THREE ATTITUDE SCALES IN RELATION TO THE ACADEMIC ACHIEVEMENTS OF MALE COLLEGE FRESHMEN OF MODERATE ACADEMIC POTENTIAL

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Walter Russell Stevens Jr.

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This is to certify that the

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By

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ABSTRACT

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Three five-item attitude scales were empirically derived from the responses made to 135 rating-scales by 63 unmarried, white, male college freshmen, students who had displayed moderate academic aptitude on the Michigan State University Freshman Orientation Test Battery (the MSU English Placement Test, the MSU Arithmetic Proficiency Test, the "Quantitative" and "Linguistic" scores of the ACE Psychological Examination--1940 edition, and the "Vocabulary" and "Comprehension" sections of the MSU Reading Test). All the rating-scales had been selected by the writer and three other counseling psychologists as logically representative of universally-experienced aspects of college life. Each of the scales met criteria for unidimensionality, and scalability was largely confirmed in cross-validation.

The attitude scales were labelled as representing: (a) Institutional Identification, the extent to which a student considers the academic enterprise to be compatible with his own needs and aspirations; (b) Self-Confidence, the degree to which the student feels comfortable--even stimulated--in his performance of the student role, particularly of its more public aspects; and (c) Achievement Valuation, the extent to which working for recognition and enjoying positions of prestige are considered worthwhile by the student.

Comparisons were made between students' scores (scale types) on the attitude scales and their cumulative grade point averages (CGPA) for three terms of the freshman year (with a minimum of 42 course credits carried and a minimum of 39 credits earned). No statistically significant relations (coefficient of contingency) were found between the attitudes

and achievement, either when the attitude scores were combined in various three-scale or two-scale profiles or when they were individually compared with the achievement criterion. The small size of the sample and the unreliability of the achievement criterion probably contributed to the essentially negative results.

The strongest relationship was that between low (scale types 0 and 1), moderate (scale types 2 and 3), and high (scale types 4 and 5) Self-Confidence Scale (SCS) levels and low (below 2.15), moderate (2.15-2.54), and high (above 2.54) CGPA levels. The obtained .325 contingency coefficient was significant at the .12 level of confidence. High achievement was associated with moderate self-confidence; moderate achievement, with low self-confidence; and low achievement, with high self-confidence. Knowledge of SCS levels increased efficiency of forecasting CGPA levels by 30.4 per cent beyond that obtained without such knowledge. Although the statistic may not have been fully justified, a curvilinear regression of CGPA on SCS scale types was computed and reported (eta=.473, significantly greater than zero at the .01 level).

When the distribution of three-scale attitude patterns was superimposed on the low, moderate, high three-by-three contingency table comparing SCS level and achievement level, a number of interesting trends appeared. The trends were not worth testing statistically because of small sample size, but may be worth pursuing with further research. The observed pattern trends failed to support the widely-held contention that optimally-achieving students (high-achievers) are inclined toward exaggerated identifications with authority-figures. Most students with attitude patterns commensurate with such identification were low-achievers. Conversely, among the high-achieving students the majority exhibited patterns essentially contradictory to such identification. The only students with patterns in keeping with the "identification" thesis who were

found achieving above the lowest level were those with SCS scale types 0 or 1. It was suggested that this last group of students is perhaps more typical of counseling center and psychological clinic clientele than of students in general, thus possibly accounting for the inclination of many clinically-trained personnel to predict high achievement for most students with strong tendencies toward identification with authority-figures.

An attempt was made to explain the trends in terms of the concepts of "feelings of personal inadequacy," "defensiveness" v. "tolerance," and "premature identification" v. "independence and flexibility." Optimal achievement for the students of the sample was viewed as symptomatic of an essentially realistic awareness of and tolerance for self and surroundings, with no particular concern for the conventional signs and symbols of prestige per se. Failure to achieve was seen as a concomitant of: (a) premature narrowing of interests (relative to the demands of first year liberal arts curricular requirements); (b) a straining after relatively superficial appearances of academic success as compensation for felt but poorly tolerated personal inadequacies; and/or (c) genuine satisfaction with the personal status quo such that no need to strive is felt. Further research was recommended to test the very tentatively-held and essentially ad hoc inferences of the present study.

Approved 

Signature of Major Professor

Date 6/10/58

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To Harold Dahnke of the Michigan State University Board of Examiners special thanks are due for his invaluable help in screening the 1955 male freshman population for the homogeneous sample of the study; and I am sure the final instrument received a sound beginning through the generous contributions of time and professional judgment so freely given by my former colleagues at the MSU Counseling Center: Gwen Norrell, Harry Grater, and Paul King. Cross-validation of the attitude scales was made possible by the contributions of class time by Roberta Koons and John Nagle at MSU and by Lark Daniel, Joseph Sidowski, Wolcott Treat, and Merle Turner at San Diego State College. Without the kind assistance of all these friends and colleagues, the research could not have been done.

Finally, I am deeply indebted to the many students whose willing participation in the study was the most direct basis for anything the ensuing pages may contribute to the understanding of relations between attitudes and academic achievement.

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Chapter I

REVIEW OF THE LITERATURE AND STATEMENT OF THE PROBLEM

General Assessment of Past Research: A Confused Literature

A problem which has commanded increasing attention and research efforts of educators and psychologists over the past three or four decades is that of identifying so-called "non-intellective" factors which are purported to relate to academic achievement. The search has come in response to the persistent failure of intelligence or achievement tests to account for more than one-quarter to one-third of the variance observed in college students' academic performances.

Published attempts to find non-intellective correlates of academic achievement are legion, many of them superficially repetitious of earlier works, some of them compellingly suggestive in their implications, and a distressing mass of them weakly conceived, awkwardly developed, and abortively brought forth to add little more than their number to the scene. In 1931 (31) and again in 1940 (32), Harris made exhaustive surveys of all the available literature pertaining to the quest for non-intellective correlates of academic achievement, and in 1950 Lord (42) performed a similar service.

At least in part the widespread confusion in this research area is traceable to ignorance or lack of methodological rigor. In his later review Harris (32) bemoaned the continuing widespread failure of researchers to profit from the errors of the early studies. The most

serious shortcomings have been failures to control for intelligence or academic aptitude, failures to select sufficiently homogeneous samples, and failures to report findings in terms of appropriate statistics. Unfortunately, Harris' objections are applicable to most of the research published since 1940.

It is virtually impossible to draw from the mass of studies unequivocal conclusions concerning relations between non-intellective aspects of personality and academic achievement. The bulk of the relevant literature represents a hodgepodge of hunches, hypotheses, and plain and fancy curiosities, pursued or attacked with all manner of tools and techniques, variously applied to a great range of populations, analyzed and interpreted in a facinating--not infrequently bizarre--variety of ways, and only too often generalized to apply to all students everywhere.

A majority of published studies have used small samples, most numbering less than one hundred subjects, and many with fewer than twenty-five. An appallingly small minority of researchers appear to have been even faintly cognizant of the necessity for cross-validating empirical findings, and this reviewer has discovered only one study, by Cronbach (14), which represents a careful attempt to repeat an earlier study, the well-known Monroe Rorschach study (48). In this instance the statistically significant results of the earlier study were not substantiated. As Cronbach himself pointed out (14), many studies using so complex an instrument as the Rorschach yield "significant" results by virtue (or vice!) of inappropriate statistical reasoning (cf. 49 and 69). Like Cronbach's study (14), that of McCandless (43, 44) was carefully conceived and executed and disclosed no Rorschach indices capable of differentiating between high- and low-achievers among Maritime Service officer candidates, all of whom were of very superior academic potential.

Vague Objectives

Often researchers appear to have had only the most general of objectives: finding some basis for differentiating between high- and low-achievers. A common approach has been the firing of a "shotgun blast" at a readily available student sample, apparently in the hope that some vulnerable spot might be hit. Representative of such studies is that of Burgess (10), in which 40 engineering students were bombarded with the Rorschach test, the Thematic Apperception Test (TAT), the Minnesota Multiphasic Personality Inventory (MMPI), the Rosenzweig Picture-Frustration (P-F) Study, the Strong Vocational Interest Blank, the Bernreuter Personality Inventory, and the Borow College Inventory of Academic Adjustment. Half of Burgess' subjects were "under-achievers" and half were "over-achievers," the categories being defined with reference to discrepancies between actual academic performances and levels of achievement predicted from several intellective indexes. Many kinds of "scores" were obtained for each subject: frequencies, sums of various weighted frequencies, ordinal rankings, ratios of various kinds, etc.; and then means were computed for each type of "score" for each of the two samples. One hundred fifty-one *t* tests (for testing the significance of the differences between the means) were made, and 11 of them were found to be "significant," five at the .05 level, and six at the .01 level. Sad to say, the most "significant" results appeared where the statistic used was least appropriate.

Empiricism and Evaluative Biases

Very few researchers, with the notable exceptions of Ryan (59) and Klugh (39), seemed even faintly aware of the theoretical limitations they assumed when they employed devices which were themselves empirically

standardized on other populations. For example, one would be hard put to provide a logically sound defense of Morgan's contention that low-achievers are perhaps "insensitive, callous, self-centered, and irresponsible" (50, p. 295) because they score significantly higher than do high-achievers on the Pd scale of the MMPI. Such an assertion betrays the false logic of "guilt by association": low-achieving students and "psychopathic deviates" (the Pd of Pd scale) tend to respond similarly to some of the same items on the MMPI; "psychopathic deviates" tend to be "insensitive, callous, self-centered, and irresponsible;" therefore, low-achieving students must also tend to be "insensitive, callous, self-centered, and irresponsible." (Besides, Morgan himself adds, "The greater percentage of nonachievers with profile elevations on Pd is partly a reflection of an absence of higher scores on the neurotic scales which were more often obtained by the achievers." (50, p. 295) In other words, Morgan's definition of "high" on any of the MMPI scales was a relative one within each individual's profile rather than an absolute one relative to the normative standard score scale of the test itself.)

Similarly, the meanings of results obtained with another empirically derived test, the Strong Vocational Interest Blank, must remain highly speculative. Both Morgan (50) and Ryan (59) found that high-achievers earned higher scores on the Group V--Social Service--occupations than did low-achievers, and although Morgan made no attempt to explain the finding, Ryan suggested that its significance might be that it reflects a tendency toward conformity or identification with authority figures! How such a conclusion was reached is not clear, but it is perhaps worth noting that the general evaluative tone accompanying Ryan's discussion is not particularly favorable to the achievers.

The evaluative bias against "over-achievers" is carried forward in another study (58), this one by Rust and Ryan. The instrument employed

was the Harrower-Erickson group method Rorschach, scored according to Klopfer's method, and their subjects were Yale College juniors and seniors, excluding engineers. The findings are summarized in the following quotation:

> An admittedly highly speculative portrait of the over-achiever begins to emerge. He is overconventional or a conformist (high P); he is practical-minded, tending to "see what's there" and exhibiting "stereotypy in thinking" (high A per cent); he shows little "introversion or self-preoccupation" (low R) and is probably emotionally immature (FM greater than M). (58, pp. 254-255)

Another pair of investigators (52) used the same Rorschach method with a somewhat different sample of college students. Their "non-achievers" were students on academic probation at the University of Georgia, while their "achievers" were psychology students who had never been on academic probation. Osborne and Sanders noted that the two groups were not even equated for "intelligence or previous educational experience" and that the achiever group was "somewhat" older than the non-achievers. (52, p. 685) A fairly long quotation of the findings of this study follows, for the variations between it and the previous quotation dramatically illustrate the sort of chaos which characterizes much of the literature, especially where the results of well-known tests (psychometric or projective) are interpreted in a doctrinaire manner or according to preconceived evaluative biases as to whether or not it is "good" to achieve above expectation.

> Non-Achievers. -- (a) Probation students as a group tend to show significantly more signs of dysphoria and anxiety; (b) oppositional tendencies were more frequent in the probation group; (c) color shock manifested by deviation in form and content was present; this is sometimes interpreted to indicate inefficient use of mental capacities or the presence of emotional disturbances without intellectual control; (d) there was a lack of attention to details, and (e) vague, formless, whole answers were more frequent in this group.

> Achievers. -- (a) Non-probation students as a group tended to demonstrate greater control on the intellectual level (F+); (b) non-probation students show considerably more human movement responses, implying an easier identification with people, as well as a more stable inner life; (c) achievers appear more mature and adjusted in the emotional areas (this is revealed by their more frequent use of FC responses and lower frequency of anxiety and failure responses), and (d) good combinatory wholes were more numerous for the achievers. This is frequently interpreted to indicate the presence of abstract and theoretical intelligence. (52, p. 690)

The above paragraphs convey a generally attractive picture of the "achievers," quite unlike the "admittedly highly speculative portrait" of such students painted by Rust and Ryan (58). Is it at least possible that the generalized anxiety and relative absence of intellectual control (if, indeed, such were the meanings of the test "signs") characteristic of Osborne and Sanders' probation group is a function of a generally lower level of intelligence and/or relative lack of experience in college, or perhaps even a function of their very probationary status and the test situation itself, in which they very probably knew they were being evaluated (and by means of a technique which, in recent years, has come to be identified with tests of "insanity")? Certainly a "somewhat" older group of students--psychology students at that!--could be expected to "demonstrate greater control on the intellectual level" and to "appear more mature and adjusted in the emotional areas," especially when they themselves realize they are functioning within the institution's (and probably their own) definition of the "good student."

The specific interpretative discrepancies between these two studies are of particular interest for the way in which they point up researchers' confusion over the variables they think they are measuring. The "over-achievers" of the Rust and Ryan study (58) were found to perceive relatively little human movement (M) in the ink blots, the significance of which the authors held to be that the over-achiever "shows little 'intro-

version or self-preoccupation.'" Osborne and Sanders (52) discovered that their "achievers" were more inclined toward human movement percepts than were "non-achievers." The interpretation given was not that the "achievers" show tendencies toward "introversion or self-preoccupation," but rather that the tendency to perceive human movement in the ink blots implies "an easier identification with people, as well as a more stable inner life."

Where Rust and Ryan (58) concluded that the over-achiever "is probably emotionally immature," their inference was based on the preponderance of animal movement percepts (FM) over human movement percepts. Osborne and Sanders (52) asserted that "achievers appear more mature and adjusted in the emotional areas," but their inference rested on other classes of evidence: (a) the relatively high frequency of percepts in which form of the blots took precedence over their color in determining their content (FC), and (b) on the "lower frequency of anxiety and failure responses." Is it to be assumed that a single factor, "emotional maturity," is common to all three response categories?

Also, where Rust and Ryan (58) interpret the over-achievers' relatively high incidence of percepts with animal content ("high A per cent") as indicative of "practical-mindedness" and "stereotypy in thinking," Osborne and Sanders (52) found that their "achievers" tended to construct relatively imaginative, well-conceived percepts out of the entire blot areas ("good combinatory wholes") and noted that, "This is frequently interpreted to indicate the presence of abstract and theoretical intelligence." Such statements leave little question that different kinds or levels of "intelligence" or "its" use are being described. Unfortunately, neither study reports data relevant to the inferences of the other, and the skeptical reader is left with the distinct impression that the authors have--probably through inadvertence--selected data which can be

interpreted as confirming their initial evaluative hypotheses.

Unfortunately, the sort of biases suggested by the comparisons in the last several paragraphs are the rule rather than the exception in research directed at non-intellective factors in academic achievement. Studies of the researchers might be more enlightening than research into student behavior! It appears that some investigators begin with evaluative assumptions favoring high achievement, while others believe at the outset that "over-achievement" is at best a neurotic compensation for unresolved conflicts.

To a disturbing degree preconceptions such as those just mentioned appear to have determined research samples, the portions of the data which researchers have chosen to emphasize, and finally the interpretations themselves. What is disturbing is not so much the fact that evaluative biases have played a part in stimulating research or in determining interpretations, but rather that the researchers themselves have been generally unaware of their biases. Where evaluative biases have not received adequate attention at the outset, they have usually filtered in at the conclusion of a study to capitalize on ambiguities resulting from weaknesses of design and sampling.

Any reasonably complete review of the literature pertaining to non-intellective factors in academic achievement clearly discloses a need for objective means for surveying clearly specified non-intellective factors across a full range of achievement for any really homogeneous student sample.

Self-Report Techniques: The Most Widely Used Approaches

Representative Findings

Because so many studies have used more or less well-known personality questionnaires or inventories, and because such devices permit easy

administration and objective scoring, further discussion of some representative results seems particularly indicated. As might be expected, the findings are confusing, being dependent upon the type of sample studied, the instrument used, and the type of analysis of results which was made.

One of the relatively early efforts to relate questionnaire responses to academic achievement was Stagner's work with the Bernreuter Personality Inventory (65). His analysis was entirely correlational, employing the Pearson product-moment correlation, with each correlation coefficient based on only about twelve cases! First he found correlations between American Council on Education Psychological Examination (ACE) scores and grades for two student groups selected on the basis of Bernreuter scores. Student samples low on the "Self-sufficiency" and "Dominance" scales yielded low correlation coefficients (.37 and .44, respectively); and the groups high on these scales yielded moderate correlations (.59 and .71, respectively). A reverse trend obtained for students selected with reference to "Neurosis" scale scores. A product-moment correlation of .60 was found between ACE scores and grades for students with low "Neurosis" scores, while a correlation of .45 was found for students with high "Neurosis" scores.

As for relationships between Bernreuter scales and achievement (grade point average), Stagner found correlations ranging from -.127 (for women on the "Neurosis" scale) to .137 (for women on the "Self-sufficiency" scale). For men, correlations varied between -.063 (on the "Dominance" scale) to .070 (on the "Self-sufficiency" scale). Finally, Stagner found the highest achievers of his total sample were "characterized by a low emotionality score and a low self-sufficiency score." (65, p. 654)

Dowd (16) found that neither the Bernreuter, the Bell Adjustment

Inventory, nor the MMPI discriminated between his high potential achievers and non-achievers. Burgess (10) found no significant differences (t tests) between the mean scores of high- and low-achievers on the Bernreuter, MMPI, or Rosenzweig P-F Study. Neither Brooks and Weynand (7) nor Phillips and Osborne (55) found significant relations between academic achievement and Kuder Preference Record scores. Neither Schofield (60) nor Hoyt and Norman (36) found significant differences in achievement levels associated with MMPI profiles, and Clark (11) concluded that, "For practical purposes, there are no profile differences [on the MMPI] to identify achievers as opposed to non-achievers." (p. 280) Morgan too (50) stated that when the MMPI clinical scales are taken "individually or as a profile pattern [there is no] clear relationship to scholastic achievement." (p. 297)

As Stagner (65) pointed out a quarter of a century ago, there is no a priori reason to anticipate a rectilinear relationship between some non-intellective personality variables and achievement.

> . . . personality influences achievement in an indirect way, by affecting the degree to which use is made of the individual's potentialities. This fact explains the uniformly low linear correlations found. At some points along the distribution personality is an advantage in academic work while different amounts of the same personality variable may be disadvantageous, or may be operative in one direction in one case, the opposite in a similar situation. (65, p. 655)

Although the findings just cited are reasonably conclusive in dispelling any hope for finding significant relationships between achievement and patterns of responses to personality questionnaires, Morgan (50) empirically derived three new scales for the MMPI which yielded statistically significant differences (at the .01 level) between high- and low-achievers. On all three scales (Do or Dominance, Re or Social Responsibility, and Ig or Intellectual Efficiency) the high-achievers earned the higher scores. Based on his findings with these special scales,

Morgan concluded that,

> . . . along with dominance or ascendancy in social situations, [the achievers show] such characteristics as optimism and persuasiveness. . . . [Their results] reflect dependability, integrity, and seriousness . . . [and, concerning intellectual functioning, imply] efficiency, energy, self-confidence, and insightful, realistic attitudes. (50, p. 297)

A Problem Peculiar to the Method: Stereotyped Responses

The suggestion made above (p. 6) with reference to students' responses to the group Rorschach is perhaps even more relevant where interpretations are based on responses to a self-report technique. That is, it is not particularly surprising that so attractive a picture of the high-achieving students of high ability emerges from their self-evaluations, and it is perhaps not entirely coincidental that the personal qualities implied by their responses are essentially congruent with some of the prevailing stereotypes of the "good student" held by students and faculty alike. That there are such stereotypes is given tentative support in a study by Myers (51) of Educational Testing Service (ETS).

Myers administered a 148-item attitude-interest questionnaire to first-term freshmen at an eastern women's college. All the subjects had taken achievement tests upon entering college and the relationship between such test results and first-term grades had been determined previously. From the total student sample, the 37 women whose obtained grades were farthest above the regression line of predicted grades were selected to represent "overachievers," and the 37 women whose obtained grades were farthest below the same regression line composed the "underachiever" sample.

