-35	-17	-28	-21	-18	08
193	322	00	-15	08	08	-13	05	06
194	234	-21	-39	12	06	-39	-11	-16
195	281	00	-08	-12	00	-05	-02	-26
196	141	-34	-43	05	-09	-09	-25	-13
197	243	-04	-09	-18	-15	-07	04	12
198	212	-16	-45	01	00	-15	-04	-17
199	234	-08	-20	-28	03	-18	-01	-11
200	260	-14	-64	-05	09	-21	-21	-10
201	369	-11	-12	-01	01	-03	09	-09
202	153	-21	-20	10	-24	-08	-07	00
203	242	01	-28	-20	-03	10	22	-17
204	262	-05	-21	-06	-12	-13	-02	-21
205	175	-24	-17	03	-28	-14	-12	20
206	149	-12	-32	-14	-37	01	12	-09
207	121	-17	-29	02	-33	04	-20	07
208	131	-14	-22	18	01	-04	-28	-03
209	162	-07	-46	-08	01	-17	-02	-11
210	164	00	-35	-17	-27	08	05	11
211	152	00	-30	10	-21	23	-02	00
212	199	07	-25	-02	-17	14	11	-02
213	222	11	-34	05	29	-15	-02	11

TABLE 7 (Contd.)

Item	PI	DI	G	A	B	S	M	O
214	255	22	-22	-16	24	-08	07	-04
215	231	-18	-53	-29	13	-25	-28	-26
216	205	-04	-48	-20	04	01	-31	-21
217	162	00	-22	12	01	-14	-11	-02
218	157	-16	-35	-16	-06	-15	06	-23
219	153	-13	-38	-22	03	-30	-02	00
220	152	-09	-34	-08	02	-24	00	-06
221	125	-25	-29	-04	-41	07	-16	-06
222	115	03	-14	-05	-27	01	-10	14
223	194	-05	-31	-02	08	-04	16	-27
224	221	-08	-61	09	-01	-33	-02	-29
225	217	-04	-43	07	-13	08	-20	-30
226	154	-16	-35	-15	-11	01	-30	-09
227	151	-19	-32	-02	-01	-01	-24	-07
228	141	-15	-07	-02	-06	00	-43	-04
229	229	11	-38	04	16	-27	-17	11
230	278	06	-36	-09	20	-22	09	-35
231	174	00	-42	-02	01	-14	-10	-03
232	192	-05	-44	-14	-02	-25	-09	-17
233	255	-08	-32	-18	00	-09	-07	-04
234	221	-02	-33	-20	-17	20	-12	-13
235	214	-13	-43	-20	09	-22	01	-20
236	321	12	-39	-33	16	-28	05	-21
237	286	-03	-21	03	06	-18	11	-38
238	251	-15	-59	-09	03	-33	-21	-24
239	311	01	-33	-44	10	-20	11	-17
240	253	-16	-57	-32	27	-47	-13	-06
241	196	-19	-45	-13	-11	-45	-18	00
242	259	-19	-31	-17	-30	-13	-03	-02
243	253	-08	-05	-24	-22	-14	-18	-07
244	279	10	03	07	-05	08	14	-39
245	318	-18	-27	-09	-23	-20	03	-04
246	133	-22	-29	18	-22	-04	-47	06
247	310	-10	-27	-32	08	-39	-08	-10
248	256	-17	-51	-34	17	-45	-08	-12
249	151	-24	-38	-06	-18	-04	-18	09
250	113	09	-23	-24	12	02	08	07
251	216	-39	-25	-22	-26	-05	-28	12
252	232	20	03	24	16	07	03	-27
253	329	11	01	06	19	-09	09	-36
254	312	-22	-20	-08	18	03	02	-08
255	157	-20	-37	-12	-06	13	-06	12
256	184	-16	-25	-08	-20	-12	-11	-12
257	144	-22	-34	-17	12	-23	-18	09
258	250	-16	-17	-05	-25	-22	10	25

TABLE 7 (Contd.)

Item	PI	DI	G	A	B	S	M	O
259	134	03	-32	-30	00	07	-10	05
260	181	12	-40	-42	20	-07	00	-18
261	232	-28	-56	-30	02	-37	07	-17
262	221	-09	-50	08	11	-26	-01	-13
263	139	-17	-42	-06	-16	-09	-18	18
264	126	-12	-31	-25	-18	01	12	-03
265	152	-10	-31	-16	-16	00	02	01
266	128	-09	-34	-10	05	01	01	09
267	172	00	-21	01	-20	00	-04	15
268	157	03	-20	-04	-08	05	05	15
269	274	-14	-41	-24	11	-09	-18	-14
270	310	-03	-49	-12	09	-19	00	-30
271	184	35	-19	-03	12	01	02	-02
272	226	26	-25	07	07	16	10	-26
273	330	-09	-37	14	03	-44	-09	-25
274	189	-25	-47	-21	-09	-14	03	-04
275	173	07	-38	-20	-08	-11	-24	-03
276	291	-03	-32	-25	15	-33	-12	-25
277	261	04	-54	12	12	-35	-06	-27
278	146	-20	-43	08	01	-16	-26	04
279	204	01	-46	05	-18	-19	-20	-05
280	132	-08	-19	-12	-29	14	-04	14
281	235	-01	-31	-13	02	08	12	-33
282	165	-05	-27	-14	-07	18	20	06
283	243	-19	-57	-33	06	-46	-04	-21
284	221	-22	-44	-37	18	-15	-27	-09
285	264	00	-43	-01	13	-18	04	-06
286	267	-16	-61	-24	14	-42	-07	-20
287	286	04	-08	04	-02	-33	-05	-11
288	407	04	-09	-04	-03	-26	15	-34
289	255	-02	-08	-02	-13	-02	03	-11
290	278	07	-35	-17	09	-12	-13	-15
291	266	-28	-45	-20	00	-17	-22	-09
292	222	-13	-30	-14	-14	-13	02	-03
293	201	-09	-32	-12	-12	-08	-22	-06
294	230	-26	-42	-24	-22	-27	-10	-31
295	173	12	-07	02	-03	05	-11	-02
296	181	-15	-34	-10	-20	-13	09	01
297	223	07	-25	-05	-10	-06	09	00
298	194	-25	-30	-13	-27	-15	01	-06
299	303	-24	-19	-18	02	-20	12	-27
300	259	-02	-44	-14	17	-25	05	-21

TABLE 7 (Contd.)

Item	PI	DI	G	A	B	S	M	O
301	266	09	-50	-21	31	-34	09	-20
302	237	-10	-15	-18	-17	-31	04	-04
303	235	-20	-53	-04	20	-30	-11	-09
304	247	-04	-41	18	-05	07	-24	-32
305	265	-15	-13	01	-19	-10	02	-20
306	225	-13	-40	05	09	-24	-18	08
307	241	-05	-25	28	06	-08	-06	-28
308	278	-07	-37	13	05	01	-12	-41
309	190	-03	-07	26	-11	00	02	-20
310	246	05	-34	02	25	-17	27	-45
311	190	-08	-44	-30	13	-27	02	-01
312	178	-13	-57	-10	15	-17	-12	-07
313	282	-03	-21	-33	05	-30	-01	-06
314	228	-14	-56	-37	21	-39	-15	-12
315	259	-18	-39	-08	06	-24	-18	-22
316	255	-15	-48	-06	08	-32	-26	00
317	247	-18	-22	-29	01	-02	04	-02
318	299	-19	-22	-15	-34	-12	15	-12
319	236	12	-29	-23	01	05	06	-15
320	288	03	05	-04	01	-01	-02	13
321	242	-13	-37	-32	12	-31	-20	01
322	270	12	-34	-28	21	-15	-20	-11
323	283	-10	-37	-45	09	-07	-17	-28
324	357	07	-31	-22	21	-11	-26	-30

* All decimals have been omitted.

Code: PI = Preference Index
 DI = Discrimination Index
 G = General Factor
 A = Adjustment Factor
 B = Background Factor
 S = Study Skills Factor
 M = Motivation Factor
 O = Orientation Factor

APPENDIX III
THE FORCED-CHOICE INSTRUMENT

Student Characteristics
by
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PART I CHARACTERISTIC PREFERENCES

In each set of items below you are to select 2 of the five items listed and mark them with a cross (X) in the space in front of the item.