Chi squares were computed for the item responses of matched pairs of subjects from the over- and underachiever samples, and 45 of the 148 items yielded chi squares significant at or beyond the .50 level of con-

fidence (three of them at the .05 level, one at the .02 level, and two at the .01 level).

The 45 "significant" items were presented to ETS staff members, and for 34 of them these "expert judges" reliably identified the direction in which "overachievers" had responded, relative to the direction taken by the "underachievers." Such is the evidence for a stereotype of the "good student" held by non-student "experts."

The same questionnaire was administered to students applying for admission to the college, and their responses to 30 of the 45 "significant" items were found to differ from those of the students who had already been accepted "in the same manner as responses of overachievers differed from those of underachievers." (51, p. 233; italics the author's) Myers assumed that the applicants for admission were probably inclined to respond in line with their stereotypes of the "good student" in order to be favorably received by admissions officials, whereas the students already enrolled and functioning in the college community were assumed to be somewhat more inclined to respond in keeping with their true attitudes and feelings, having no particular need to create an especially favorable impression.

Of the 45 "significant" items, 38 composed the "stereotypes" of either the "expert" or applicant samples, as differentially defined above, but the remaining seven items were "correctly predicted" by neither group.

Once again the study in question offers only very tentative conclusions. As usual, some aspects of the design are open to question, the samples were small and heterogeneous with respect to intelligence, the statistical levels of confidence are weak, a number of procedures were sketchily reported, and adequate cross-validation is lacking. At any rate, there appears to be some basis for suspecting that some respondents

to relatively transparent self-report techniques are inclined to relate themselves to some normative standard rather than disclosing the qualitative interrelations of their idiosyncratic characteristics.

The likelihood that "good student" stereotypes exist raises further doubt concerning the efficacy of self-report techniques whose psychological validities are vitiated by subjects' evaluative biases and defensiveness.

Criterion Problems: The Cumulative Grade Point Average

Variability of Student Performances

Studies attempting to predict academic achievement are faced with the problem of unsatisfactory criteria of achievement. Achievement criterion measures (usually cumulative grade point averages[1] covering rankings of performances in a variety of courses over one or more terms in the academic year) are themselves subject to numerous questions. Krathwohl (40) has clearly shown that college students' performances, relative to their potential (represented by various aptitude test scores), fluctuate widely over subject areas, with no significant relations demonstrable between performances in the several areas.

Bendig and Sprague (5) have investigated not only the relations between performance on a "temperament" questionnaire and academic achievement level (average grade) in an introductory psychology course, but also the relations between temperament and achievement fluctuation (each student's variability over the several tests given during the full term of the course). These authors predicted and discovered a significant curvilinear relationship between achievement level and achievement fluctuation, with the greatest average fluctuation being characteristic of students

[1]Hereafter referred to as CGPA

in the moderate achievement category. They further hypothesized that "a predictor may be rectilinearly related to both level and fluctuations, but because of the curvilinear confounding of level and fluctuation may show a zero correlation with level." (5, p. 409) The study did not report an attempt at the multiple prediction implied in the latter hypothesis, but did survey the findings of efforts to relate the temperament scales to each of the achievement variables, level and fluctuation.

All of the correlations, both Pearson product-moment and eta, were low, with only the following being significantly greater than zero: achievement level was found to be rectilinearly related to the "Restraint" and "Objectivity" scales (of the Guilford-Zimmerman Temperament Survey), with rs of .20 and .21, respectively; achievement level was curvilinearly related to "Friendliness" and "Masculinity," with etas of .27 and .25, respectively; and etas of .35, .27, and .24 were found between achievement fluctuation and "Ascendance," "Social Interest," and "Emotional Stability," respectively.

Obviously, then, CGPA represents a somewhat unknown entity in that students do not perform at a consistent level even in a single course, to say nothing of their functioning in a particular curriculum or across the entire experience known as a college education. The finding of Bendig and Sprague (5) suggests that the CGPA is a purer criterion of achievement level at the extremes of the achievement distribution than in the middle ranges. It appears not unlikely that the academic performances of students whose over-all achievement level is moderate may be especially susceptible to the influences of non-intellective variables, such as moods, attitudes, etc.

Variability in Grading Practices

A number of other serious problems enter the matter of retaining

CGPA as the criterion of academic achievement. Grades provide only very crude estimates of the relative worth of a student's performances, even in specific activities (e. g., classroom discussion, test-taking, outside research papers, laboratory activities, etc.). Such specific activities in a given academic situation represent quite different circumstances to different students. For example, a junior psychology major with only one or two psychology courses to his credit could, with a given amount of effort, be expected to perform less adequately in an upper division psychology course than would another psychology major of comparable intelligence, whose course background is more extensive and who exerts the same amount of effort. When exactly the same evaluative standard is applied to both students, its effect is to favor the latter student; but when an instructor attempts to take account of such personal qualifications for course participation, applying some sort of sliding scale to his evaluations, the same grades appearing on the different students' transcripts have quite different meanings when referred to some such variable as "proficiency in course content."

It is a rare instance when really uniform standards for evaluation of course performance are applied. Instructor "A" may base his evaluations on a rigid application of some fixed criterion of adequate performance, a predetermined "per cent correct" on tests, or a particular level of class attendance, or an adding of the number of times a student appropriately expresses himself in class, etc. Instructor "B" may grade "on the curve," applying normal curve statistics to a class of any size, at any level, and with preconceived expectations of the proportion of students to be assigned each of four or five evaluative labels. Instructor "C" may also grade "on the curve," subjectively establishing cutting-points between letter grades on the curve of total points earned by students in various activities throughout the course. Separate tests and

other activities are weighted in almost every conceivable manner by different instructors and even by a given instructor at different times in his teaching career or even for different courses he may be teaching concurrently.

Scale Characteristics of Letter Grades

Finally, the scale characteristics of the grades themselves impose serious restrictions on their usefulness and on the appropriateness of summarizing student performances in CGPA. In almost every college and university in the United States the letter grading system is followed, with an "A"--usually weighted 4--representing very superior achievement, and an "F"--usually weighted 0--representing failure. A "C"--usually weighted 2--conventionally represents minimally satisfactory performance.

The numerical weights assigned to the respective letter grades represent an ordinal scale. That is, although 4 is higher than 3 and 3 is higher than 2, it is not possible to state that 4 is as much higher than 3 as 3 is higher than 2. In fact, it is widely affirmed by educators that a 4 should be attached to only the most rarified levels of academic excellence, while a 3 is taken to reflect a not uncommon level of superiority. In other words, hardly anyone assumes that equal ranges of performance are represented by the several grades. The crudity of the "measure" is tacitly recognized when the considerable breadth of the "satisfactory" (C) range is nullified in computing CGPA. Whether a student earned a "low C" or a "high C," his performance is represented by the numeral 2 in such computations; thus, all points throughout the "C" range come to represent equally mediocre performances, performances equally inferior to all the performances of the "B" range and equally superior to all the performances of the "D" range.

With all their limitations grades remain the language of academic

evaluation. And grades are not only recorded as admittedly qualitative evaluations of relative performances; they are multiplied by "course units" or "credits," are added together, and then are divided by total number of course units attempted to arrive at a ratio (CGPA) which supposedly represents the central tendency of a student's "over-all academic proficiency" or "academic achievement." Obviously when such diverse ordinal scale units as letter grades are subjected to such manipulations, pseudo-quantities are the evaluative labels which serve as predictive criteria and by which decisions about students are made. The widely used CGPA sometimes comes very near the logical absurdity of adding three elephants, two gallons (of nothing in particular), eight adjectives, and five musical tones, for a total of eighteen and an average of four and five-tenths!

The most that a CGPA may convey is a rough estimate of a student's "over-all academic achievement," relative to that of other students whose academic experiences are, it is hoped, essentially similar to his. Sometimes it fails to do even this. Unfortunately, the CGPA is the only even approximately standard way of estimating academic achievement that is readily available, but its use as a criterion in predictive studies is bound to minimize relations between actual achievement as a psychologically valid variable and other psychological aspects of the person.

Orientation to the Present Study: Attitudes and Achievement

At the conclusion of his lengthy psychometric (questionnaire) study of the same general topic as that reviewed here, Borow (6) remarked, "The writer suggests that what often seem to be fairly specific entities of student adjustment may be pervaded by more cogent generalized attitudes about academic matters." (p. 269) Brown and Holtzman (9) met with considerable predictive success when they constructed self-rating scales

for students to use in estimating frequency of application to themselves of various "study-mechanics" and "study-attitudes." A significantly higher proportion of the most discriminant items were those categorized as "study-attitudes" items. However, Schultz and Green (62) found nothing of significance in their elaborate three-year study of relations between responses to an attitude questionnaire and students' grades.

Attitudes Toward Authorities: Identification

As already noted, Rust and Ryan (58) and Ryan (59) arrived at a rather tentative conclusion that "over-achievers" tend to be somewhat conventional people, especially inclined to identify with academic authority-figures. More specifically, Rust and Ryan state,

> Conventionality may be associated with attitude toward authority (and, perhaps earlier in personality development, toward the parents). The university (represented by its officers and regulations) becomes the authority. The authority wishes regular study, class attendance, and good performance on examinations. Those who rebel (let us say because of early family situations) against the authority and their desiderata will therefore not perform as well as those who accept. (58, p. 453)

This view of educational achievement may be recognized as similar to that of orthodox psychoanalysis (cf. especially Fenichel, 19) wherein formal academic attainments (grades in particular) are likened to "transference improvements," the relatively superficial symptomatic improvements which patients "adopt" as a function of their inclinations to please (and thus implicitly control) their analysts by taking on the analysts' own values and mannerisms.

Using open-ended interview techniques, Hollander and Bair (35) asked Naval Aviation Cadets to discuss their instructors, and found that unsuccessful cadets tended to discuss their instructors' technical proficiencies or shortcomings, while successful cadets emphasized their

own personal reactions to and estimates of the instructors in interpersonal situations. The authors concluded that the cadets with high motivation levels tended to identify with their instructors (authority-figures) more than did the cadets with low motivation levels. Furthermore, when interviews were conducted prior to aviation training (34), similar differences obtained relative to attitudes toward authority-figures whom the cadets had encountered in high school or college. The cadets who subsequently withdrew from flight training were found to have been those who had emphasized the instructor-role factors rather than the self-instructor-relations factors prior to aviation training.

The notion that high-achieving students readily identify with others, and particularly with authority-figures, thus finds some support in recent psychological literature, with no studies appearing to offer specific refutation of it.

Attitudes Toward Self

Self-confidence. A second personality trait which appears throughout the literature on non-intellective factors in academic achievement is that of "self-confidence" or "self-sufficiency." However, with reference to this variable there is far from the unanimity of evidence and opinion which can be amassed to support the contention that identification with others, especially authority-figures, is somehow related to achievement.

Stagner (65) found high-achievers low on the Bernreuter "Self-sufficiency" scale, compared with low-achievers. Young and Estabrooks (73) used the Colgate B_2 and C_2 Personal Inventories and from their findings concluded that high-achieving students are, among other things, "unsocial, self-sufficient, self-conscious, impulsively selfish, but self-sacrificing on principle." (p. 736) Finding that high-achievers

scored relatively high on a specially constructed "Intellectual Efficiency" scale for the MMPI, Morgan (50) inferred that high-achievers are possessed of "efficiency, energy, self-confidence, and insightful, realistic attitudes." (p. 297)

Herriott (33) had instructors rate students on their attitudes in a number of areas, the ratings being made along several continua, such as "persevering--vacillating," "self-confident--dependent," "cheerful--despondent," and "ambitious--indifferent." He was surprised to find that the high-achieving students tended to be rated as having the more dependent attitudes, while the low-achieving students were rated more self-confident. Hughes (37) also found a negative relationship between self-confidence and achievement.

Self-satisfaction v. Need for Achievement. A somewhat different approach to the question of students' self-experiences in the college setting might be termed "degree of striving," "need for achievement," or some other label connoting extent of dissatisfaction with at least some aspects of current life situation. A statement clearly representative of the "high" end of the continuum for such a variable is Burgess' (10) assertion that high-achieving engineering students "are more motivated for college, study, enjoy it more, and expect to get more from it [and that they] are better adjusted to the college situation." (p. 524) She also states that such students are more dissatisfied with their past experiences, especially in the home environment, and exhibit a greater need for achievement, presumably as a means of finding a more satisfying future environment. Conversely, the low-achieving students are described as being better adjusted socially, less inhibited emotionally, relatively low in need for achievement, placing relatively less value on education, and tending to favor their extra-curricular experiences, both past and present, to the academic situation as such. Dowd's (16) findings are in

essential agreement with Burgess on all the above counts.

In one of the few really careful and productive studies dealing with the relations between so-called "study-habits" and academic achievement at the college level, Wrenn and Humber (72) found 27 of the Wrenn Study Habits Inventory items discriminated significantly between 826 carefully matched pairs of high- and low-achieving men. In the reviewer's opinion, the majority of the 27 items reflect an imperviousness to course content, an avoidance of academic realities, and/or emphasis on non-academic gratifications and on somatic rationalizations for academic failure.

For several years Tiebout (70) had the opportunity to maintain continuous close contact with a group of low-achieving college women of high ability. His opinion was that a reasonably clear clinical syndrome characterized the girls. Like Dowd's (16) and Burgess' (10) low-achievers, they tended to be an emotionally labile, easy-going group of students. They had little patience with heavy content courses, but occasionally displayed interest and competence in areas where they could express (rather superficially and fleetingly) creative inclinations or their own pre-formed ideas. They exhibited a decidedly hedonistic emphasis in their lives, avoiding as much as possible any intrusion of academic reality on their world of the pleasure principle.

Under situational pressure (especially from college authorities or parents), Tiebout's under-achieving girls tended readily to accept any of a number of superficial solutions to their academic difficulties (e. g., new schemes for more effective study, resolutions, schedules, etc.), soon to slack off, then projecting the blame for their difficulties onto the imposition of various circumstances (e. g., illness, friends' requests for companionship, faulty instruction, etc.). Generally speaking, they appeared to be only slightly involved in the academic environ-

ment per se, and were stimulated largely by non-academic influences which served either to gratify their peculiar needs or to threaten withdrawal of such gratification.

Brown, Abeles, and Iscoe (8) found a very significant difference between high- and low-achievers in the degree to which they were willing to participate in a research project or to avail themselves of freely offered study aids, even under various artificial inducements. The authors speculate that low-achievers reveal an "activity delay," a tendency to procrastinate, perhaps being uninterested or unwilling to conform to various requirements imposed by college authorities and academic situations in general.

Weigand's (71) weakly designed interview study of probationary students defined achievers as those who managed to attain a "C" average, thus rising out of the ranks of the probationers; and non-achievers as those who failed to achieve such "satisfactory" standing. The non-achievers were found to be the more susceptible to influence from family and friends in selecting their educational and vocational goals, but also were found frequently choosing course programs inappropriate to their professed vocational goals, whose natures were vague to the students themselves. Perhaps there is an implication here of relatively superficial identification with—or, better, acquiescence to—others, especially authority-figures (parents), but the failure to follow through to the borrowed goals suggests a fundamental conflict, behaviors at variance with the expressed aspirations. At any rate, academically-directed striving was not a salient aspect of the behavior of the non-achievers.

McClelland, et al. (45) have done some interesting theorizing in the area of motivation, testing their formulations by means of numerous studies in which the need for achievement (nAch) has been inferred from stories which subjects have composed in response to specially devised

ambiguous pictures (similar to those of the TAT). These authors have noted that the relationship between nAch and college grades remains in doubt, partially as a function of the complexity of the determiners of grades, but they also state,

> The plain fact of the matter is that this whole area needs much more carefully planned research than we have conducted. Our interest has always been primarily in other problems and the relationships reported here have been incidental to other findings. However, we think that they are sufficiently suggestive to warrant further study. (pp. 241-242)

Like Burgess (10), Morgan (50) found that achievers were significantly higher in nAch as measured by the TAT. Morgan administered the McClelland version of the TAT and also a series of semi-structured questions pertaining to personal identity, fears, and wishes to his sample of male sophomores.

Parrish and Rethlingshafer (54), on the other hand, using a population similar to Morgan's except that it was composed of both men and women, were able to find no differences in nAch between high- and low-achievers. They observe that the supposed stimulus to projection of nAch on the TAT, "deprivation of success in their college careers" (p. 223), is unlike food deprivation or failure on psychological tests (the sort of stimuli employed by McClelland and his co-workers). Their rationale is that the low-achievers may not have been ego-involved in their failure, thus experiencing little or no frustration and no strong tendency to project nAch into their interpretations of ambiguous stimulus pictures. Whether or not there was ego-involvement, the subjects had been living with their failures for some time, and it seems probable that they had developed a number of defensive reactions against emotion-arousing cues relating to such failure. Finally, the authors suggest that the test instrument (the McClelland modification of the TAT--or the

TAT at all, for that matter) and formal methods of scoring it may be too clearly structured and too restricted in interpretation to permit the appearance of significant variation as a function of a gross life situation like academic failure. (Incidentally, these authors were unable to find significant differences in their subjects' TAT stories in relation to their actual achievement levels, even when the stories were scored and interpreted according to the most liberal, "intuitive" methods.)

Review Summary and Specific Hypotheses

In summary, then, the literature to date suggests that there may be relations between students' attitudes and their academic achievement levels, but the findings have been so equivocal that the present study set out to test the null hypothesis with reference to such relations and each of three attitude areas, the three which have been discussed above: attitude toward authorities, attitude toward self (self-confidence), and attitude toward self (striving or achievement orientation).

Three attitude areas were selected for study not only because each of them has appeared fairly prominently in the literature, but also because the writer wanted to investigate possible relations between academic achievement and attitude patterns; specifically, students' profiles on the three attitude scales. For example, it was expected that students relatively high in attitudes toward authorities and toward achievement, but with relatively low self-confidence would be among the highest achievers. The rationale here is that such students would be most typical of those who are currently dissatisfied with themselves and seek relief from their dissatisfaction by emulating the behavior of authority-figures and by striving toward goals set by those in positions of power and authority.

Conversely, students with relatively high self-confidence and a

tendency to devalue both authorities and achievement (recognition from others, symbols of prestige and security, etc.) were expected to be predominantly those students whose levels of academic achievement are below the levels predicted from intellective indexes. Such students might be those who have been found occasionally to be socially "well-adjusted" although maladapted to academic requirements. With relative absence of a "need to strive," they could be expected to coast along at a merely "satisfactory" level or even to fall below it unless and until they became dissatisfied with their position as a function of imposed stress.

Parenthetically, it was anticipated that the term relatively in statements concerning the former pattern would have particular significance. That is, it was considered doubtful that students with really low self-confidence would achieve above a moderate level, probably with a majority of them achieving at a low level, whereas moderate self-confidence, particularly in conjunction with the pattern in question, would be fairly common among the high-achievers.

The two attitude patterns which have just been described were the easiest to specify on the basis of published research. Available research information did not, however, provide precedents for anticipating relations between other attitude patterns and academic achievement. Once again the most conservative hypothesis is the null, and it was planned to test it with reference to general relations between attitude patterns and academic achievement, with supplementary tests of the specific hypotheses concerning the two patterns discussed above.

Aims

The present study addressed itself to several of the more pressing problems associated with supposed relations between non-intellective per-

sonality factors and academic achievement in college.

In the first place, it sought to provide attitude scales representative of common collegiate experiences. The scales were to be easily administered to large groups, subject to machine scoring, possessing sufficient face validity to appeal to students but also sufficiently ambiguous to permit relatively free self-expression without excessive adherence to stereotypical responses. It was hoped that each of the scales would be sufficiently homogeneous and sufficiently independent of each of the other scales to warrant profiling of scores.

Secondly, the study attempted to investigate the supposed relations between non-intellective (attitudinal) factors and academic achievement in a student sample homogeneous with respect to intellective and a few other non-attitudinal variables.

Finally, the study was limited to statistically correct tests of several hypotheses suggested by research already reported in the literature. The hypotheses tested all pertain to relations between students' attitudes and their achievement levels, represented by CUFA. That attitude-achievement relations were relevant targets has been attested to by some of the more prominent recent studies, reviewed above.

Chapter II

METHOD AND PROCEDURE

Scale Analysis As an Approach to Homogeneity

The Theory of Scale Analysis

Among the approaches to the problem of devising homogeneous attitude scales, that of Guttman (25, 26, 27, 28) and his co-workers (56, 66, 67) minimizes assumptions concerning the units of measurement employed. The method rests on the observation that it is possible (ideally) to reproduce an individual's item responses from knowledge of his total rank among his fellow respondents to a test, provided the test items represent an internally consistent (homogeneous) universe of similar items. The principle is illustrated by Fig. 1, an item-score matrix in which each item response is assigned a score of one (for a "positive" or "affirmative" response) or zero (for a "negative" response), and the total score is the sum of the item scores.

The ideal item-score matrix discloses that all subjects whose ranks in the total score distribution are identical, also have made identical responses to individual items; thus, all subjects earning a score of five on the test represented by Fig. 1 would have responded positively to items d, e, f, g, and h and negatively to items a, b, and c. This amounts to stating that "persons who answer a given question favorably all have higher ranks on the scale than persons who answer the same question unfavorably." (66, p. 9)

Subjects	Items								Total score
	a	b	c	d	e	f	g	h	
A	1	1	1	1	1	1	1	1	8
B	0	1	1	1	1	1	1	1	7
C	0	0	1	1	1	1	1	1	6
D	0	0	0	1	1	1	1	1	5
E	0	0	0	0	1	1	1	1	4
F	0	0	0	0	0	1	1	1	3
G	0	0	0	0	0	0	1	1	2
H	0	0	0	0	0	0	0	1	1
I	0	0	0	0	0	0	0	0	0

Fig. 1. Item-score matrix for a perfectly reproducible scale, in which each item is scored 1 or 0 and the total score is the sum of the item scores.

In practice, the ideal is seldom if ever attained. For example, some subjects with a score of five on the scale represented by Fig. 1 might have responded positively to one or more of items a, b, or c and negatively to one or more of items d, e, f, g, or h, leading to erroneous prediction of item responses from total score ranks. Guttman (25, 26, 27) has proposed a 10 per cent error of reproducibility as the maximum allowable if a set of items is to be considered representative of a scalable (i. e., unidimensional or homogeneous) universe of items. That is, if a set of items indeed represent a range of affirmation (as in attitude scaling) or of difficulty (as in ability testing) within a single common factor, errors in reproduction of item responses from subjects' ranks should result from chance factors and should not exceed 10 per cent of the total number of item response predictions called for. The extent to which this criterion is approached is given by the coefficient of

reproducibility (27, p. 117):

$$\text{Coefficient of Reproducibility} = 1 - \frac{\text{number of errors}}{\text{number of questions x number of respondents}}$$

A 10 per cent error in reproduction of item responses from total score ranks results in a .90 coefficient of reproducibility. Lower coefficients identify sets of items which are not unidimensional; i. e., scales which represent more than one factor.

Reproducibility is but the most easily quantified of four criteria proposed by Guttman (25, 26, 27) for appraising the unidimensionality of a set of items; another is that of the number of response categories, combined with what falls under the heading of "item difficulty" in ability testing. That is, greater confidence can be placed in a given coefficient of reproducibility obtained with items for which there are at least three possible response categories (e. g., responses weighted 2, 1, and 0) than in the same coefficient obtained with dichotomous items (weighted 1 and 0). In Guttman's language,

> The more response categories for items included in a scale, the greater is the assurance that the entire universe is scalable. . . . For example, four dichotomous items with high reproducibility do not provide as dependable an inference concerning the scalability of an area as would four trichotomous items which were equally as reproducible. It is especially important to keep as many response categories as possible when the total number of items is small. (26, pp. 79-80)

The primary reason for this recommendation is the fact that the "reproducibility of any individual item can never be less than the percentage of respondents falling into a single answer category of that item, regardless of whether or not a scale exists" (26, p. 78), and combining scale categories often produces items which do not discriminate among respondents. If combining response categories produces items which have been responded to affirmatively (or negatively) by as many as 90 per

cent of subjects, a spuriously high (at least .90) coefficient of reproducibility is automatically obtained. In reality, all that has been accomplished in such an instance is to compose a scale of items about which there is little or no disagreement among respondents, some items being almost universally accepted and some being almost universally rejected.

Thus, it is necessary that as many scale categories as possible be retained, or if dichotomization of item responses must be resorted to, that "attempts . . . be made to include in the sample [of items] as wide a range of marginal distributions as possible, and specifically to attempt to include items with marginals around 50-50." (26, p. 78) This is equivalent to stating that item "difficulties" (borrowing from the terminology of ability testing) should cover a wide range and should include a fairly sizeable proportion of items which are answered affirmatively ("correctly" in ability testing) by approximately 50 per cent of the respondents, and negatively ("incorrectly") by the other 50 per cent.

A third criterion for unidimensionality is presented as a recommendation to be followed if the obtained coefficient of reproducibility is to be accorded confidence. The advice is that, unless it is possible to include among the items several whose marginal distributions "are in the range of 30 per cent to 70 per cent" (26, p. 79), it is necessary to use at least 10 items to represent the scale being developed.

Riley, et al. (56) have found as few as five or six dichotomized items to be useful for classifying respondents with respect to broad attitudes, and contend that more precise classification is usually not warranted by the nature of the attitude being studied; e. g., it is unlikely that "attitudes toward academic authorities" is subject to meaningful analysis into more than five or six gross strata. Guttman (26) further states,

> An important property of a scalable universe is that the ordering of persons based on a sample of items will be essentially the same as that based on the universe [of items from which the items in question are assumed to constitute a sample]. If the universe is scalable, the addition of further items merely breaks up each type [i. e., rank] given by the sample into more differentiated types. But it would not interchange the order of the types already in the sample. (p. 81)

Therefore, provided the marginal frequencies of the scale-limiting items fall generally within the 70 per cent - 30 per cent range, with a number of the intervening items approximating the 50-50 splitting of the sample of respondents, an obtained coefficient of reproducibility of .90 or higher leads to a reasonably confident conclusion that the items represent a scalable universe of similar items.

Even should the coefficient of reproducibility be less than .90 (i. e., in the .80s), if the pattern of errors of prediction of item responses from total score rank displays a gradual interlacing or overlap (see Fig. 2), it may be inferred that the sample of items in question represents a quasi scale rather than a truly scalable universe. A quasi scale represents a principal factor, plus a number of lesser factors which have introduced error variance--beyond that attributable to chance alone--into the attempt to order subjects according to their ranks along the scale continuum. The absence of such a pattern of error in prediction of item responses stands as the fourth criterion for unidimensionality. Should such a pattern of error obtain in conjunction with an acceptable coefficient of reproducibility, it discloses the presence of a useful--albeit less than unidimensional--scale. In fact, Guttman maintains that,

> The importance of a quasi scale lies in how it is used for external prediction problems. . . . The prediction of the external variable rests essentially on the dominant factor that is being measured by the quasi-scale scores. Thus a quasi scale has the full mathematical advantages of a scalable area. (28, p. 162)

Should it be found, however, that a set of items defines a quasi

Subject's rank order (based on total score)	Item A (random scale errors)		Item B (grouped nonscale errors)		Item C (gradient quasi-scale errors)	
	Scores		Scores		Scores	
	1	0	1	0	1	0
1	X		X		X	
2	X		X		X	
3	X		X		X	
4	X		X		X	
5	X		X		X	
6	X		X		X	
7		X	X			X
8	X			X		X
9	X			X	X	
10	X			X	X	
11		X		X	X	
12	X			X	X	
13	X		X			X
14	X		X		X	
15		X	X		X	
16		X	X			X
17		X	X			X
18	X		X		X	
19		X		X	X	
20		X		X		X
21		X		X		X
22		X		X		X
23		X	X			X
24		X	X			X
25		X	X			X
26		X		X		X
27		X		X		X
28		X		X		X
29		X		X		X
30		X		X		X
Errors:	1	2	3	5	2	3

Fig. 2. Examples of the three principal types of error distributions in predicting item responses from subjects' ranks. (Of course many more items would be needed to determine so many ranks.) Each X represents a respondent's reply to an item; an affirmative reply being represented by an X in the "1" column; a negative reply, by an X in the "0" column. (Adapted from Guttman [28, p. 161].)

scale rather than a truly unidimensional scale, it would be necessary to include a larger number of items for stable differentiation among subjects. Guttman (28) states it as follows:

> While the single dominant variable of a quasi scale cannot be represented by means of a small number of items due to the amount of error involved, increasing the number of items which contain this dominant variable makes this error assume a gradient pattern, and permits an invariant rank order [of respondents]. (p. 163)

In Guttman's Cornell technique of scalogram analysis (25), subjects are first ranked according to their total scores on the attitude questionnaire being used, and their responses to each item of the questionnaire are then recorded as in Fig. 2, above. Visual inspection of the resulting chart permits location of the point in the distribution of responses to each item at which it would be necessary to alter prediction of subjects' responses to that item, based on their total score ranks. In Fig. 2 these points are identified by horizontal lines in among the Xs. They must be so located as to minimize errors of item response prediction, but as Edwards (17) and Edwards and Kilpatrick (18) point out, the cutting-points must fall between ranks and not within a set of rank ties as Guttman (25) has been inclined to place them.

In Fig. 2, "1" responses would be expected on Item A from all subjects whose ranks among the 30 respondents are 14 or higher; and "0" responses, from all subjects whose ranks are 15 or lower. This prediction results in three errors (10 per cent of the 30 predictions for the item): a "1" response by a subject with the rank of 18, and "0s" by subjects with ranks of 7 and 11. It will be recalled that predictive error of this magnitude is the maximum allowed by Guttman's approach to scale homogeneity if a given set of items is to be considered to represent a scalable (unidimensional) universe.

The errors in prediction for the other two items of Fig. 2 are greater than the 10 per cent allowable, but those for Item C exhibit a gradient pattern of error similar to that of the scalable item; i. e., there is no clearly definable clustering of errors, as there is in the

responses to Item B. A set of items including some with error patterns like that of Item C would thus compose a quasi scale, which could be retained as a reasonably reliable basis for predicting an external criterion.

The Riley Revisions of Scaling Techniques

Riley, et al. (56) have improved Guttman's approach to scale analysis, largely by minimizing the subjective judgments required and by maximizing quantification. Their method requires items with but two response categories, or items whose response categories have been combined into dichotomies by splitting the obtained item response distributions as near their medians as possible, scoring "0" all categories below the cutting-point (toward the "negative" end of the response continuum) and assigning a differential scoring to all categories above the cutting-point.

The differentially weighted scoring of responses on the "positive" or "affirmative" side of the respective cutting-points assumes an ascending geometric progression from the item receiving the highest proportion of positive response. In this method scales are usually limited to five or six items, and in a five-item scale the differential weights would be 1, 2, 4, 8, and 16. In other words, with such dichotomous scoring, the item to which the highest proportion of affirmative response is obtained carries the scoring weight of 1 and earns 0 points for all subjects below the median division point in the obtained item response distribution and 1 point for all subjects above the division point. Similarly, the next most affirmative item, with a scoring weight of 2, yields 0 or 2 points credit; the item weighted 4 yields 0 or 4; etc.

Total scores, called "unique scores," are the sums of the weighted item scores, but these are not the direct basis for ranking of subjects from which the coefficient of reproducibility is to be computed. Obtain-

ing unique scores is but the first step in the derivation of the best possible ranking of subjects. The most efficient ordering of respondents —the ordering which leads to the smallest possible error in reproduction of item responses from subjects' ranks--is that based on what both Riley, et al. and Guttman call "scale types." The scale type concept can perhaps best be defined by means of illustration. Figure 3 presents all the possible patterns of item responses under the Riley differential weighting method, the corresponding unique scores, scale type assignments, and "error" designations for a scale having five dichotomized items.

In Fig. 3 "errorless" scale types would be represented by subjects earning unique scores of 31, 15, 7, 3, 1, and 0. Such respondents have not "erred" by giving a negative reply to an item with a high proportion of positive responses and/or a positive reply to an item having a high proportion of negative responses. Converting their unique scores to scale types, "pure," errorless scale assignments are obtained. Subjects earning unique scores other than these six are said to have "erred" in responding to one or two items of the five-item scale, and thus belong to "error" scale types. (Riley, et al. use the term "non-scale scores" interchangeably with the term "non-scale types," both terms referring to unique scores which yield error scale types.)

For example, a subject earning a unique score of 29 is said to belong to scale type 5 on the premise that his negative response to the item carrying a weight of 2 was an "error" of omission, in view of his positive response to all the other items, particularly the three items which were responded to negatively by a higher proportion of the subjects. Similarly, a subject with a unique score of 20 is assigned to scale type 0 on the premise that his positive responses to the items weighted 4 and 16, after responding negatively to items with lesser weights, are "errors" of commission.

Scoring weights: Negative				Positive	Unique score	Scale type	Errors (No.)
16	8	4	2	1			
X	X	X	X	X	31	5	0
X	X	X	X	(X)	30	5	1
X	X	X	(X)	X	29	5	1
X	X	X	(X)	(X)	28	5	2
X	X	(X)	X	X	27	5	1
X	X	(X)	X	(X)	26	5	2
(X)	(X)			X	25	1 or 5	2
(X)	(X)				24	0	2
(X)		X	X	X	23	3 or 5	1
(X)		X	X	(X)	22	2 or 5	2
(X)		X	(X)	X	21	1 or 5	2
(X)		(X)			20	0	2
(X)			X	X	19	2	1
(X)			X	(X)	18	2 or 0	2
(X)				X	17	1	1
(X)					16	0	1
	X	X	X	X	15	4	0
	X	X	X	(X)	14	4	1
	X	X	(X)	X	13	4	1
	X	X	(X)	(X)	12	1 or 0	2
	(X)		X	X	11	3 or 4	1
	(X)		X	(X)	10	2 or 0	2
	(X)			X	9	1	1
	(X)				8	0	1
		X	X	X	7	3	0
		X	X	(X)	6	3	1
		X	(X)	X	5	3 or 1	1
		(X)			4	0	1
			X	X	3	2	0
			X	(X)	2	2 or 1	1
				X	1	1	0
					0	0	0

Fig. 3. Derivation of all possible "unique scores" and "scale types" from weighted scoring of responses to a five-item scale; all items dichotomized. Each X indicates a positive response to the item carrying the designated weight; blank spaces indicate negative responses. "Errors" in item responses are indicated by parentheses.

Perhaps it is evident that the Riley method implies a somewhat different interpretation of "error" from that of Guttman. No longer is the emphasis on errors made by someone else in predicting subjects' item responses from their ranks; rather, the implication is that scale errors are those the subjects themselves have made in responding to the items

of the scale. (However, whichever way errors are viewed, their number in any given scale is the same.) The latter "error" concept is made clearer by an analogy borrowed from Riley, et al. (56):

> We might ask each of 100 men, "Are you at least 5' 4" tall?" If each says "Yes," we can ask, "Are you at least 5' 5" tall . . . 5' 6" tall . . . ," etc. Eventually, each should say "No." The tallest man is the one who continues to say "Yes" the greatest number of times, provided of course that the men know how tall they are (and that none has a sense of humor). But it is in an identical sense that we try to find which people take the most extreme response to attitude questions. Although we never know the "unit" difference from one question to the next in attitude research, we feel that the rank order into which people fall is meaningful and that such a measure is potentially useful.
>
> This analogy gives us another chance to see what is meant by "scale error." If a man checks "No" to the question asking whether he is at least 5' 4", but then proceeds to check "Yes" to greater heights until he reaches 5' 9", then he made an error somewhere. In Guttman's approach, the first reply of "No" would be counted as the error and the "Yes" to the others would be accepted as correct responses. The man would be classified as 5' 8", with one response error. The alternative is to say he is less than 5' 4", and that the four "Yes" replies after the "No" were all errors. In counting errors and classifying people, Guttman always assigns a person to the class which minimizes the errors.
>
> The "error" just discussed could have arisen from carelessness on the part of the respondent, misunderstanding of the task at hand, misinterpretation of the question, etc. This is the problem of question unreliability. But scale error can arise in other ways. If, after the first question about height, we interpolate a question which reads, "Are you married," or "Do you have red hair," it is obvious that the "Yes" or "No" response does not belong on our yardstick. In attitude scaling, a count of the errors by questions helps us to decide which are not useful as scale questions, either because of unreliability or because they are off the continuum. If we were able to phrase our height questions no more accurately than the following, we could well imagine that the "Yes" and the "No" answers would be helter-skelter:
>
> Are you taller than a table?
> Are you taller than the head of a pony?
> Are you taller than a good-sized bookcase?
>
> While these are ridiculous, we often wonder whether attitude questions do not throw up just as vague images for the respondent to cope with. In fact, the size of a pony may be a lot more definite! The Guttman approach certainly offers no final answer to questions of reliability or validity, and his error criteria for scale acceptability are still characterized by rules-of-thumb. Nonetheless, they are a big improvement over the sheer intuition which has guided us through many a survey. (pp. 281-282)

Several times it has been mentioned that assignment of subjects to scale types is made such that errors are kept to a minimum. When more than one assignment can be made with the same amount of error (e. g., a cutting-point between ranks 19 and 20 for Item C of Fig. 2, p. 32), Riley, et al. (56) have suggested rules for arbitrary designation of scale type. In Fig. 3 the scale type chosen in such cases is indicated by underlining; e. g., subjects with unique scores of 25 are assigned to scale type 1, even though assignment to scale type 5 would result if the negative responses to items weighted 4 and 2 had been considered the errors, a number of errors no greater than that resulting from the recommended designation. All such quandries for a five-item scale are resolved by applying a rule that assigns unique scores to the one of the pair of scale types which is nearer the center of the distribution of scale types. The distribution for a five-item scale is, of course, 0, 1, 2, 3, 4, and 5, with types 2 and 3 nearest the center. Riley, et al. state that the effect of the application of this rule is to distribute error as evenly as possible over the five items and the six scale types.

Improving on Guttman's (25) visual inspection technique (see p. 33, above), Riley, et al. (56) make the following suggestion for quantitatively evaluating the randomness of error in a scale which has been derived from ranking based on scale types. (It should be recalled that the term "non-scale score" in this quotation refers to any unique score which yields error in assigning scale type.)

> If there is a high concentration in one or more particular non-scale scores, this indicates that error is not randomly distributed, as is required for an acceptable scale. . . . There is no exact measure as yet for judging the randomness of a distribution. Empirically, if a non-scale score contains over 5 per cent of the sample population, the scale should be viewed with suspicion. (pp. 293-294)

These authors further state that if any one item of a scale contains

more than 15 per cent error responses, that item "is undoubtedly not suitable and the scale as it stands must be rejected." (p. 295) It should be remembered, however, that a set of items which include such an "unsuitable" item may still represent a quasi scale (see pp. 31-33, above) of potential value in predicting an outside criterion.

The foregoing summary of Guttman's approach to attitude scaling, particularly as modified by Riley, et al. (56), provides a methodological introduction to the present investigation of possible relations between the attitudes held by male college students and their academic achievements.

Construction of the Student Opinion Survey

Introduction

Skepticism concerning the appropriateness of extant instruments for testing the hypotheses of the present study dictated the construction of a more adequate device; specifically, a device or devices suitable for reliably measuring three areas of student attitude. At the outset the approach taken was rational rather than empirical, in general following the model procedure described by Suchman (67) for sampling a universe of items.

> The concept of an aggregate of characterizing items . . . conceives of a sample from an unlimited number of items which may be used to characterize any social phenomenon. The characterizing universe consists of all items which can be used to exemplify the social concept. The determination of whether or not an item belongs to a certain universe, however, remains a matter which must be decided upon by common agreement. A characterizing item belongs to a universe on the basis of some arbitrary decision as to its content. The universe itself is decided upon arbitrarily as the content of interest to the investigator. Some additional means, such as the consensus of judges, might be introduced to help the investigator, but the final decision of whether or not this item characterized the universe or phenomenon of interest, must be a subjective one. (67, p. 84)

Problems of Type of Item

Prior to deciding upon attitude area contents, a number of considerations entered decisions concerning the exact type of item to be used. Although the typical questionnaire item which must be answered "yes," "?," or "no" has the apparent advantage of ready quantifiability, it has the disadvantage that it often arouses oppositional tendencies in subjects of average or higher intelligence. That is, many subjects feel frustrated by their inability to represent the variety of their experiences or attitudes when they are forced to make a series of responses so narrow in scope. They sometimes feel that they have been asked to give "yes" or "no" replies to questions of the "Have-you-stopped-beating-your-wife-yet" variety, and become resistive and disinterested in the task, seeking refuge in the "?" column and producing a total score of questionable validity.

A subgoal of the present study was the devising of an instrument which could tap attitudes toward a fairly wide variety of attributes of any one aspect of the academic environment; e. g., attitudes toward academic authorities. For example, knowing what opinion a student holds concerning instructors was considered of potential interest. An incomplete sentence offered the advantage of giving a great potential latitude of response, but if a student were asked to complete a sentence, "I think most instructors are . . .," he could be expected to give a one-word or short-answer response, such as ". . . interesting" or ". . . inclined to be too demanding." Such responses quite probably neglect very many other attitudes the student has concerning instructors, attitudes which would add fuller perspective to an appraisal of how he feels about instructors.