Section A MOST CHARACTERISTIC In each set put a cross (X) in front of the two items which are most characteristic of you as a student.

- Set 1 ☐ am bothered when I don't do as well as I can
☐ definitely have the will to do better in my studies
☐ have some really true friends
☐ have the will power to attend classes
☐ like to succeed
- Set 2 ☐ realize study must come before many other things
☐ have parents who motivate me to do my best
☐ know what I want to do when I finish my education
☐ outline and keep notes which makes it easier for me to review
☐ go over mistakes on returned tests
- Set 3 ☐ feel a sense of competition and a drive to keep up
☐ listen intently in class
☐ look for mistakes carefully in work to be handed in
☐ realize what school is costing my parents and this keeps me hard at work
☐ taking subjects which cover the things I'm interested in
- Set 4 ☐ have family whose understanding of what I'm trying to do is a big help
☐ have high interest in subjects which enables me to learn more easily
☐ know how to use the library
☐ make a logical organization of my thoughts before I write a paper
☐ want to be accepted into a special field and this motivates me to make better grades

- Set 5 ___ discuss materials with my friends before a test
___ have friends who respect my privacy when I need
___ to study
___ have no immediate crucial worries
___ ignore radio and TV when I study
___ put all attention on subjects and teacher when I
___ go to class
- Set 6 ___ am very determined because of the responsibility
___ I feel upon myself
___ do my best even if I don't like a course
___ finish work even if it is boring
___ get along well with other people
___ have parents who put my work before things they
___ want done
- Set 7 ___ am acquainted with different types of tests and
___ know how to go about answering them
___ have a sound knowledge of English grammar
___ have learned to use my time effectively
___ have people offering help and advice in almost
___ any way I turn
___ learned to be a good speller back in elementary
___ school
- Set 8 ___ have comfortable but not too comfortable place to
___ study
___ have confidence in myself
___ plan how much work I have to finish before I start
___ use a system of underlining
___ can take most any kind of test

Section B LEAST CHARACTERISTIC Below are sets of causes to which some people have attributed their failure in school. Place a cross mark (X) before 2 items in each set which are least characteristic of you.

- Set 1 ☐ can't work hard for a grade even if I like the course
☐ don't finish assignments if they're too long
☐ don't have a good relationship with people in my family
☐ don't make good grades because the school puts too much emphasis on activities
☐ have lost interest in my choice of vocation
- Set 2 ☐ do not feel badly about receiving a poor grade
☐ find favorite television programs cutting into my study time
☐ have folks who disregard my school duties when they want something done
☐ have very little curiosity about any new subject
☐ lack money so must work when I should be studying
- Set 3 ☐ always get stuck with least interesting teachers and courses
☐ can't concentrate on what I'm doing for worrying about all I have to do
☐ feel that courses are not practical enough
☐ have a fear of flunking out
☐ lack self confidence
- Set 4 ☐ become restless after a short period of study
☐ cannot force myself to do well on courses I don't like
☐ don't know how to find the important points when reading
☐ socialize too much
☐ worry about other lessons while studying on one subject
- Set 5 ☐ actually don't know how to study
☐ can't settle down to work immediately
☐ find my mind wandering when I sit down to study
☐ resent required courses out of major field which I will never use again
☐ usually go along with what others are doing

- Set 6 ___ am biased against some subjects
 ___ am easily distracted when I try to concentrate
 ___ find it hard to turn down a date
 ___ make careless mistakes on work
 ___ take a very long time to read my assignments
- Set 7 ___ always got good grades, but it was due to simple
 subject matter
 ___ budget my time poorly
 ___ do not have anyone to study with
 ___ never had any speech training
 ___ realize my real problem is laziness
- Set 8 ___ find it very difficult to catch up once I get
 behind
 ___ have a lot on my mind
 ___ have to force myself to study some courses
 ___ hear everything that goes on, noises distract me
 ___ never learned to say no to anyone who needs my
 help

PART II DIAGNOSTIC RANKING

Section A STRENGTHS In each set in this section you will find five possible strengths. You are to rank them from 1 (high) to 5 (low) as to how much they apply to you. Pick the one which is most like you and mark it "1", and so on down to the one least like you which you will mark "5". Use all five numbers.