Furthermore, like most projective techniques, incomplete sentences are extremely cumbersome for testing large groups (a goal held with reference to predicting academic achievement in college), and are subjective

in their scoring and interpretation (30). Objectivity of scoring tends to restrict breadth of interpretation, thus reducing the value such instruments are purported to have when interpreted somewhat more intuitively by a skilled clinician.

Returning to the idea of a questionnaire, the student might have been asked to answer "yes," "?," or "no" to questions such as, "Do you think most instructors are interesting?" or, "Do you think most instructors are too demanding?" However, in this manner of presentation the focus of the respondent's attention is so concentrated on the single relationship; e. g., "instructor--interesting" or "instructor--too demanding," and upon the fairly obvious social implications of either a "yes" or a "no" answer; that he would be expected often to give the socially acceptable answer or resort to the "?".

A partial solution to the problems just enumerated might have been to provide a broader range of "socially acceptable" responses (and also of responses on the "socially unacceptable" side of a theoretically "neutral" position). However, the usual Likert-type scale (e. g., State whether you "strongly agree," "agree," "mildly agree," "mildly disagree," "disagree," or "strongly disagree" with the following statement: "Most instructors are interesting.") has the disadvantage of requiring a separate pairing of--in the example--instructor-trait and rating scale, resulting in a rather unwieldy test format.

Perhaps a more serious obstacle from a clinical viewpoint is that items like the one just suggested ask the subject to qualify the extent of his own agreement or disagreement with a given statement. It was thought preferable to ask him to qualify his response in keeping with his impression of the frequency or intensity of the presence of the particular trait in the instructor. The consequence of such an emphasis might well be to give a naive subject the impression that he is rating

something "out there" in the instructor rather than something in himself, thus tending to minimize the need to be defensive. That such an impression is logically fallacious should not reduce the operational value of so directing the subject's attention away from an evaluative appraisal of himself.

In an attempt to blend the worthwhile features of the several types of items discussed above, but without introducing insurmountable obstacles to administration or analysis, an incomplete sentence, such as "I think most instructors are . . .," was combined with a series of qualifying adjective or participial Likert-type rating-scales, roughly similar to the scales used by Osgood (53). Although this method could hardly be expected to eliminate entirely the problem of stereotypical responses, the hope was that it would tend to reduce somewhat a subject's tendency to conform to social stereotypes in his responses. Embedding a given rating in a context of many different ratings, all pertaining to the same initial referent (the same incomplete sentence), was viewed as tending to push a respondent to assume his own personal frame of reference within the test structure, at the same time drawing him away from making comparisons between his own attitudes and those he believes others hold.

For a given content area, the use of such a variety of qualifying rating-scales gave a breadth of opinion, which was then readily amenable to completely objective scoring. Such objectively scored rating-scales (hereafter called items) then provided a pool from which unidimensional attitude scales could be derived (see pp. 56-62, below).

Determination of Content Areas

Four incomplete sentence fragments were composed to represent various facets of each of the three attitude areas involved in the hypotheses under study. An attempt was made to have each sentence refer to some

universally experienced aspect of the college situation or to future aspirations common to college students, but content areas were sought about which it is logical to expect a difference of opinion to exist among college freshmen. The four sentence fragments for each attitude area were:

Attitude toward academic authorities ("Area X" sentences):

A. I think most instructors are . . .

B. I think most textbooks are . . .

C. I think most academic requirements are . . .

Most student intellectual leaders are . . .[2]

Attitude toward self; self-confidence ("Area Y" sentences):

D. When I am studying, I feel . . .

E. Just before a test, I feel . . .

F. When called on to contribute to a class discussion, I feel . . .

Just before I receive my grades, I feel . . .[2]

Attitude toward self; striving or achievement orientation ("Area Z" sentences):

G. Having a college degree would be . . .

H. Working for recognition from others is . . .

J. Being an outstanding success would be . . .

Being an influential person would be . . .[2]

Fifty sets of polar adjectives or present-participles (APPENDIX A) were composed as a reservoir of verbal limiting-points for rating-scales, from which sets of items were to be selected to represent a range of logical completions for each of the sentence fragments.

The writer and each of three other counseling psychologists on the staff of the Michigan State University Counseling Center independently

[2]Fragments discarded by the method described below.

selected from the list of 50 polar combinations the 25 which he considered logically most appropriate for completing each of the 12 sentence fragments. He then crossed out the five of that 25 which he believed to be the least suitable of those he had selected (those five to be used only as additional items, if needed, in selecting the final set of items for each sentence fragment, according to the criterion and procedure set forth below). Also, he indicated which direction for each item (responses toward which of the poles) he expected to be positively related to academic achievement, that direction to become the a priori "positive" end of the response continuum for the item. Finally, he checked which three of the four sentence fragments he thought most representative of the attitude area under which it was subsumed.

An arbitrary criterion of three-fourths agreement among the psychologists was first used to select three sentence fragments to represent each attitude area. Complete agreement was obtained among the four raters on the inclusion of sentence fragments A, B, C, D, E, and F. Three-fourths agreement was obtained on the remaining three sentence fragments. One rater thought that sentence fragment G was too specific and represented something about which there is likely to be little difference of opinion among college students (a contention empirically confirmed later). Three of the raters felt that the sentence fragment, "Being an influential person would be . . .," was a less satisfactory expression of essentially the same content area as that represented by sentence fragment J.

Fifteen sets of polar adjectives or present-participles were selected for each of the incomplete sentences, in all cases the criterion of three-fourths agreement being met, though it was twice necessary to resort to use of the crossed-out items among the 25 selected by some of the raters. When this was necessary, the practice was to choose first

those items in which no more than one cross-out selection was needed to produce three-fourths agreement.

Poorest agreement among the raters was found for fragment J, for which six of the 15 items were based on the inclusion of cross-out selections. For sentence fragment A, three of the final 15 items were dependent on the inclusion of cross-out selections. All items for all other sentence fragments were based on the raters' best-20 selections only.

For six of the nine sentence fragments, exactly 15 items were obtained by original three-fourths agreement, without resort to the cross-out listings. For sentence fragment B, 16 items were obtained, forcing the writer to make a further subjective judgment as to which item was the least suitable of the nine on which three of the four psychologists had agreed. The item "orderly-chaotic" was rejected. For sentence fragment G, three-fourths agreement was obtained for 17 items, and here the items "calm-exciting" and "liberating-restricting" were subjectively rejected by the writer from among the seven agreed upon by three of the four psychologists. The item "calm-exciting" was similarly rejected from among the nine sentence fragment H items which carried three-fourths agreement.

Three-fourths agreement was easily obtained for "positive" direction of all the items, most dircctions in fact being decided unanimously.

The Student Opinion Survey

Test booklets, entitled Student Opinion Survey (APPENDIX B), were prepared with an incomplete sentence heading each of nine pages, placed in the order (according to sentence fragment designations): A, D, G, B, E, H, C, F, and J. The appropriate 15 sets of polar adjectives or present-participles were placed below each sentence fragment according to a table of random numbers (38), each item's location determined by a

number assigned to it which corresponded to its rank among the other 15 for the page as the items had been ordered originally in the list of 50 sets (APPENDIX A); and with the direction of "positive" response randomized by a coin toss for each item.

A six-category forcing scale, selected with the purpose of attempting to reduce what Guilford (23) has referred to as the "error of central tendency," was employed to separate the polar extremes of each item. Bendig (4) has demonstrated that an even-category rating-scale (his had four categories) was more reliable than scales having an odd number of categories (three or five categories in his study). However, such an even-numbered scale was somewhat more prone to rater bias than were odd-numbered scales. Bendig (2, 3) also showed that there is no significant change in rater reliability in scales having anywhere from five to nine categories.

Each category of the items was anchored by the words, "Always," "Often," "Sometimes," "Sometimes," "Often," and "Always" at the top of the six columns on each page of the test booklet. Verbally anchoring each position on the scale continuum in terms of frequency of occurrence of a given trait or experience (e. g., "Always," "Often," or "Sometimes" for each direction on the continuum from "interesting" to "boring" with reference to "I think most instructors are . . .") provided for each response to an item, a measure of both the direction and the intensity of a subject's attitude concerning a particular subject-trait pair (e. g., "Instructors--often--interesting" or "Instructors--sometimes--too demanding"). According to Bendig (2), such verbal anchoring has the further advantage of increasing somewhat the reliability of self-rating scales.

The six steps for each continuum between the polar extremes were typed in and numbered 1-6 to represent the first six positions on IBM

Form I. T. S. 1100 A 151 (APPENDIX C). These numbers, 1-6, were merely to guide subjects to the appropriate answer sheet spaces, and are not to be construed as having any necessary relationship to eventual scoring, the scoring weight actually being reversed for items having their "positive" extreme to the left in the test booklet.

Two answer sheets, prominently numbered in red: 1, 1R (for reverse side of 1), and 2, were used in actual testing; and careful written and vocal instructions were given, so subjects would place responses to sentence fragments A, B, and C on the front of answer sheet one, responses to sentence fragments D, E, and F on the reverse side of answer sheet one, and responses to sentence fragments G, H, and J on the front of answer sheet two. By this means, the three attitude areas, split up in the test booklets, were once again integrated on the answer sheets, facilitating scoring.

An example for illustration and practice was included on the face sheet of the test booklet, practice responses being recorded by the subjects on the reverse side of answer sheet two.

Subjects

On logical grounds, but with the implications of the Bendig and Sprague study (5) as support (see p. 14, above), it appeared probable that attitudes would be more directly related to academic achievement in a group of students of average academic potential (as measured by an orientation test battery and compared with college freshman norms) than they would be in either a group with high potential (similarly defined), whose intelligence and/or superior preparation might be expected to carry them through at least some of their first year college courses with reasonably good grades, even with relatively "unfavorable" attitudes; or in a group of students with low potential, who might be somewhat predis-

posed to relatively low achievement no matter how "favorable" their attitudes. Students of average potential were selected also because there appeared a good chance of finding in that large group representing the middle 40 to 60 per cent of entering freshmen a reasonably large homogeneous sample.

In order to eliminate problems stemming from various selective factors which might accompany marital, racial, and sex differences, the sample was limited to single, white, male subjects.

The entire freshman male population for the fall quarter, 1955, at Michigan State University (MSU) was sorted for a homogeneous group of students having the following characteristics:

1. Never married
2. No previous college experience
3. Admitted to the University under regular conditions (not required to take entrance examinations, no irregularities in secondary level preparation)
4. Scores on the MSU Freshman Orientation Test Battery meeting the following criteria:

	Raw score range	MSU Derived Scores[3]
a. MSU English Placement Test (E)	11-23	4-7
b. MSU Arithmetic Proficiency Test (A)	26-40	4-7
c. ACE Psychological Examination; 1940 Ed.		
(1). Quantitative (Q)	38-48	5-6
(2). Linguistic (L)	52-67	5-6
d. MSU Reading Test		
(1). Vocabulary (V)	12-21	5-6
(2). Reading Comprehension (C)	17-23	5-6

[3]MSU Derived Scores comprise a 10 point division of the distribution of freshman scores for each test or subtest of the Orientation Battery, such that the following proportions of the total entering freshman class (male and female combined) are represented for each Derived Score: scores 1 and 10, .01 each; scores 2 and 9, .03 each; scores 3 and 8, .08 each; scores 4 and 7, .16 each; and scores 5 and 6, .22 each.

The indicated test score criteria were selected to minimize scatter of performance, on the premise that students having all their test scores within a fairly narrow normative range can more validly be labeled "average" in their general academic potential than can students exhibiting wide divergence of performance on the tests. The latter type of performance might reflect differences in potential in separate aspects of academic endeavor (e. g., "linguistic" v. "quantitative") and/or the differential effects of a factor like anxiety on their specific test performances, where the tests are administered differently (e. g., timed v. untimed). The narrower score range was selected for the ACE and the MSU Reading Test because the subtests used were known to be better predictors of academic achievement at MSU than are the scores of the other two tests.

Out of the total male freshman population of 2,993, a homogeneous sample of only 77 was obtained (far fewer than had been anticipated). This number was further reduced by the loss of nine students who had left college during the freshman year, leaving 68 to be contacted for testing. Letters (APPENDIX D) were sent to each of the 68 men the last week of the spring quarter, 1956, inviting them to participate in a research study. An incentive was provided by offering two prizes, one of 20 dollars and one of 10 dollars, to be awarded to two participants on the basis of a blind drawing to be held following the final day of testing. The incentive was thought necessary in view of the fact that the men were being asked to take time out from their accustomed routines just before the beginning of final-examination week.

Follow-up telephone calls were made to students who had not yet appeared after the first few test sessions. The only additional information given in such calls was that the research involved a survey of student opinion, that it was in no way related to the students' work at the University, and that it would require less than the one hour of their

time originally estimated.

Of the 68 men selected, 65 participated in the study. When their complete freshman year records became available at the end of the spring quarter, it developed that eight of the men had failed to earn an average of 15 course credits over the three terms of their freshman year, and one of them had completed only two terms in school, having dropped out for the winter quarter. At MSU a 15-credit minimum is necessary if a student (in courses other than engineering, where the requirement for graduation is 20 credits higher than the total in other curricula) is to graduate after 12 quarters (four school years) in college. However, following the definition of "full-time attendance" set down by the Veterans Administration for compensation purposes under the "G. I. Bill," an average of 14 credits per term was accepted, giving a minimum total for the three quarters of 42 credits. This latter criterion restored to the sample three of the nine subjects lost under the more stringent 15-credit minimum.

Further examination of the course records of the other five students (it will be remembered that one of the nine had completed only two terms in school) disclosed that they had repeated one or more courses in which they had received grades below "C," thereby earning fewer total credits along with a spuriously high three-term CGPA. In such cases the grade earned in repeating the course replaced the original grade on the student's transcript. Such students were retained in the sample provided they had carried at least 14 credits per term, thus having academic experience as extensive as that of many of the other students in the sample. However, their criterion scores (CGPA) were computed on the basis of their original performances, in a few instances with a credit total of 39 units. Four more of the students qualified for inclusion in the sample on the 42-credits-carried criterion.

To recapitulate, two students out of the sample of 65 were excluded

from the data (even though they had participated in the study) on grounds of having had less academic experience than the majority of the sample, leaving a homogeneous sample of 63 unmarried, white, male freshmen of average academic potential, whose total collegiate experience consisted of three terms at MSU, during which time they had carried a minimum average course load of 14 credits per term and had earned a minimum of 39 course credits.

In view of the problems attendant upon the use of CGPA as the criterion of academic achievement (see pp. 13-17, above), it was considered desirable--if not necessary--to use a three-term CGPA in an effort to minimize random error factors such as would have relatively greater effect on only one term's performance. At MSU further stability of the criterion is contributed by the presence of a core curriculum of so-called "Basic College" courses (Communication Skills, Natural Science, and for some students, Social Science), which, for the subjects of this study, provided a minimum common base of approximately 40 per cent of their total course credits.

Cross-validation Sample

Concurrent with the examination of the sample of 63 male freshmen in the specially selected homogeneous sample, all the students enrolled in the five sections of an MSU psychology one-credit "service" course (Methods of Effective Study) were asked to respond to the Student Opinion Survey. The Survey was administered by the writer during regular class time. In April, 1957, seven sections of General Psychology, a required lower division (including freshmen) "General Education" course at San Diego State College (SDSC), were similarly asked to respond to the Student Opinion Survey, again administered by the writer. In all cases it was possible to maintain an administrative format comparable to that for

the men in the homogeneous sample.

From the several hundred students tested in the 12 psychology classes, it was possible to obtain a second sample of--coincidentally--63 white, male freshmen, all nearing the end of their first year in college and with no previous college experience. Unlike the specially-selected homogeneous sample, the second sample contained students representing a wide range of academic aptitude and included both married and single men. Only the variables of race, sex, and educational experience were controlled. All the men had carried roughly a full-time course load for the year, but this variable was not as strictly controlled as it had been in the first sample. Incidentally, the CGPA was based on three quarter's work at MSU, but on two semesters at SDSC.

Table 1

Frequency Distribution of Cumulative Grade Point Averages Earned by Male Freshmen; One Year's Performance

Achievement level	CGPA limits	Exact limits	Frequency	
			Sample 1	Sample 2
High	2.8 and above	2.75 and above	9	9
	2.6-2.7	2.55-2.74	10	7
Moderate	2.4-2.5	2.35-2.54	10	6
	2.2-2.3	2.15-2.34	13	7
Low	2.0-2.1	1.95-2.14	12	8
	1.9 and below	1.94 and below	9	26

Table 1 presents the frequency distributions of CGPA for both samples, and readily discloses the practical import of the differences between the two groups. In the homogeneous sample (Sample 1), roughly equivalent numbers of subjects fell into each of the six class intervals, but in the

cross-validation sample (Sample 2) a very heavy plurality of the men fell into the lowest class interval. When the distribution of Sample 1 is trichotomized--as is frequently done in the analysis of the data reported in the next chapter--it results in 19 subjects being classified "high-achievers;" 23 subjects, "moderate-achievers;" and 21 subjects, "low-achievers." The corresponding frequencies in the second sample are 16, 13, and 34, respectively.

Administration of the Student Opinion Survey

All the participating students were asked to fill out a face sheet (APPENDIX E for the 63 men of the homogeneous sample, APPENDIX F for the MSU men in the cross-validation sample, and APPENDIX G for the SDSC men in the cross-validation sample) and were told that the information called for and everything else about the Opinion Survey would be held in confidence, being for the examiner's personal use as part of his doctoral research.

When the students had completed the face sheet, they were told that the Survey asked for strictly personal opinions concerning a number of factors pertaining to their experiences in college. They were told that there are no "right" or "wrong" answers to the ratings they were to make, that all answers are a matter of personal opinion, and that the entire procedure is experimental and previously untried, thus not even providing the examiner with a conception of how the ratings would be made.

During each testing session, the examiner read the instructions aloud, especially emphasizing that each item forces a response in one direction or the other with reference to the incomplete sentence at the top of a given page, and that the subjects were to mark only one space on the answer sheet corresponding to each scale item, the mark to represent both the direction of their choice and the frequency with which they

considered the trait or experience they were rating to apply to the subject of the sentence fragment in question.

Considering that the students had to record their responses on three of the sides of two separate answer sheets, and with the necessity of changing to a new side and location for each consecutive page of the Survey, it was gratifying to find only a very small proportion of papers spoiled by clerical errors (not more than two or three per cent out of the total number of over 400 papers). Students completed the Survey in from 10 to 40 minutes, with the median time somewhere around 20 minutes. It was quite easy to administer the entire procedure--introduction, face sheet, and Survey--in a 50-minute class period; and administrations in the smaller groups of the homogeneous sample seldom exceeded 35 to 40 minutes. There appeared to be a good deal of student interest in the instrument and there were no overt signs of distress or defensiveness during the test sessions, as are so commonly elicited when tests such as the MMPI, the Bernreuter, or the Guilford-Zimmerman Temperament Survey are administered.

Chapter III

RESULTS

Derivation of the Three Attitude Scales

Item Selection

Riley, et al. (56) have proposed that items for an attitude scale be selected from a pool of items like that represented by each of the 45-item attitude areas of the Student Opinion Survey. According to these authors, selection should provide that:

(a) the item having the nearest approach to unanimity of response ("positive" or "negative") should certainly be no more extreme than an 80 per cent - 20 per cent split;

(b) each item-by-item change from maximum affirmation to maximum negation along the scale continuum should represent more than five per cent of the respondents; e. g., in the homogeneous sample of 63 men, if the item receiving the greatest proportion of affirmation were so replied to by 45 subjects (a 71 per cent affirmative - 29 per cent negative split), the item chosen to represent the next step in the scale continuum toward maximum negation should be responded to affirmatively by no more than 41 subjects (41 being 65 per cent of 63, representing a drop in affirmation equal to six per cent of the total sample of subjects); and

(c) the items bracket the full range of response, from those items to which a sizeable majority of subjects (within the requirement of [a], above) respond in the affirmative to those eliciting positive response from a minority (again within the requirement of [a], above).

Adherence to the Riley criteria for item selection tends to insure that all scale types will contain approximately equivalent percentages of the respondents and that there will be no inversion of order among scale types in successive samples.

Scoring and Scale Analysis

The answer sheets for each of the 63 men in the homogeneous sample were scored according to the a priori assignment of scale values for the original six rating-scale categories (APPENDIX H), the most "positive" category for each item receiving a score of six; the category at the opposite extreme, a score of one. The minimum possible total score for the 45 items of each attitude area was therefore 45; the maximum possible score, 270.

Item-score matrices were constructed, one for each of the three attitude areas, based on the scoring outlined above and with subjects ranked from high to low in each matrix according to their total scores for that attitude area. Visual inspection of the matrices disclosed which of the 45 items in each attitude area most nearly approached the criterion, that "persons who answer a given question favorably all have higher ranks on the scale than persons who answer the same question unfavorably" (66, p. 9), and the six-category scoring for these selected items was then reduced to dichotomous scoring. APPENDIX I lists the selected items by number for each of the three attitude areas, and indicates the item response categories which were combined to represent "positive" response for each item according to dichotomous scoring.

The remaining data of APPENDIX I were the bases for several trial-and-error attempts to satisfy the criteria for item selection set forth above (see pp. 34-39 and p. 55, above). To illustrate: for Attitude Area X, the two items responded to positively by the lowest and highest

percentages, respectively (items 10 and 8), might have been selected to define the limits of the Area X scale continuum, with three additional items being selected to represent the intervening steps in the continuum, each step to include "more than five per cent" of the subjects. Approximately equal steps might be represented by items 33, 15, and 25, responded to positively by 44, 56, and 65 per cent of the subjects, respectively. These three items appear to provide a better scale continuum than would items 11, 40, and 2--which were also responded to positively by 44, 56, and 65 per cent, respectively--because those of the former set yield consistently smaller error ratios (the last column of APPENDIX I) along with roughly comparable numbers of subjects above or below the cutting-points.

Sets of five items, selected in the manner just described, were then submitted to scale analysis, following the method of Riley, et al. (56) outlined on pp. 34-39, above. Initial failures to achieve the minimal standards for unidimensionality necessitated substitutions of alternate items, new scoring, re-ranking of subjects, and reapplication of the techniques for appraising the scale characteristics of each new set of items.

Obviously, the data of APPENDIX I could not serve as more than a rough guide to item selection, based as these data are on the 45-item, six-category matrices. When only five dichotomous items were selected and subjects were ranked according to the new total score distributions, it was inevitable that new error patterns would appear. Only then was it possible to identify and reject an apparently suitable item, now shown to have contributed too high a proportion of error to the new ordering of subjects, or one contributing to the occurrence of too high an incidence of a single non-scale (unique) score.

Table 2 lists those items which were finally selected to represent the three attitude area scales. It may be noted that on three occasions,

Table 2

Dichotomized Items Comprising Three Scales, Each Representing an Area of Student Attitude

	Attitude areas and items	Per cent of subjects responding: "Positive"	"Negative"
	Area X		
34.	I think most academic requirements are . . . punishing - rewarding.	63	37
35.	I think most academic requirements are . . . sensible - senseless.	59	41
43.	I think most academic requirements are . . . realistic - unrealistic.	54	46
33.	I think most academic requirements are . . . inconsistent - consistent.	44	56
45.	I think most academic requirements are . . . encouraging - discouraging.	35	65
	Area Y		
54.	When I am studying, I feel . . . enthusiastic - apathetic.	67	33
86.	When called on to contribute to a class discussion, I feel . . . timid - confident.	56	44
84.	When called on to contribute to a class discussion, I feel . . . sad - happy.	49	51
89.	When called on to contribute to a class discussion, I feel . . . orderly - chaotic.	41	59
93.	When called on to contribute to a class discussion, I feel . . . elated - depressed.	37	63
	Area Z		
21.	Working for recognition from others is . . . valuable - worthless.	71	29
19.	Working for recognition from others is . . . immature - mature.	56	44
36.	Being an outstanding success would be . . . sensible - senseless.	44	56
34.	Being an outstanding success would be . . . immature - mature.	36	64
41.	Being an outstanding success would be . . . good - bad.	24	76

Note.--The items are numbered and the polar opposites for each item appear as in the Survey booklets (APPENDIX B). The terms which are underlined define the "positive" extremes of their respective items.

twice in the Area X scale and once in the Area Y scale, the recommendation that steps along the scale continuum encompass "more than five per cent" of respondents was not met. In fact, the step from the "most favorable" item to the next "most favorable" item in Area X, and from the "least favorable" to the next "most favorable" item in Area Y, each include only four per cent of the subjects. Although this failure to meet the criterion for differentiation of response within the scale is of no immediate concern, scale instability can be expected in future applications of the weaker scales. (Such instability did appear in cross-validation--see next page--but it was not in conjunction with the above-mentioned items.)

Table 3

Summary of the Extent to Which the Three Attitude Scales Meet Criteria for Scalability (Unidimensionality)

Attitude area	Least possible coefficient of reproducibility	Obtained coefficient of reproducibility (Criterion: .90 or more)	% of Ss with most frequent non-scale score (Criterion: 5% or less)	% of error in poorest item (Criterion: 15% or less)
X	.59	.91	6.4*	12.7
Y	.59	.90	4.8	14.3
Z	.64	.93	3.2	9.5

*Only one non-scale score was obtained for so many subjects (N=4). Had this score been earned by only three subjects, the criterion would have been met.

Of considerably greater consequence to the present study is the fact that all three scales meet the requirements for scalability, in spite of the small size of the population sample. It is customary in such research to work with a random sample of several thousand subjects, and Guttman (25, 26) has stated that it is very difficult to attain unidimensionality

with fewer than 100 subjects. Quite probably the very homogeneity of the present sample has favored the appearance of unidimensionality. Appendixes J, K, and L present the item-score matrices and scale analysis information for the three attitude scales as finally constituted. Table 3 summarizes the formal characteristics of the three scales.

Cross-validation

The answer sheets of the second sample of male freshmen were scored for the three five-item attitude scales as a cross-validation of the scale characteristics just reported. Table 4 summarizes the results of that procedure.

Table 4

Summary of the Extent to Which the Three Attitude Scales Meet Criteria for Scalability; Cross-validation Sample

Attitude area	Least possible coefficient of reproducibility	Obtained coefficient of reproducibility (Criterion: .90 or more)	% of Ss with most frequent non-scale score (Criterion: 5% or less)	% of error in poorest item (Criterion: 15% or less)
X	.62	.92	6.4	11.1
Y	.66	.90	9.5	22.2
Z	.61	.89	7.9	12.7

For the second sample of male freshmen, the Area X items were found to have quite different levels of affirmation from those obtaining in the homogeneous sample. That is, in the second sample the items receiving the lowest and next lowest proportions of affirmation, respectively, had received the next lowest and the lowest, respectively, in the first sample; and similarly for the next two items along the scale continuum. The values reported for Area X in Table 4 are those obtained with scoring

revised to conform to the new scale order in the second sample. As in the original sample, only one non-scale score was found to exceed the maximum frequency criterion in Area X.

The scale continuum of Area Y was maintained in the second sample, but with the three least affirmative items very close together; i. e., with nearly equal proportions of the student sample responding in the same direction. In addition to the most frequent error score reported in Table 4, another non-scale score was obtained for 6.4 per cent of the subjects. It should perhaps be mentioned that the second poorest item of Area Y contained only 11.1 per cent error.

As with Area Y, the original Area Z scale continuum was maintained in the cross-validation sample. However, in addition to the most frequent error score reported in the table, two other non-scale scores were each obtained for 6.4 per cent of the subjects.

Considering that such small samples are involved in both student samples, and also that the cross-validation sample was markedly different from the homogeneous sample from whose responses the scales were derived, the results just reported are encouraging. At the very least, it appears that the attitude scales which have been derived are quasi scales, and thus qualify as useful predictive indexes, particularly for samples of male freshmen of "average" academic potential.

Although it may appear that the reduction of the six-category scoring to dichotomous scoring and reduction of a 45-item scale to one of only five items have eliminated much useful information, in reality these procedures have primarily eliminated error contributed by extraneous (non-scale) items. Stating it more concretely, the probability is much greater that Student A is more favorably disposed toward the content of Attitude Area X than is Student B if that contention rests on their respective ranks (scale types) on the five-item scale than if it is based

on their ranks on the original 45-item scales.

Naming the Scales

The original goal was the measurement of what were somewhat vaguely called "attitude toward academic authorities," "attitude toward self; self-confidence," and "attitude toward self; striving or achievement orientation." With the final selection of unidimensional five-item scales, a revision of scale names seemed called for, in order to reflect more accurately the principal emphasis of each set of scale items.

Returning to Table 2 (p. 58, above), it will be observed that the five items of the Area X scale all complete the sentence fragment, "I think most academic requirements are . . .," and may be summarized as referring to a student's appraisal of the extent to which such requirements are "objectively" appropriate ("sensible," "realistic," and "consistent") and "subjectively" satisfying ("rewarding" and "encouraging"). More concisely, it appears that the Area X scale measures the extent to which a student considers academic requirements compatible with his needs and aspirations; or, emphasizing the other side of the coin, the extent to which he considers himself to be in essential accord with academic requirements.

The five items defining what has been called Attitude Area X have been renamed the Institutional Identification Scale (IIS). It should not be assumed that the former "attitude toward academic authorities" notion is hereby discarded. Rather, the scale continues to include attitudes toward academic authorities, but with an emphasis on identification with general institutional representations of such authority, in contrast to a possible identification with specific persons holding positions of authority.

The Area Y items have a decidedly emotional tone, reflecting the

extent to which a student feels "enthusiastic," "confident," "happy," "orderly," and "elated" as he performs in roles assigned him in college, particularly in the public role of student-in-class. In them there is self-appraisal, but with at least an implication that the emotions are the consequences of social experiences, reflections of the ways in which the student has been (and/or anticipates being) received by fellow students and faculty members as he performs his role publicly. Conceivably he feels confident, enthusiastic, and happy, and tends to derive continued satisfaction in situations where his efforts have been well-received (rewarded). The Area Y scale carries a heavy self-confidence connotation and has been renamed the Self-Confidence Scale (SCS).

The five items of Area Z appear to represent the degree to which a student considers "working for recognition from others" and "being an outstanding success" to be worthy goals. Consequently, this area scale has been renamed the Achievement Value Scale (AVS).

Although the scale names have been revised to reflect the particular contents of their respective items, it should be remembered that all the items of the original 45-item scales helped determine the final five-item scales and therefore are implicitly represented by them. Different initial sets of items would have resulted in different original total scores and rankings, and therefore in the selection of other "most representative" items than those which were selected (APPENDIX I).

It is quite possible that there are other sets of five (or more) items from the original matrices which would yield scale characteristics as satisfactory as those which have been selected. The item combinations which compose the three scales were merely the first to meet the criteria for unidimensionality in their respective content areas.

And finally, among the remaining 40 items of each original matrix, there may be one or more additional unidimensional scales, representing

somewhat different item universes than those portrayed by the three scales which have been derived. In other words, the selection of three unidimensional five-item scales should not be viewed as necessarily exhausting the reliable scale information provided by the original Survey booklets. Only further manipulation of the data--beyond the scope of the present study--could establish or refute an empirical basis for these speculations.

APPENDIX M lists CGPA, scores on the Orientation Tests, and attitude scale types for the 63 men of the specially selected homogeneous sample. In APPENDIX N will be found background data of possible interest.

Applications of the Attitude Scales to the Problem of Academic Achievement

Problems of Attitude Pattern Designation

Attitudes and achievement could be compared in a variety of ways, but there are two practical considerations which here served as guides to the most appropriate comparisons: (a) the student sample is regrettably small, and (b) both achievement and attitude data are in terms of ordinal scales.

It will be recalled that the original plan had been to use the three attitude scales simultaneously as profiles or patterns from which to predict achievement. With six scale types in each of the three attitude areas, there would be 216 possible profile combinations. It could hardly be maintained that each of these profiles represents a psychologically unique attitude pattern, but if a "high-low" dichotomy of each of the attitude scales is made, eight basic patterns result, under which the 216 specific profiles may be subsumed.

Several questions arose concerning the efficacy of the three-scale pattern approach. First was that of definition of "high" and "low,"

whether to use an absolute definition in which scale types 0, 1, and 2 would be "low" and scale types 3, 4, and 5 would be "high" (in which event, for example, the profile 2-4-4[4] would be labeled "low-high-high" [L-H-H][4] but the profile 3-5-5 would be labeled "high-high-high" [H-H-H], although both profiles have the same internal relationships among the subject's scale types); or to use a more relativistic labeling which would emphasize the relations among an individual's attitudes rather than the normative relations of his attitudes compared with the standardization sample.

A second problem encountered in the three-scale pattern approach, even when the many combinations of scale types are reduced to eight basic patterns, is that imposed by the small total sample of students. A comparison of eight attitude patterns with three achievement levels ("low," "moderate," and "high") results in a three-by-eight contingency table. With a total sample of only 63, the expected cell frequencies in the 24 cells of the table are too small to inspire confidence in any result obtained.

Finally, comparisons of the three attitude scales with each other disclosed that a hypothesis that they are essentially independent of each other (the null hypothesis) would have to be rejected for one pairing. Table 5 presents the analysis of the interrelations among the attitude scales.

The contingency coefficients of Table 5 were derived from chi squares of three-by-three contingency tables of low, moderate, and high scale types (two scale types to each of the categories) in each of the attitude areas. For three-by-three tables, the maximum attainable coefficiency of contingency is .816 (22). The confidence levels referred to are those of

[4] All such pattern designations list the IIS scale type first, the SCS scale type second, and the AVS scale type last.

the respective chi squares from which the contingency coefficients were derived.

Table 5

Contingency Coefficients Representing Relationships Between Pairs of the Three Attitude Scales

Scales	Contingency coefficients	Confidence levels
IIS-SCS	.263	.35
IIS-AVS	.285	.25
SCS-AVS	.437	.01

Although there is a significant relationship between SCS and AVS, it is not large enough to negate the value of three-scale profiles. Of course, a relatively large proportion of obtained differences in subjects' responses to the SCS and AVS scales would have to be attributed to chance, thus tending to reduce the levels of confidence accorded conclusions drawn from profiles employing both scales.

Attitude Patterns and Academic Achievement Levels; General Considerations

Contingency tables were drawn up for the eight basic three-scale patterns, but no matter how the question of pattern designation was met (absolutistic or relativistic), no evidence appeared to warrant rejection of the null hypothesis; i. e., that no general relationship obtains between the three-scale attitude patterns and academic achievement.

The most nearly significant chi square obtained was for a three-by-eight contingency table (Table 6) derived from attitude patterns in which a relativistic approach was made to pattern designation. Here chi square was 17.59 (without Yates correction for continuity), significant at only

the .25 level, and this in a contingency table whose largest expected cell frequency was 4.38. Of the 24 expected cell frequencies, 15 were below 3.00.

Table 6

Comparison of Eight Basic Three-Scale Attitude Patterns with Three Levels of Academic Achievement

Three-scale attitude patterns (IIS-SCS-AVS)	Achievement levels (CGPA)		
	Low (below 2.15)	Moderate (2.15-2.54)	High (above 2.54)
H - H - H	2	2	3
H - H - L	5	2	5
H - L - H	5	4	1
L - H - H	2	1	0
H - L - L	1	5	1
L - H - L	0	5	5
L - L - H	2	1	3
L - L - L	4	3	1

A two-scale pattern, using IIS and SCS, also proved fruitless. Here a low-moderate-high trichotomy of both the attitude and achievement continua produced a three-by-nine contingency table whose uncorrected chi square of 18.45 was found to be significant at only the .30 level and whose highest expected cell frequency was only 3.65.

Not only did dichotomization of the achievement continuum for both three-scale and two-scale pattern analyses fail to increase expected cell frequencies appreciably, obtained chi squares in all instances were found to be much less significant than those already cited. Thus, the present

study lends no support to the assertion that there is a relationship between students' attitude patterns per se (as measured by the three unidimensional scales of the Student Opinion Survey) and their academic achievement levels (as defined above for the homogeneous sample of male college freshmen).

Each Attitude Scale Compared with Academic Achievement

Attitude Levels and Achievement Levels. The simplest comparison, that of each of the attitude scales with achievement, is made in Table 7,

Table 7

Composite Table for Comparisons of Each of the Attitude Scales with Academic Achievement Levels (Entries for Each Attitude Scale to be Considered Independently of the Others)

Achievement levels (CGPA)	Attitude levels								
	Low (scale types 0 & 1)			Moderate (scale types 2 & 3)			High (scale types 4 & 5)		
	IIS	SCS	AVS	IIS	SCS	AVS	IIS	SCS	AVS
High (above 2.54)	6	3	7	5	10	5	8	6	7
Moderate (2.15-2.54)	8	12	10	9	6	7	6	5	6
Low (below 2.15)	7	7	5	4	6	10	10	8	6

with the statistical analyses summarized in Table 8. The information contained in Table 8 is based on each of the three-by-three contingency tables of Table 7, and may be accepted with a fair degree of confidence because the sample size was sufficient to meet the criterion for minimum

expected cell frequency size, obviating the need for Yates correction.

Table 8

Statistical Summary of Comparisons of Each of the Attitude Scales with Academic Achievement Levels

Attitude scales	Chi square	Confidence level	Contingency coefficient
IIS	3.07	.55	.216
SCS	7.46	.12	.325
AVS	3.19	.55	.220

If any positive conclusion is to be drawn from the study, it is hinted at in Table 8, in which only SCS even approaches a significant relationship with academic achievement. The .325 contingency coefficient is certainly not large, and it goes without saying that the .12 level instills really very little confidence for rejecting the hypothesis that there is no relationship at all, even between SCS and academic achievement. However, in view of the unreliability of the criterion measure (see pp. 13-17, above), the observed trend was thought significant enough to warrant further exploration of the possible relationship.

Attitudes and Achievement. Table 9 shows that, of the three attitude scales, only SCS provides a potentially useful basis for prediction of CGPA. Secondly, it shows that the relationship between these two variables--and for prediction of CGPA from SCS scale types only--is not linear. However, in spite of the quite respectable levels of statistical confidence with which it appears the inferences of Table 9 may be entertained, it must be pointed out that neither the product-moment correlation nor correlation ratio (eta) are really defensible statistical techniques for analyzing the data at hand. The reasons are that: (a) both

variables represent ordinal scales; (b) the attitude data has a very narrow variance, being limited to only six scale types; (c) it appears doubtful that homoscedasticity obtains; and (d) there are very few cases falling into several of the row and column totals in the scatter diagrams. The computations have been made and reported only because they may shed some possible further light on the nature of the still tentatively accepted relationship between SCS and academic achievement.

Table 9

Relations Between Each of the Attitude Scales and Academic Achievement

Attitude scales	Coefficient of linear regression (Pearsonian r) between CGPA and each attitude scale	Coefficient of curvilinear regression (eta) of CGPA on each attitude scale	Coefficient of curvilinear regression (eta) of each attitude scale on CGPA
IIS	.016	.252	.524
SCS	.081*	.473*	.340
AVS	-.149	.363	.425

*Chi square test for linearity of regression permitted rejection of linearity at the .01 level, and the eta coefficient was found to be significantly greater than zero at the .01 level (with fiducial limits of .212 to .734). Linearity of regression could not be rejected for any other variables, even at the .10 level.

Summary. The present study furnishes no statistically significant evidence of relations between three areas of student attitude and the academic achievement of those students, either when the attitudes are considered together in various three-scale or two-scale patterns or when they are compared singly with academic achievement. In fact, this study lends no support to any of the positive assertions in the reviewed literature concerning relations between attitudes toward authorities and academic achievement or between attitudes toward achievement and actual

achievement.

Self-confidence and Achievement

Introduction. Only an attitude scale purportedly representing a dimension of self-confidence was found to manifest a suggestion of potential gain in predicting academic achievement, and that with only a low curvilinear regression, with "high" achievement being most typical of students with only moderate levels of self-confidence.

Self-Confidence Scale Levels and Achievement Levels. Returning to the SCS portion of Table 7, and pursuing the relationship in question a bit further, it is interesting to note that information concerning self-confidence level (on the low-moderate-high trichotomy) advances efficiency of forecasting achievement level (a comparable trichotomy) by 30.4 per cent. That is, 23 of the men in the sample of 63 were found to have achieved at the "moderate" level, and since neither of the other achievement levels contained as many subjects, "moderate" achievement would have been the best estimate of achievement for the subjects of the study (a quite logical estimate for students of supposedly "moderate" potential!). However, when the subjects are tallied in the three-by-three contingency table which introduces the variable of self-confidence to that of achievement, "low" achievement becomes the estimate for students with high self-confidence and eight of them are correctly predicted; "high" achievement is the estimate for students of moderate self-confidence and 10 of them are correctly predicted; and "moderate" achievement is predicted for students low in self-confidence and 12 of them are correctly assessed. The total correctly predicted with information concerning self-confidence level is thus 30, an increase of 30.4 per cent over the 23 predicted without such information.

In view of the very careful sampling and the completeness of the

controls over intellective variables in the present study, and considering that almost all of the selected subjects (63 out of the total of 66) responded to the Student Opinion Survey, the obtained forecasting efficiency with the Self-Confidence Scale alone appears promising, not so much for the dubious value of offering a means of assigning students to achievement categories, but for the possibility of providing additional leads into the dynamics of academic achievement.