- Set 1 ___ always finish studying before I do other things
 ___ find every subject interesting
 ___ have friends who'd rather discuss school subjects
 than regular chit chat
 ___ just jot down important words, not sentences when
 I read
 ___ went to school where we were made to work hard
- Set 2 ___ find all my courses interesting, so don't mind
 studying assignments
 ___ have ability to say no to something that would
 interfere with my studying
 ___ have someone who'll help me if I don't understand
 something
 ___ took a lot of science in my previous work
 ___ was required to use the library a lot in my
 earlier schooling

- Set 3 ☐ am interested in all my courses
☐ finish assignments even if they're too long
☐ have time for rest and relaxation by budgeting my time for studying
☐ live with people who are quiet when I want to study
☐ went to school where practically everybody worked to get good grades
- Set 4 ☐ am always striving to better my grades
☐ grew up in a family which always used large vocabularies
☐ have friends who put good grades before most other things
☐ keep my attention on what I'm doing
☐ take any problems which arise in stride
- Set 5 ☐ almost never cut classes because of my high interest
☐ am not afraid to speak up and answer questions in class
☐ take good notes in class
☐ think of my parents who are paying for my education and if I am messing around then I want to do as good as I can
☐ would rather be a good student than a good socializer
- Set 6 ☐ am able to study any time of the day
☐ am from a family which was always English conscious
☐ am very interested in learning
☐ can adjust quickly to new situations
☐ put studying before social life
- Set 7 ☐ don't cut classes unless I'm sick
☐ feel I have an adequate social life
☐ get a lot of moral support from my parents
☐ have people where I live who are interested in my doing well
☐ realize I must make a high point hour to get into field which I wish to enter
- Set 8 ☐ ask a friend to explain something to me if I don't understand it
☐ feel that as a person I'm alert and happy
☐ get along well with students and instructors
☐ have a family which encourages me
☐ want to learn as much as possible about many things

Section B WEAKNESSES In the following items you will find five possible weaknesses. Again you are to rank these from 1 (high) to 5 (low) as regards the degree they apply or could conceivably apply to you. Remember to use all five numbers from 1 (most like you) through 5 (least like you), just as you did in Section A above.

- Set 1 ☐ don't care whether I graduate or not
☐ don't mind if I do a poor job if I know a friend who has done poorly in a class
☐ don't take notes because it takes too long
☐ have no really close friends
☐ know family opinion is against my going to school
- Set 2 ☐ am on the shy side
☐ don't care if parents like what I'm doing
☐ feel too homesick to study sometimes
☐ find it boring to review
☐ spend a lot of time talking with the opposite sex so I'll have enough dates
- Set 3 ☐ am burdened by my personal problems
☐ brought up in a home where the English spoken was very poor
☐ drawn away from study by a great deal of social pressure
☐ find that concentration is completely lacking
☐ hadn't wanted to come to school in the first place
- Set 4 ☐ day dream with the book propped up in front of me
☐ didn't particularly want to come to school but didn't know what else to do
☐ have too many other obligations not connected with education
☐ have very critical parents
☐ never learned to read properly
- Set 5 ☐ can't study unless I'm under pressure
☐ dislike courses where you have to memorize things
☐ know many people who don't put a high premium on studying
☐ missed some courses I needed for those I'm taking now
☐ never bother with tests after I get them back
- Set 6 ☐ avoided numbers and mathematics in past education
☐ feel that I am licked before I start
☐ have given up trying to figure what my teachers will ask when it comes to exams
☐ have outside interests which win out over my studying

___ went to a school in past where you weren't liked
as well if you studied too much

Set 7 ___ can't finish my work if it's boring
___ forced to take some subjects which give me a pain
___ found past schooling did not prepare me for my
work here
___ have spells of depression and worry
___ slack off for a while once I make a good grade

Set 8 ___ just don't have my heart set on good grades
___ realize my background in English is not very good
___ spend too much time with activities other than
studying
___ was not required to do enough reading in past
schools
___ would do better if I could relax more

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