Self-Confidence Scale Levels, Three-Scale Attitude Patterns, and Achievement Levels. It will be recalled that a supplementary test was proposed (see pp. 24-25, above) to investigate the achievement levels of two of the three-scale attitude patterns, the pattern in which IIS and AVS are high, relative to SCS (H-L-H); and the pattern in which IIS and AVS are low, relative to SCS (L-H-L). It was stated that the expectation for students with the former pattern was for achievement beyond the level predicted by intellective indexes, while that for students with the latter pattern was for lower-than-predicted achievement, with the further qualification that students with a really low SCS score would be no better than moderate-achievers regardless of their three-scale pattern.

Although statistical tests for significance are vitiated by the extremely small cell frequencies, examination of Table 10 teases out some further implications of the present data for the predictions just reviewed. Contrary to prediction, students with IIS and AVS scores relatively higher than SCS scores (H-L-H) tended to achieve <u>below</u> expectation. Five such students (half of the pattern total) were found among the 21 "low-achievers" and of those five, four were found to have moderate SCS scores! Four students with the pattern were "moderate-achievers," but three of those four had <u>low</u> SCS scores (scale types 0 or 1)! Only one student out of the 10 with the H-L-H pattern was found among the "high-achievers," and he had a low SCS score.

Conversely, students with low IIS and AVS scores relative to their SCS scores (L-H-L) tended to achieve above the level predicted from their academic aptitude scores. Once again the pattern was common to 10 out of the 63 students, and of the 10 none was found among the 21 "low-achievers." Five were "moderate-achievers," of whom three had high SCS scores and two had moderate SCS scores. Of the five in the "high-achievement" category, two had high SCS scores and three had moderate SCS scores.

Table 10

Frequencies of Occurrence of the Eight Basic Three-Scale Attitude Patterns (IIS-SCS-AVS) When Levels on the Self-Confidence Scale Are Compared with Academic Achievement Levels (Table 6 Superimposed on the SCS Portion of Table 7)

SCS level (scale types)	Achievement levels (CGPA)					
	Low (below 2.15)		Moderate (2.15-2.54)		High (above 2.54)	
High (4, 5)	H-H-H	2	H-H-H	1	H-H-H	3
	H-H-L	4	H-H-L	1	H-H-L	1
	L-H-H	2	L-H-L	3	L-H-L	2
	Totals	8		5		6
Moderate (2, 3)	H-H-L	1	H-H-H	1	H-H-L	4
	H-L-H	4	H-H-L	1	L-H-L	3
	L-L-H	1	H-L-H	1	L-L-H	2
			L-H-H	1	L-L-L	1
			L-H-L	2		
	Totals	6		6		10
Low (0, 1)	H-L-H	1	H-L-H	3	H-L-H	1
	H-L-L	1	H-L-L	5	H-L-L	1
	L-L-H	1	L-L-H	1	L-L-H	1
	L-L-L	4	L-L-L	3		
	Totals	7		12		3

In other words, not only did this study not confirm the assertion that "over-achieving" college students tend to be driven by their needs for dependence upon authority-figures, it tended toward exactly the oppo-

site assertion: that students with attitude patterns commensurate with such needs achieve below a level predicted for them on the basis of intellective indexes. The trend toward "under-achievement" is supported even when the achievement continuum is dichotomized. Eight of the 10 students with the H-L-H pattern were found among the 34 "low-achievers," while only two were tallied with the 29 "high-achievers."

The most widely prevalent three-scale attitude pattern, H-H-L, was common to 12 of the 63 students. To some degree this pattern might reflect identification with authority-figures, at least to the extent that self-confidence and institutional identification are coequal in contrast to relatively low achievement valuation; i. e., institution and self are both favorably appraised. Of the 12, five were found to be "low-achievers" and five, "high-achievers." Four of the five "low-achievers" had high SCS scores, while four of the five "high-achievers" had moderate SCS scores. The two "moderate-achievers" with the H-H-L pattern split, one with high SCS and one with moderate SCS. Once again, the evidence suggests that the students most extreme in their "identification with authority-figures" fail to achieve up to their potential, to say nothing of their being "over-achievers."

Summary. Slightly over half the "high-achievers" fell into two three-scale attitude patterns, neither of which seems to support the contention that such "over-achievers" tend toward exaggerated identifications with authority-figures as a defense against their own feelings of inadequacy (or for any other reason), thereby achieving academic success as a function of their slavish efforts to emulate their academic superiors. In fact, the evidence suggests that most such "high-achieving" students hold no better than moderately favorable attitudes toward themselves and toward authorities, or even unfavorable attitudes toward the latter. It was also found that 12 of the 19 "high-achievers" had relatively low

achievement valuation scores.) Conversely, 10 of the 21 "low-achievers" were found with the two three-scale patterns most suggestive of conformity or exaggerated identification with authority-figures. (And 11 of the 21 had relatively high achievement valuation scores.)

No mention has been made yet of the "moderate-achievers." As already noted, it was something of a surprise to find students low in self-confidence tending toward "moderate" achievement (12 of the 22 students at that self-confidence level), and it was even more surprising to find students low in self-confidence going counter to the trends already reported. That is, of the 15 low self-confidence students who attained "moderate" or "high" achievement levels (see Table 10), 10 exhibited three-scale attitude patterns essentially compatible with the notion of identification with institutional authorities as a reaction against feelings of personal inadequacy. Six of the 10 had relatively high (moderate or high) IIS scores in contrast to their low SCS and AVS scores (H-L-L), while the remaining four displayed the H-L-H pattern which had been predicted for "high-achievers" but which was found typically among "low-achievers." Three of the latter subgroup of four students were, however, found in the lower half of the "moderate-achievement" category, the remaining student occupying the lone "high-achievement" position for subjects with the H-L-H pattern.

Chapter IV

DISCUSSION AND SUGGESTIONS FOR FURTHER RESEARCH

Implications of Present Failure to Demonstrate Statistically Significant Attitude-Achievement Relations

A number of factors combined in the present study to facilitate the appearance of any relations there might be between students' attitudes and their academic achievements.

The participants in the study were drawn from a clearly-defined "average academic potential" population, a group within which it was assumed that non-intellective factors such as attitudes would have maximal influence on academic performance. The student sample was homogeneous also with reference to academic experience, marital status, race, sex, and--incidentally--age. The subjects had all completed nearly three full quarters of the freshman year at a large middle-western state university when the attitude data was collected from them, and their CGPAs have at least the stability attendant upon their being based on at least 39 academic credits, of which a minimum of 40 per cent were earned in a core curriculum common to all the subjects.

The obtained attitude scores may be said to reflect a final, momentary cross-section of student reaction to experiences of the first year in college, experiences somewhat differently represented in the students' CGPAs. The importance of the fact that the measures of the two classes of variables were more or less concurrent is that all the "predictions" discussed in the last chapter represent temporally static statistical inferences rather than predictions forward in time.

With so many factors in the present study tending to maximize the
rance of relations between students' attitudes and their academic
vements, the fact that only meager hints of slight relations appeared
plex ones at that--raises very serious doubt that psychometric
aches to the problem will be very productive, and leads to almost
ete pessimism concerning the prospects for the more difficult task
king accurate predictions of academic achievement forward in time
attitude scores.

On the other hand, there are the very real problems of the unreli-
ty of the academic achievement criterion, CGPA. Conceivably, a
r criterion would have permitted the appearance of some very signi-
t relations between attitudes and achievement, even using the pre-
psychometric approach. The problem in that event becomes the formi-
one of establishing a more reliable achievement criterion and
ing large numbers of instructors (individualists all!) to adopt it
o apply it rigorously. At the present time, weekend excursions to
ar galaxies appear more probable of accomplishment!

At the very least the present study demonstrated the necessity for
ully specifying the nature of the relationships under investigation
he particular circumstances under which they are supposed to obtain,
voiding loose or grandiose claims about such variables as "attitudes
d authority-figures," "passive-dependent identification," "stereo-
al thinking," "need for achievement," "need to strive," "drive
d mastery," "emotional stability," "social adjustment," etc. Cer-
y each of these labels, and many hundreds of others like them,
s a multifarious range of specific behavioral referents and even
e variety of classes of behavior. Behavior scientists are faced
the task of getting down to more detailed descriptions of behavioral
xts, rather than too hastily summarizing and categorizing behavior.

For example, it appears quite probable that the Naval Aviation Cadets terviewed by Hollander and Bair (34, 35) exhibited differences in attides ("identifications") toward their instructors as a function of their n performances in flight training and/or differences in flight training rformances as a function of their attitudes, but learning to fly an plane has little in common with the varied behaviors whose combined essments produce an academic CGPA. Learning to fly has perhaps a much ger component of imitative behavior, of deep reliance upon the specific lls--the smallest mannerisms--of the instructor, skills which the stut seeks to reproduce in detail, and always with the real threat to e or limb should he fail in his efforts. A respect for the instructor a person, perhaps even a kind of affection, might well be expected to ilitate learning. So too in the psychotherapeutic situation (19), rein the analysand or client is faced with but one "adversary," who simultaneously a most vital "protagonist."

In college the picture is unquestionably different, if only in its lexity. The student--each student-- has his own peculiar goals, and ay reach them because of, in spite of, or quite untouched by impres- numbers of his academic peers and superiors. As Bendig (1) and ell and Bendig (57) have shown, students' ratings of instructors are ntially independent of their course experiences. That is, they may ery fond of an instructor but have a profound dislike for his course, .ce versa; they may enjoy a course and yet do very poorly in it, or versa; they may earn a high grade and still dislike the instructor, ce versa; or any combination of any of the variables.

Attempts to Rationalize the Trends of the Study: Feelings of Inadequacy, Institutional Identification, and Academic Achievement

The collegiate experience--especially the first year or two in a

liberal arts college--brings the student into contact with a wide variety f subject matter and perhaps an even wider spectrum of human variation. or the individual student, the only real stability in the situation is hat which he carries within himself. If, like Hollander and Bair's (34, 5) cadets, he adheres to the ways and values of one instructor, he may end to excell in that man's field. Provided the student had sufficient redits for him to accept his model as an advisor and to concentrate his cademic activities in the instructor's field of specialization, he might ill build a quite respectable CGPA. However, in the first year of college, a student (like those of the present research sample) who attempts emulate a few instructors exclusively is very likely to find himself odds with other instructors whose ways are counter to those of his osen models.

The liberal arts college freshman, it is here maintained, needs a ir degree of independence, a breadth of interest and curiosity, an pen-mindedness," if he is to produce an optimal scholastic record. He forced (by academic requirements, if not by his own inclinations) to ociate himself with such a variety of people and ideas that he dare become too dependent upon any of them too soon. The penalty for such nature adherence to a man or a point of view is, it is proposed, a uced capacity to entertain the points of view or personal idiosyncra- s of the many others he must respond to in his total educational erience, and the mark of such a reduced capacity may well be a con- rable number of less-valued performances and a lower CGPA.

The foregoing appears to this writer to be an implication of the lts of the present study. There was a marked tendency for students only moderate self-confidence to achieve above predicted levels (10 of the 22 students with moderate self-confidence), especially when a level of self-confidence was combined with a comparable or lower

al of institutional identification and a lower level of achievement
ıation. Seen in contrast to the overwhelming tendency toward achieve-
w potential among students with moderate self-confidence but with
ıer institutional identification and achievement valuation (four out
ive students), the first of these facts suggests the possibility that
"high-achievers" are better able to tolerate their feelings of inad-
ıcy without seeking premature and necessarily artificial identifica-
ıs with institutions and people whose goals and means to goals they
rfectly understand. It is suggested that the "low-achievers" among
students with only moderate self-confidence were reacting somewhat
nsively to similar feelings of inadequacy, a defensiveness reflected
only in the high institutional identification of their relativisti-
y defined attitude patterns, but also in the hypothesized premature
tallizing of behavior patterns in the college setting.

It may be recalled also that high self-confidence, combined with
institutional identification and moderate or low achievement valua-
, was typical of "low-achievers;" while moderate self-confidence,
rate or high institutional identification, and low achievement valua-
was a pattern common among "high-achievers." The H-H-L pattern
g "low-achievers" implies a failure to recognize or to admit inade-
ies either in the institution or in self, either out of defensiveness
ut of a more genuine satisfaction with things-as-they-are, with a
equent inflexibility in academic pursuits (if the pattern reflects
fensive reaction) and a subsequent "sour-grapes" rationalization of
value of achievement (e. g., "working for recognition from others"),
relative absence of a need for achievement (if the pattern reflects
tisfaction with the status quo).

On the other hand, the H-H-L pattern among "high-achievers" (whose
scores were really only moderate) is hypothesized to reflect an

ess of and a tolerance for some inadequacy in institution and self
correspondingly flexible participation in the variety of student
ance. It is hypothesized that for these "high-achievers" a rela-
evaluation of achievement has a different significance than it has
students who are failing or just barely "scraping by." Such rela-
evaluation of achievement, coming in conjunction with actual high
ement may reflect a bit of "false modesty," or an element of disap-
ent with achievement once attained (assuming the students them-
consider their level of achievement to be high), or even the
rtance of the more formal signs of achievement to students whose
satisfactions come in the performance of daily activities rather
n the fantasied anticipation of rewards from others; e. g., recog-
and prestige.

inally, there is the notable exception to the general trends, the
enon of "moderate" achievement among students with low self-confi-
especially when that low self-confidence is combined with moderate
h institutional identification and/or achievement valuation. That
tudents are so inclined toward "moderate" achievement (12 out of
low in self-confidence) rather than toward "low" achievement
out of the 22), was itself something of a surprise; but to find
these 12 "moderate-achievers" a preponderance (eight out of the 12)
very patterns (H-L-H and H-L-L) which were not associated with
ement at other levels of self-confidence is decidedly problematic.
e trend is carried over into the "high-achievers" among students
ow self-confidence, where each of the patterns in question was
ed by one of the three students.

ollowing the "defensiveness" rationale, is it possible that stu-
with really low self-confidence levels are only too aware of their
uacies; that is, recognize them (or even have an accentuated aware-

them), but are poorly able to tolerate them? If such is the case, y find some strength through their fancied participation in the ies and advantages of the institution and its representatives. would be the students typically referred to by the psychoanalysts y Rust and Ryan (58), and by Ryan (59) as striving for a passive- nt kind of identification with authority-figures and achieving c success as a consequence.

udents who are low in self-confidence (absolutely, with scale or 1 on the Self-Confidence Scale, rather than relative to /or AVS scale types) might be expected to represent a considerably proportion among the clients of counseling centers and psycholog- inics than their proportionate representation in the total student ion. In this connection, it has been most interesting to obtain tions from colleagues with reference to the achievement levels nying the two attitude patterns which received special attention and L-H-L). In a quite informal survey of the opinions of some r ten colleagues, those with experience in college counseling or l psychology (roughly half) all predicted high achievement for mer pattern and low achievement for the latter (not confirmed in sent study), while all of the men with only teaching and academic g experience with students predicted the reverse (which was the or the present study). At least there is here a kind of presump- idence that quite different student samples may be expected to very differently in response to attitude patterns and/or respond ite different attitude patterns in the face of similar academic

Suggestions for Further Research

e present study certainly was not designed to cope with the many

s of essentially ad hoc interpretation suggested above. Indeed,
not even appropriately address itself to a description of sequen-
atterning of attitudes and achievement; for this, a longitudinal
is needed. At best, the present study has hinted at some possibly
icant concurrent patternings of attitudes and achievement.

f the hypotheses of this chapter are to be given adequate tests,
ly must future studies involve predictions across time, they will
o go beyond a merely psychometric evaluation, into interviews of
readth and subtlety, in order to derive more sophisticated descrip-
of the life situations of the subjects and their typical reaction
ns.

inally, it should be emphasized again that the present study has
sed itself entirely to an investigation of attitudes and achieve-
n a single, homogeneous sample of single, white, male freshmen of
e academic potential. In most other studies where academic poten-
as been used to identify a relatively homogeneous sample of stu-
the emphasis has been on students of high potential (e. g., 16,
, 60, 70). Further studies are needed to investigate the breadth
ropriate application of the three attitude scales which have been
ped from the Student Opinion Survey, or to derive new scales more
riate to student samples having different academic potentials.
tudies of the stability of the attitude scales within samples are
, not that representations of attitudes should remain constant if
titudes themselves vary across time. Most useful would be studies
aviors other than those reflected in the attitude scale types, as
ehaviors vary concurrent with and consequent to changes in subjects'
types.

ne most ambitious research program might envision attacking all
problems (and more!) in a large, heterogeneous student population,

the several years of the members' participation in collegiate
ties; the least ambitious program might concentrate on so limited
tion as performing a more adequate cross-validation of the three
de scales of the present study, using a second homogeneous sample
gle, white, male freshmen of moderate academic potential.

Chapter V

SUMMARY AND CONCLUSIONS

ıree five-item attitude scales were empirically derived from the
ses made to 135 rating-scales by 63 unmarried, white, male college
en, students who had displayed moderate academic aptitude on the
an State University Freshman Orientation Test Battery (the MSU
ı Placement Test, the MSU Arithmetic Proficiency Test, the "Quanti-
' and "Linguistic" scores of the ACE Psychological Examination--
dition, and the "Vocabulary" and "Comprehension" sections of the
ading Test). All the rating-scales had been selected by the writer
ree other counseling psychologists as logically representative of
cally-experienced aspects of college life. Each of the scales met
a for unidimensionality, and scalability was largely confirmed in
alidation.

e attitude scales were labelled as representing: (a) Institu-
Identification, the extent to which a student considers the aca-
nterprise to be compatible with his own needs and aspirations;
f-Confidence, the degree to which the student feels comfortable--
imulated--in his performance of the student role, particularly of
e public aspects; and (c) Achievement Valuation, the extent to
orking for recognition and enjoying positions of prestige are con-
worthwhile by the student.

ıparisons were made between students' scores (scale types) on the
e scales and their cumulative grade point averages (CGPA) for
erms of the freshman year (with a minimum of 42 course credits

d and a minimum of 39 credits earned). No statistically significant
ons (coefficient of contingency) were found between the attitudes
hievement, either when the attitude scores were combined in various
scale or two-scale profiles or when they were individually compared
he achievement criterion. The small size of the sample and the
ability of the achievement criterion probably contributed to the
ially negative results.

he strongest relationship was that between low (scale types 0 and
derate (scale types 2 and 3), and high (scale types 4 and 5) Self-
ence Scale (SCS) levels and low (below 2.15), moderate (2.15-2.54),
gh (above 2.54) CGPA levels. The obtained .325 contingency coef-
was significant at the .12 level of confidence. High achievement
sociated with moderate self-confidence; moderate achievement, with
f-confidence; and low achievement, with high self-confidence.
ge of SCS levels increased efficiency of forecasting CGPA levels
per cent beyond that obtained without such knowledge. Although
tistic may not have been fully justified, a curvilinear regression
on SCS scale types was computed and reported (eta=.473, signifi-
greater than zero at the .01 level).

en the distribution of three-scale attitude patterns was super-
on the low, moderate, high three-by-three contingency table com-
SCS level and achievement level, a number of interesting trends
d. The trends were not worth testing statistically because of
ample size, but may be worth pursuing with further research. The
d pattern trends failed to support the widely-held contention that
ly-achieving students (high-achievers) are inclined toward exag-
identifications with authority-figures. Most students with atti-
tterns commensurate with such identification were low-achievers.
ely, among the high-achieving students the majority exhibited pat-

essentially contradictory to such identification. The only students patterns in keeping with the "identification" thesis who were found ving above the lowest level were those with SOS scale types 0 or 1. as suggested that this last group of students is perhaps more typical ounseling center and psychological clinic clientele than of students eneral, thus possibly accounting for the inclination of many clinically- ned personnel to predict high achievement for most students with strong dencies toward identification with authority-figures.

An attempt was made to explain the trends in terms of the concepts "feelings of personal inadequacy," "defensiveness" v. "tolerance," and emature identification" v. "independence and flexibility." Optimal ievement for the students of the sample was viewed as symptomatic of essentially realistic awareness of and tolerance for self and surround- gs, with no particular concern for the conventional signs and symbols prestige per se. Failure to achieve was seen as a concomitant of: a) premature narrowing of interests (relative to the demands of first ear liberal arts curricular requirements); (b) a straining after rela- ively superficial appearances of academic success as compensation for elt but poorly tolerated personal inadequacies; and/or (c) genuine satis- faction with the personal status quo such that no need to strive is felt. Further research was recommended to test the very tentatively-held and essentially ad hoc inferences of the present study.

SELECTED REFERENCES

Bendig, A. W. The relation of level of course achievement to students' instructor and course ratings in introductory psychology. Educ. psychol. Measmt, 1953, 13, 437-448.

Bendig, A. W. The reliability of self-ratings as a function of the amount of verbal anchoring and of the number of categories on the scale. J. appl. Psychol., 1953, 37, 38-41.

Bendig, A. W. Reliability and the number of rating scale categories. J. appl. Psychol., 1954, 38, 38-40.

Bendig, A. W. Reliability of short rating scales and the heterogeneity of the rated stimuli. J. appl. Psychol., 1954, 38, 167-170.

Bendig, A. W. & Sprague, J. L. The Guilford-Zimmerman Temperament Survey as a predictor of achievement level and achievement fluctuation in introductory psychology. J. appl. Psychol., 1954, 38, 409-413.

Borow, H. A psychometric study of non-intellectual factors in college achievement. Unpublished doctoral dissertation, Penn. State College, 1945.

Brooks, M. S. & Weynand, R. S. Interest preferences and their effect upon academic success. Social Forces, 1954, 32, 281-285.

Brown, W. F., Abeles, N., & Iscoe, I. Motivational differences between high and low scholarship college students. J. educ. Psychol., 1954, 45, 215-223.

Brown, W. F., & Holtzman, W. H. A study-attitudes questionnaire for predicting academic success. J. educ. Psychol., 1955, 46, 75-84.

Burgess, Elva. Personality factors in over- and under-achievers in engineering. Penn. State Univer. Abstr. of Doctoral Dissertations, 1953, 16, 536-543.

Clark, J. H. Grade achievement of female college students in relation to non-intellective factors: MMPI items. J. soc. Psychol., 1953, 37, 275-281.

Clark, K. E. & Kriedt, P. H. An application of Guttman's new scaling techniques to an attitude questionnaire. Educ. psychol. Measmt, 1948, 8, 215-223.

Cronbach, L. J. Essentials of psychological testing. New York: Harper & Brothers, 1949.

ronbach, L. J. Studies of the group Rorschach in relation to success in the College of The University of Chicago. J. educ. Psychol., 1950, 41, 65-82.

lVesta, F. J., Woodruff, A. D., & Hertel, J. P. Motivation as a predictor of college success. Educ. psychol. Measmt, 1949, 9, 339-348.

owd, R. J. Underachieving students of high capacity. J. higher Educ., 1952, 23, 327-330.

dwards, A. L. On Guttman's scale analysis. Educ. psychol. Measmt, 1948, 8, 313-318.

dwards, A. L. & Kilpatrick, F. P. A technique for the construction of attitude scales. J. appl. Psychol., 1948, 32, 374-384.

enichel, O. The psychoanalytic theory of neurosis. New York: W. W. Norton, 1949.

estinger, L. The treatment of qualitative data by "scale analysis." Psychol. Bull., 1947, 44, 149-161.

ough, H. G. The construction of a personality scale to predict scholastic achievement. J. appl. Psychol., 1953, 37, 361-366.

ilford, J. P. Fundamental statistics in psychology and education. (2nd ed.) New York: McGraw-Hill, 1950.

ilford, J. P. Psychometric Methods. (2nd ed.) New York: McGraw-Hill, 1954.

ttman, L. On Festinger's evaluation of scale analysis. Psychol. Bull., 1947, 44, 451-465.

ttman, L. The Cornell technique for scale and intensity analysis. Educ. psychol. Measmt, 1947, 7, 247-280.

ttman, L. The basis for scalogram analysis. In Stouffer, S. A., et al. Measurement and prediction. Princeton: Princeton Univer. Press, 1950. Pp. 60-90.

ttman, L. The scalogram board technique for scale analysis. In Stouffer, S. A., et al. Measurement and prediction. Princeton: Princeton Univer. Press, 1950. Pp. 91-121.

ttman, L. The utility of scalogram analysis. In Stouffer, S. A., et al. Measurement and prediction. Princeton: Princeton Univer. Press, 1950. Pp. 122-171.

ttman, L. On Smith's paper on "'Randomness of error' in reproducible scales." Educ. psychol. Measmt, 1953, 13, 505-511.

dley, J. M. & Kennedy, V. E. A comparison between performance on a sentence completion test and academic success. Educ. psychol. Measmt, 1949, 9, 649-670.

larris, D. The relation to college grades of some factors other than intelligence. Arch. Psychol., 1931, 20, No. 131.

larris, D. Factors affecting college grades: A review of the literature, 1930-1937. Psychol. Bull., 1940, 37, 125-166.

erriott, M. E. Attitudes as factors of scholastic success. Univer. of Illinois Bureau of Educ. Res. Bull., 1929, No. 47.

ollander, E. P. & Bair, J. T. Pre-training attitudes toward authority-figures as predictors of inadequate motivation among Naval Aviation Cadets. Project Number NM 001 058.05.05. U. S. Naval School of Aviation Medicine, Pensacola, Florida, 10 Nov. 1952.

ollander, E. P. & Bair, J. T. Attitudes toward authority-figures as correlates of motivation among Naval Aviation Cadets. J. appl. Psychol., 1954, 38, 21-25.

oyt, D. P. & Norman, W. T. Adjustment and academic predictability. J. counsel. Psychol., 1954, 1, 96-99.

ughes, W. H. Personality traits and the college success of high school graduates. California quart. secondary educ., 1925, 1, 225-236.

endall, M. G. & Smith, B. B. Tables of random sampling numbers. London: Cambridge Univer. Press, 1939.

ugh, H. E. The prediction of academic achievement from measures of personality. Unpublished masters dissertation, Univer. of Pittsburgh, 1952.

athwohl, W. C. Specificity of over- and under-achievement in college courses. J. appl. Psychol., 1952, 36, 103-106.

iedt, P. H. & Clark, K. E. "Item-analysis" versus "scale analysis." J. appl. Psychol., 1949, 33, 114-121.

rd, F. M. Prediction of scholastic achievement from non-cognitive factors. ETS Res. Bull., Princeton: Educational Testing Service, 1950.

Candless, B. R. The Rorschach as a differential predictor of academic success for matched groups of highly superior men. Amer. Psychol., 1947, 2, 414-415. (Abstract)

Candless, B. R. The Rorschach as a predictor of academic success. J. appl. Psychol., 1949, 33, 43-50.

lelland, D. C., Atkinson, J. W., Clark, R. A., & Lowell, E. L. The achievement motive. New York: Appleton-Century Crofts, 1953.

emar, Q. Psychological statistics. (2nd ed.) New York: Wiley, 1955.

uary, J. P. Some relationships between non-intellectual characteristics and academic achievement. J. educ. Psychol., 1953, 44, 215-228.

roe, Ruth L. Prediction of the adjustment and academic performance of college students by a modification of the Rorschach method. Appl. Psychol. Monogr., 1945, No. 7.

ntalto, Fannie D. An application of the group Rorschach technique to the problem of achievement in college. J. clin. Psychol., 1946, 2, 254-260.

rgan, H. H. A psychometric comparison of achieving and non-achieving college students of high ability. J. consult. Psychol., 1952, 16, 292-298.

ers, R. C. The academic overachiever: stereotyped aspects. J. exp. Educ., 1950, 18, 229-238.

borne, R. T. & Sanders, Wilma B. Multiple-choice Rorschach responses of college achievers and non-achievers. Educ. psychol. Measmt, 1949, 9, 685-691.

good, C. E. The nature and measurement of meaning. Psychol. Bull., 1952, 49, 197-237.

rrish, J. & Rethlingshafer, Dorothy. A study of the need to achieve in college achievers and non-achievers. J. gen. Psychol., 1954, 50, 209-226.

illips, W. S. & Osborne, R. T. A note on the relationship of the Kuder Preference Record scales to college marks, scholastic aptitude and other variables. Educ. psychol. Measmt, 1949, 9, 331-337.

ley, Matilda W., Riley, J. W. Jr., & Toby, J. Sociological studies in scale analysis. New Brunswick: Rutgers Univer. Press, 1954.

ssell, H. E. & Bendig, A. W. Student ratings of instructors and course achievement with academic aptitude controlled. Educ. psychol. Measmt, 1953, 13, 626-635.

st, R. M. & Ryan, F. J. The relationship of some Rorschach variables to academic behavior. J. Pers., 1953, 21, 441-456.

an, F. J. Personality differences between under- and over-achievers in college. Ph. D. thesis, 1951, Columbia Univer. Ann Arbor: Univer. Microfilms, No. 2857.

hofield, W. A study of medical students with the MMPI: III. Personality and academic success. J. appl. Psychol., 1953, 37, 47-52.

oemaker, H. A. & Rohrer, J. H. Relationship between success in the study of medicine and certain psychological and personal data. J. Assoc. Amer. Med. Colleges, 1948, 23, 1-12.

2. Schultz, D. G. & Green, F. F. Jr. Predicting academic achievement with a new attitude-interest questionnaire--II. Educ. psychol. Measmt, 1953, 13, 54-64.

3. Smith, R. G. Jr. Reproducible scales and the assumption of normality. Educ. psychol. Measmt, 1950, 10, 395-399.

4. Smith, R. G. Jr. "Randomness of error" in reproducible scales. Educ. psychol. Measmt, 1951, 11, 587-596.

5. Stagner, R. The relation of personality to academic aptitude and achievement. J. educ. Res., 1933, 26, 648-660.

6. Stouffer, S. A. An overview of the contributions to scaling and scale theory. In Stouffer, S. A., et al. Measurement and prediction. Princeton: Princeton Univer. Press, 1950. Pp. 3-45.

7. Suchman, E. A. The logic of scale construction. Educ. psychol. Measmt, 1950, 10, 79-93.

8. Thompson, Grace M. Non-intellective factors and grades: The group Rorschach. Amer. Psychol., 1947, 2, 415. (Abstract)

9. Thompson, Grace M. College grades and the group Rorschach. J. appl. Psychol., 1948, 32, 398-407.

0. Tiebout, H. M. The misnamed lazy student. Educ. Rec., 1943, 24, 113-129.

1. Weigand, G. Goal aspiration and academic success. Personnel Guid. J., 1953, 31, 458-461.

2. Wrenn, C. G. & Humber, W. J. Study habits associated with high and low scholarship. J. educ. Psychol., 1941, 32, 611-616.

3. Young, C. W. & Estabrooks, G. H. Non-intellective factors related to scholastic achievement. Psychol. Bull., 1934, 31, 735-736.

APPENDIX A

Fifty Polar Adjective and Present-participle Combinations

1. active-passive
2. autocratic-democratic
3. bold-shy
4. calm-excited(ing)
5. careful-careless
6. clear-vague
7. confident-timid
8. consistent-inconsistent
9. eager-reticent
0. easy-difficult
1. encouraged(ing)-discouraged(ing)
2. enthusiastic-apathetic
3. exhilarated(ing)-depressed(ing)
4. fair-unfair
5. flexible-rigid
6. generous-demanding
7. good-bad
8. happy-sad
9. healthy-sick
0. helped(ful)-hindered(ing)
1. honest-dishonest
2. honorable-dishonorable
3. intelligent-stupid
4. interested(ing)-bored(ing)
5. kind-cruel
26. liberated(ing)-restricted(ing)
27. lively-dull
28. lovable-hateful
29. loyal-disloyal
30. mature-immature
31. necessary-unnecessary
32. objective-subjective
33. optimistic-pessimistic
34. orderly-chaotic
35. organized-disorganized
36. patient-impatient
37. pleasant (pleased) - unpleasant (displeased)
38. realistic-unrealistic
39. reasonable-unreasonable
40. relaxed-tense
41. rewarded(ing)-punished(ing)
42. sensible-senseless
43. sensitive-insensitive
44. stimulated(ing)-suppressed(ing)
45. strong-weak
46. tolerant-intolerant
47. trusting-suspicious
48. useful-useless
49. valuable-worthless
50. well-adjusted - neurotic

APPENDIX B

The Student Opinion Survey

On the pages that follow you will find incomplete sentences at the top, and sets of opposing attitudes or traits below. Each pair of opposites is separated by six spaces. Each page will look something like this:

I think most children are . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
96.	weak	======	======	======	======	======	======	strong
		1	2	3	4	5	6	
97.	hateful	======	======	======	======	======	======	lovable
		1	2	3	4	5	6	
98.	passive	======	======	======	======	======	======	active
		1	2	3	4	5	6	
99.	realistic	======	======	======	======	======	======	unrealistic
		1	2	3	4	5	6	
00.	loyal	======	======	======	======	======	======	disloyal

You are being asked to do two things:

1. On the basis of your first impressions, decide in which direction you want to complete the sentence at the top of the page, with reference to each set of opposites.

2. As you make each of these decisions, also make a judgment as to whether you think the direction you have chosen applies "Sometimes," "Often," or "Always." (Try to think of the step from "Sometimes" to "Often" as being equal to the step from "Often" to "Always.")

On the answer sheets, darken the space appropriate to your two decisions for each of the sets of opposites as they apply to the incompleted sentence at the top of the page. Darken only one space for each set of opposites and do not skip any of the sets.

Turn your "Background - Answer Sheets" packet over and practice on numbers 96-100 for the incomplete sentence and opposites as they appear in the above sample. For example, suppose you decide that, "I think most children are . . . weak," (rather than "strong"). Then you decide that they are "Often" weak (rather than "Always" or "Sometimes"). You would darken space number 2 opposite 96 on the answer sheet. Do not mark in the test booklet! Do ratings 97-100 as you wish. Are there any questions?

Please be particularly careful to read and follow the instructions at the bottom and top of each page of the test booklet. Do not continue from one page to the next without changing your position on the answer sheets as instructed!

think most instructors are . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
1.	immature	======	======	======	======	======	======	mature
2.	unreasonable	======	======	======	======	======	======	reasonable
3.	relaxed	======	======	======	======	======	======	tense
4.	rigid	======	======	======	======	======	======	flexible
5.	hindering	======	======	======	======	======	======	helpful
6.	autocratic	======	======	======	======	======	======	democratic
7.	organized	======	======	======	======	======	======	disorganized
8.	unrealistic	======	======	======	======	======	======	realistic
9.	stimulating	======	======	======	======	======	======	suppressive
0.	stupid	======	======	======	======	======	======	intelligent
1.	boring	======	======	======	======	======	======	interesting
2.	inconsistent	======	======	======	======	======	======	consistent
3.	subjective	======	======	======	======	======	======	objective
4.	fair	======	======	======	======	======	======	unfair
5.	encouraging	======	======	======	======	======	======	discouraging

rn <u>this</u> answer sheet over and begin with number 51.

Begin with number 51.

When I am studying, I feel . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
1.	suppressed	======	======	======	======	======	======	stimulated
2.	calm	======	======	======	======	======	======	excited
3.	liberated	======	======	======	======	======	======	restricted
4.	enthusiastic	======	======	======	======	======	======	apathetic
5.	chaotic	======	======	======	======	======	======	orderly
6.	happy	======	======	======	======	======	======	sad
7.	careful	======	======	======	======	======	======	careless
8.	clear	======	======	======	======	======	======	vague
9.	interested	======	======	======	======	======	======	bored
0.	tense	======	======	======	======	======	======	relaxed
.	useful	======	======	======	======	======	======	useless
.	stupid	======	======	======	======	======	======	intelligent
.	discouraged	======	======	======	======	======	======	encouraged
.	rewarded	======	======	======	======	======	======	punished
.	eager	======	======	======	======	======	======	reluctant

Stop! Turn to answer sheet 2, and begin with number 1.

egin with number 1 on answer sheet 2.

aving a college degree would be . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
1.	realistic	======	======	======	======	======	======	unrealistic
2.	good	======	======	======	======	======	======	bad
3.	unnecessary	======	======	======	======	======	======	necessary
4.	suppressive	======	======	======	======	======	======	stimulating
5.	discouraging	======	======	======	======	======	======	encouraging
6.	hindering	======	======	======	======	======	======	helpful
7.	elating	======	======	======	======	======	======	depressing
8.	useless	======	======	======	======	======	======	useful
9.	punishing	======	======	======	======	======	======	rewarding
0.	reasonable	======	======	======	======	======	======	unreasonable
1.	senseless	======	======	======	======	======	======	sensible
2.	boring	======	======	======	======	======	======	interesting
3.	stupid	======	======	======	======	======	======	intelligent
4.	valuable	======	======	======	======	======	======	worthless
5.	pleasant	======	======	======	======	======	======	unpleasant

op! Go back to answer sheet 1 and begin with number 16.

Begin with number 16 on answer sheet 1.

I think most textbooks are . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
16.	stimulating	======	======	======	======	======	======	suppressive
		1	2	3	4	5	6	
17.	vague	======	======	======	======	======	======	clear
		1	2	3	4	5	6	
18.	helpful	======	======	======	======	======	======	hindering
		1	2	3	4	5	6	
19.	easy	======	======	======	======	======	======	difficult
		1	2	3	4	5	6	
20.	disorganized	======	======	======	======	======	======	organized
		1	2	3	4	5	6	
21.	worthless	======	======	======	======	======	======	valuable
		1	2	3	4	5	6	
22.	consistent	======	======	======	======	======	======	inconsistent
		1	2	3	4	5	6	
23.	unrealistic	======	======	======	======	======	======	realistic
		1	2	3	4	5	6	
24.	pleasant	======	======	======	======	======	======	unpleasant
		1	2	3	4	5	6	
25.	senseless	======	======	======	======	======	======	sensible
		1	2	3	4	5	6	
26.	lively	======	======	======	======	======	======	dull
		1	2	3	4	5	6	
27.	useless	======	======	======	======	======	======	useful
		1	2	3	4	5	6	
28.	unnecessary	======	======	======	======	======	======	necessary
		1	2	3	4	5	6	
29.	boring	======	======	======	======	======	======	interesting
		1	2	3	4	5	6	
30.	subjective	======	======	======	======	======	======	objective

Stop! Turn <u>this</u> answer sheet over and begin with number 66.

Begin with number 66.

Just before a test, I feel . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
66.	pleasant	======	======	======	======	======	======	unpleasant
67.	stimulated	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	suppressed
68.	encouraged	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	discouraged
69.	active	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	passive
70.	rigid	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	flexible
71.	pessimistic	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	optimistic
72.	confident	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	timid
73.	bad	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	good
74.	disorganized	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	organized
75.	sensitive	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	insensitive
76.	calm	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	excited
77.	intelligent	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	stupid
78.	shy	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	bold
79.	relaxed	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	tense
80.	vague	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	clear

Stop! Turn to answer sheet 2, and begin with number 16.

Begin with number 16 on answer sheet 2.

Working for recognition from others is . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
16.	unrealistic	======	======	======	======	======	======	realistic
		1	2	3	4	5	6	
17.	easy	======	======	======	======	======	======	difficult
		1	2	3	4	5	6	
18.	senseless	======	======	======	======	======	======	sensible
		1	2	3	4	5	6	
19.	immature	======	======	======	======	======	======	mature
		1	2	3	4	5	6	
20.	stimulating	======	======	======	======	======	======	suppressing
		1	2	3	4	5	6	
21.	valuable	======	======	======	======	======	======	worthless
		1	2	3	4	5	6	
22.	elating	======	======	======	======	======	======	depressing
		1	2	3	4	5	6	
23.	encouraging	======	======	======	======	======	======	discouraging
		1	2	3	4	5	6	
24.	rewarding	======	======	======	======	======	======	punishing
		1	2	3	4	5	6	
25.	unpleasant	======	======	======	======	======	======	pleasant
		1	2	3	4	5	6	
26.	stupid	======	======	======	======	======	======	intelligent
		1	2	3	4	5	6	
27.	necessary	======	======	======	======	======	======	unnecessary
		1	2	3	4	5	6	
28.	unreasonable	======	======	======	======	======	======	reasonable
		1	2	3	4	5	6	
29.	confident	======	======	======	======	======	======	timid
		1	2	3	4	5	6	
30.	unfair	======	======	======	======	======	======	fair

Stop! Go back to answer sheet 1, and begin with number 31.

Begin with number 31 on answer sheet 1.

I think most academic requirements are . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
31.	useful	======	======	======	======	======	======	useless
32.	intelligent	======	======	======	======	======	======	stupid
33.	inconsistent	======	======	======	======	======	======	consistent
34.	punishing	======	======	======	======	======	======	rewarding
35.	sensible	======	======	======	======	======	======	senseless
36.	worthless	======	======	======	======	======	======	valuable
37.	orderly	======	======	======	======	======	======	chaotic
38.	helpful	======	======	======	======	======	======	hindering
39.	unnecessary	======	======	======	======	======	======	necessary
40.	reasonable	======	======	======	======	======	======	unreasonable
41.	fair	======	======	======	======	======	======	unfair
42.	easy	======	======	======	======	======	======	difficult
43.	realistic	======	======	======	======	======	======	unrealistic
44.	clear	======	======	======	======	======	======	vague
45.	encouraging	======	======	======	======	======	======	discouraging

Stop! Turn this answer sheet over and begin with number 81.

Begin with number 81.

When called on to contribute to a class discussion, I feel . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
81.	eager	======	======	======	======	======	======	reluctant
82.	sensitive	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	insensitive
83.	interested	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	bored
84.	sad	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	happy
85.	intelligent	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	stupid
86.	timid	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	confident
87.	apathetic	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	enthusiastic
88.	bold	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	shy
89.	orderly	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	chaotic
90.	clear	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	vague
91.	excited	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	calm
92.	tense	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	relaxed
93.	elated	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	depressed
94.	organized	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	disorganized
95.	immature	1 ======	2 ======	3 ======	4 ======	5 ======	6 ======	mature

Stop! Turn to answer sheet 2, and begin with number 31.

Begin with number 31 on answer sheet 2.

Being an outstanding success would be . . .

		Always	Often	Some-times	Some-times	Often	Always	
		1	2	3	4	5	6	
31.	depressing	======	======	======	======	======	======	elating
32.	dishonorable	======	======	======	======	======	======	honorable
33.	calm	======	======	======	======	======	======	exciting
34.	immature	======	======	======	======	======	======	mature
35.	stupid	======	======	======	======	======	======	intelligent
36.	sensible	======	======	======	======	======	======	senseless
37.	unpleasant	======	======	======	======	======	======	pleasant
38.	difficult	======	======	======	======	======	======	easy
39.	punishing	======	======	======	======	======	======	rewarding
40.	lively	======	======	======	======	======	======	dull
41.	good	======	======	======	======	======	======	bad
42.	restricting	======	======	======	======	======	======	liberating
43.	interesting	======	======	======	======	======	======	boring
44.	suppressive	======	======	======	======	======	======	stimulating
45.	valuable	======	======	======	======	======	======	worthless

This is the end. Thank you!

SCORES

NAME _____ DATE _____ 1 _____ 5 _____ DATE OF BIRTH _____ AGE _____ SEX _____

LAST FIRST MIDDLE M OR F

SCHOOL _____ CITY _____ 2 _____ 6 _____

3 _____ 7 _____ GRADE OR CLASS _____ INSTRUCTOR _____

1 _____ 2 _____ 4 _____ 8 _____ NAME OF TEST _____ PART 2

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BE SURE YOUR MARKS ARE HEAVY AND BLACK. ERASE COMPLETELY ANY ANSWER YOU WISH TO CHANGE.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
2	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
3	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
4	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
5	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
6	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
7	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
8	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
9	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
10	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
11	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
12	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
13	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
14	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
15	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
16	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
17	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
18	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
19	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
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21	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
22	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
23	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
24	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
25	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
26	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
27	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
28	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
29	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
30	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
31	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
32	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
33	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
34	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
35	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
36	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
37	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
38	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
39	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
40	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
41	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
42	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
43	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
44	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
45	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
46	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
47	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
48	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
49	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯
50	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯

NAME _____
LAST FIRST MIDDLE

SCORES

1. _____ 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____ 8. _____

(OVER)

IBM FORM I.T.S. 1100 A 151-2

BE SURE YOUR MARKS ARE HEAVY AND BLACK. ERASE COMPLETELY ANY ANSWER YOU WISH TO CHANGE.

51 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
53 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
54 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
55 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
56 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
57 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
58 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
59 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
60 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
61 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
62 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
63 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
64 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
65 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
66 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
67 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
68 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
69 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
70 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
71 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
72 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
73 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
74 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
75 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
76 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
77 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
78 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
79 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
80 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
81 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
82 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
83 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
84 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
85 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
86 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
87 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
88 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
89 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
90 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
91 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
92 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
93 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
94 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
95 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
96 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
97 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
98 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
99 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

APPENDIX D

May 29, 1956

Dear Mr.

You are one of sixty-eight Michigan State men who are receiving letters like this today. Out of my personal account, I will give a $20 prize to one of these sixty-eight men, a $10 prize to another, on the basis of a drawing to be held before interested members of the group at 9:00 PM, Monday, June 11, in the Counseling Center waiting room, on the second floor of the Basic College Building.

Offering these prizes is the best way I have of making it worth your while at this busy time of the year to participate in a research study which I am conducting. Participation in the study will take only one hour of your time and involves a paper and pencil method requiring only slight concentration or thought. In short it is painless, and even interesting.

Because your name, and those of the sixty-seven others, has been very carefully selected out of the total group of men who first came to State last fall, it is necessary that you bring this letter and your ID card as proof of your identity when you come to participate.

Sessions will be held at 7:00 PM and 8:30 PM in the basement of the Basic College Building each of these evenings: June 1, 4, 5, 6, and 7. Saturday, June 2, sessions will be at 9:00 AM and 10:30 AM. If none of these times is convenient for you, please call me at the University, Extension 2567, and I will be glad to arrange a time suitable for you.

The drawing for the $20 and $10 prizes will be from among signed slips which you will be able to submit when you have completed your part in the study. Only those men who actually participate will be eligible for the prizes, but you need not be present at the drawing to win. If you win but are not present, a check will be mailed to you at your home address.

Not only do you have a good chance of winning one of the prizes, you will be assisting in research which may benefit you and other students in the years to come. I will very greatly appreciate your cooperation in this study, and look forward to working with you.

Sincerely yours,

Walter R. Stevens
Counselor

Background - Answer Sheets

Name:_____ BirthDATE:_____

Where did you graduate from high school?_____ When?_____

Marital status (underline one): Never married, Married, Separated, Divorced, Other

If you are married, for how long?_____ Are you a veteran?_____

If you have worked while here in college, indicate opposite the proper terms below the approximate average number of hours per week worked:

Fall '55_____ Winter '56_____ Spring '56_____

Had you earned any college credits before coming to State?_____ How many?_____

What is your major field?_____ Have you changed your major since coming to State?_____ From what?_____

Have you ever taken Psychology 101, "Methods of Effective Study"?_____ When?_____ Why?_____

If you have taken any of the Improvement Service courses here, underline the proper term below, opposite the course(s) you took, and briefly give the reason for your taking it:

		Reason:
Arithmetic Improvement:	Fall, Winter, Spring	_____
Reading Improvement :	Fall, Winter, Spring	_____
Speech Improvement :	Fall, Winter, Spring	_____
Writing Improvement :	Fall, Winter, Spring	_____

Concerning your parents:	Father	Mother
Are they living?	_____	_____
Extent of their education	_____years	_____years
Educated mostly in U. S.?	_____	_____

Are they still living together?_____ If not, how old were you when the family was broken?_____, and with whom did you live subsequently?_____

_____

Indicate your position among your brothers and/or sisters. (Indicate brothers with a "B," sisters with an "S," and yourself with an "I.")

_____ _____ _____ _____ _____ _____ _____ _____ _____

youngest oldest

Background - Answer Sheets

Note: All of the information asked for below will be held completely confidential. It is for my personal use in evaluating the results of the opinion survey which follows. In no instance will it be given to any member of the Psychology Department or to any other Michigan State University staff member or student. It will not be a part of any file.

Name:_____ Sex:_____ BirthDATE:_____

Your high school:_____ Town:_____ Grad. when?_____

Are you a veteran?_____ If you are married, since what term in college?_____

When did you first come to State?_____ Has your college education been interrupted at any time?_____ When?_____ For how long?_____

What is your major field?_____ Have you changed your major since coming to State?_____ From what?_____

When?_____ Why?_____

How did you first hear of Psychology 101?_____

When?_____ What (or who) actually led you to enroll in this course?_____

_____ If someone else urged you to take it, do you think you were yourself generally in favor of it or opposed to it?_____

What do you now think of the course?_____

If you have worked while here in college, indicate below the appropriate average number of hours per week worked in each term you have been here:

_____ _____ _____ _____ _____ _____

Concerning your parents:	Father	Mother
Are they living?	_____	_____
Extent of their education?	_____years	_____years
Educated mostly in U. S. (or other English-speaking country)?	_____	_____

Are they still living together?_____ If not, how old were you when the family was broken?_____, and with whom did you live subsequently?_____

_____

Indicate your position among your brothers and/or sisters. (Indicate brothers with a "B," sisters with an "S," and yourself with an "M.")

_____ _____ _____ _____ _____ _____ _____ _____ _____

youngest oldest

Background - Answer Sheets

Note: All of the information asked for below, and that you will be giving in replying to the opinion survey which follows, is for my own personal use. In no instance will your replies be available to any other member of the Psychology Department or to any other SDSC staff member or student, except in the form of the group results for the total sample of students being asked to participate. Several weeks after the spring recess I hope to be able to return the results to you and discuss with you the purpose of the study.

Name:_____ Sex:_____ BirthDATE:_____

Where did you graduate from high school?_____ When?_____

Are you a veteran?_____ Are you married?_____ When were you married?_____

When did you first come to SDSC?_____ Had you been in college before?_____

Has your college education been interrupted at any time?_____ When?_____ For how long?_____ Reason:_____

What is your major field?_____ Have you changed your major since coming to SDSC?_____ From what?_____ When?_____

Reason:_____

If you have worked while here in college, indicate below the approximate average number of hours per week worked in each term you have been here:

1st semester	2nd semester	3rd semester	4th semester	5th semester	6th semester

Concerning your parents:	Father	Mother
Are they living?	_____	_____
Extent of their education	_____years	_____years
Educated mostly in U. S. (or other English-speaking country)?	Y N	Y N

If both are living, are they still living together?_____ If not living together, or if one or both are deceased, how old were you when the family was broken?_____, and with whom did you live subsequently?_____

Indicate your position among your brothers and/or sisters. (Indicate brothers with a "B," sisters with an "S," and yourself with an "M.")

youngest							oldest

APPENDIX H

Terms Which Defined the a Priori "Positive" Extreme for Each Item of the Student Opinion Survey, as Determined by the Judges

Attitude Area X	Attitude Area Y	Attitude Area Z
1. mature	51. stimulated	1. realistic
2. reasonable	52. calm	2. good
3. relaxed	53. liberated	3. necessary
4. flexible	54. enthusiastic	4. stimulating
5. helpful	55. orderly	5. encouraging
6. democratic	56. happy	6. helpful
7. organized	57. careful	7. elating
8. realistic	58. clear	8. useful
9. stimulating	59. interested	9. rewarding
10. intelligent	60. relaxed	10. reasonable
11. interesting	61. useful	11. sensible
12. consistent	62. intelligent	12. interesting
13. objective	63. encouraged	13. intelligent
14. fair	64. rewarded	14. valuable
15. encouraging	65. eager	15. pleasant
16. stimulating	66. pleasant	16. realistic
17. clear	67. stimulated	17. easy
18. helpful	68. encouraged	18. sensible
19. easy	69. active	19. mature
20. organized	70. flexible	20. stimulating
21. valuable	71. optimistic	21. valuable
22. consistent	72. confident	22. elating
23. realistic	73. good	23. encouraging
24. pleasant	74. organized	24. rewarding
25. sensible	75. sensitive	25. pleasant
26. lively	76. calm	26. intelligent
27. useful	77. intelligent	27. necessary
28. necessary	78. bold	28. reasonable
29. interesting	79. relaxed	29. confident
30. objective	80. clear	30. fair
31. useful	81. eager	31. elating
32. intelligent	82. sensitive	32. honorable
33. consistent	83. interested	33. exciting
34. rewarding	84. happy	34. mature
35. sensible	85. intelligent	35. intelligent
36. valuable	86. confident	36. sensible
37. orderly	87. enthusiastic	37. pleasant
38. helpful	88. bold	38. easy
39. necessary	89. orderly	39. rewarding
40. reasonable	90. clear	40. lively
41. fair	91. calm	41. good
42. easy	92. relaxed	42. liberating
43. realistic	93. elated	43. interesting
44. clear	94. organized	44. stimulating
45. encouraging	95. mature	45. valuable

APPENDIX I

Items Approximating Desired Scale Distributions in Original Forty-five-item Matrices; Also Data on Which Final Item Selection Was Based

Item No.	"Positive" categories	% of Ss "positive"	(A) No. of Ss beyond cut*	(B) No. of errors*	Ratio B/A
Area X:					
2	4, 5, 6	65	25	13	.52
6	5, 6	54	19	18	.95
8	5, 6	70	24	17	.71
10	6	29	20	14	.70
11	4, 5, 6	44	24	18	.75
15	5, 6	56	28	19	.68
16	4, 5, 6	52	27	20	.74
17	4, 5, 6	40	27	18	.67
23	5, 6	59	27	15	.56
24	4, 5, 6	60	29	18	.62
25	5, 6	65	26	12	.46
30	5, 6	51	26	17	.65
33	5, 6	44	31	12	.39
34	5, 6	63	25	12	.48
35	5, 6	59	19	12	.63
40	5, 6	56	22	18	.82
43	5, 6	54	26	15	.58
45	5, 6	35	13	13	1.00
Area Y:					
51	4, 5, 6	49	21	19	.91
54	4, 5, 6	67	14	11	.79
55	5, 6	44	28	18	.64
56	5, 6	38	23	17	.74
58	4, 5, 6	43	22	15	.68
63	4, 5, 6	40	22	15	.68
64	5, 6	67	30	19	.63
66	4, 5, 6	40	26	15	.58
67	4, 5, 6	62	31	17	.55
68	4, 5, 6	57	24	19	.79
69	5, 6	70	18	13	.72
74	4, 5, 6	60	28	13	.46
78	4, 5, 6	59	19	15	.79
80	4, 5, 6	46	28	14	.50
81	4, 5, 6	68	20	12	.60
84	5, 6	49	29	15	.52
86	4, 5, 6	56	20	10	.50
87	5, 6	41	23	15	.65

(continued on next page)

APPENDIX I (continued)

Item No.	"Positive" categories	% of Ss "positive"	(A) No. of Ss beyond cut*	(B) No. of errors*	Ratio B/A
Area Y (continued):					
88	4, 5, 6	56	29	17	.59
89	5, 6	41	29	14	.48
90	5, 6	38	20	12	.60
93	5, 6	37	24	13	.54
94	4, 5, 6	57	23	16	.70
95	4, 5, 6	76	15	12	.80
Area Z:					
4	6	51	28	20	.72
8	6	56	29	12	.41
12	6	25	13	13	1.00
15	6	41	14	16	1.14
18	6	24	18	9	.50
19	5, 6	56	25	7	.28
21	5, 6	71	15	13	.87
26	5, 6	54	23	14	.61
29	5, 6	40	20	15	.75
31	6	51	24	16	.67
32	6	52	27	17	.63
34	6	37	21	10	.48
36	6	44	17	15	.88
37	6	29	14	11	.79
39	6	33	16	13	.81
41	6	24	15	8	.53

* These figures are derived from the original, forty-five-item, item-score matrices. The "cut" referred to in Column A is the cutting point in the distribution of respondent rankings in those matrices at which the investigator would alter predictions as to item responses: "positive" being the prediction for all subjects ranked above the cutting point, and "negative" the prediction for all subjects ranked below the cutting point. For a fuller discussion, see pages 32 and 33.

APPENDIX J

Final Item-Score Matrix (5 Dichotomized Items); Attitude Area X

Subject number*	Items and scoring weights Item No.: 45 33 43 35 34 Weight : 16 8 4 2 1	Unique score	Scale type	Total errors
9	x x x x x	31	5	0
15	x x x x x	31	5	0
16	x x x x x	31	5	0
18	x x x x x	31	5	0
23	x x x x x	31	5	0
46	x x x x x	31	5	0
57	x x x x x	31	5	0
58	x x x x x	31	5	0
63	x x x x x	31	5	0
27	x x x x ( )	30	5	1
44	x x x ( ) x	29	5	1
4	x x ( ) x x	27	5	1
28	x x ( ) x x	27	5	1
48	x x ( ) x x	27	5	1
5	x x x x	15	4	0
25	x x x x	15	4	0
35	x x x x	15	4	0
37	x x x x	15	4	0
50	x x x x	15	4	0
52	x x x x	15	4	0
55	x x x x	15	4	0
2	x x x ( )	14	4	1
49	x x x ( )	14	4	1
7	x x ( ) ( )	12	4	2
24	x x x	7	3	0
32	x x x	7	3	0
62	x x x	7	3	0
3	(x) x x x	23	3	1
38	(x) x x x	23	3	1
39	(x) x x x	23	3	1
51	(x) x x x	23	3	1
14	x x ( )	6	3	1
22	x x ( )	6	3	1
45	x x ( )	6	3	1
26	x ( ) x	5	3	1
31	x ( ) x	5	3	1
61	x ( ) x	5	3	1

(continued on next page)

APPENDIX J (continued)

Subject number*	Items and scoring weights Item No.: 45 33 43 35 34 Weight : 16 8 4 2 1	Unique score	Scale type	Total errors
21	x x	3	2	0
42	x x	3	2	0
1	(x) x x	19	2	1
17	(x) x x	11	2	1
19	(x) x x	11	2	1
12	x	1	1	0
29	x	1	1	0
47	x	1	1	0
56	x	1	1	0
6	(x) x	17	1	1
11	(x) (x) x	25	1	2
8		0	0	0
10		0	0	0
13		0	0	0
20		0	0	0
33		0	0	0
34		0	0	0
36		0	0	0
40		0	0	0
41		0	0	0
43		0	0	0
53		0	0	0
54		0	0	0
59		0	0	0
60		0	0	0
30	(x) (x)	24	0	2
Total errors:	8 4 3 5 7			27
% error :	12.7 6.4 4.8 7.9 11.1			8.6

* Subjects are numbered according to their CGPA rank, with 1 being assigned to the student with the highest CGPA and 63 assigned to the student with the lowest CGPA. Where subjects were tied for a particular CGPA, they were numbered in keeping with the alphabetical order of their last initials. In Appendixes M and N subjects will be found ranked in descending order.

APPENDIX K

Final Item-Score Matrix (5 Dichotomized Items); Attitude Area Y

Subject number*	Items and scoring weights Item No.: 93 89 84 86 54 Weight : 16 8 4 2 1	Unique score	Scale type	Total errors
4	x x x x x	31	5	0
6	x x x x x	31	5	0
15	x x x x x	31	5	0
16	x x x x x	31	5	0
32	x x x x x	31	5	0
38	x x x x x	31	5	0
44	x x x x x	31	5	0
52	x x x x x	31	5	0
55	x x x x x	31	5	0
62	x x x x x	31	5	0
23	x x x x ( )	30	5	1
26	x x x x ( )	30	5	1
47	x x x x ( )	30	5	1
17	x x ( ) x x	27	5	1
18	x x x x	15	4	0
41	x x x x	15	4	0
61	x x x x	15	4	0
63	x x ( ) x	13	4	1
57	x x ( ) ( )	12	4	2
11	x x x	7	3	0
25	x x x	7	3	0
36	x x x	7	3	0
3	(x) x x x	23	3	1
14	(x) x x x	23	3	1
24	(x) x x x	23	3	1
51	x x ( )	6	3	1
5	x ( ) x	5	3	1
19	x ( ) x	5	3	1
58	x ( ) x	5	3	1
1	(x) x x ( )	22	3	2
2	(x) x ( ) x	21	3	2

(continued on next page)

APPENDIX K (continued)

Subject number*	Items and scoring weights Item No.: 93 89 84 86 54 Weight : 16 8 4 2 1	Unique score	Scale type	Total errors
10	x x	3	2	0
33	x x	3	2	0
43	x x	3	2	0
48	x x	3	2	0
50	x x	3	2	0
12	(x) x x	19	2	1
8	(x) x x	11	2	1
28	(x) x x	11	2	1
46	(x) x x	11	2	1
40	(x) x ( )	18	2	2
7	x	1	1	0
13	x	1	1	0
22	x	1	1	0
27	x	1	1	0
31	x	1	1	0
34	x	1	1	0
37	x	1	1	0
45	(x) x	9	1	1
20		0	0	0
29		0	0	0
39		0	0	0
42		0	0	0
53		0	0	0
54		0	0	0
56		0	0	0
59		0	0	0
60		0	0	0
21	(x)	16	0	1
30	(x)	8	0	1
49	(x)	8	0	1
9	(x)	4	0	1
35	(x) (x)	24	0	2
Total errors:	9 7 2 6 7			31
% error :	14.3 11.1 3.2 9.5 11.1			9.8

* Subjects are numbered according to their CGPA rank, with 1 being assigned to the student with the highest CGPA and 63 assigned to the student with the lowest CGPA. Where subjects were tied for a particular CGPA, they were numbered in keeping with the alphabetical order of their last initials. In Appendixes M and N subjects will be found ranked in descending order.

APPENDIX L

Final Item-Score Matrix (5 Dichotomized Items); Attitude Area Z

Subject number*	Items and scoring weights Item No.: 41 34 36 19 21 Weight : 16 8 4 2 1	Unique score	Scale type	Total errors
4	x x x x x	31	5	0
10	x x x x x	31	5	0
16	x x x x x	31	5	0
31	x x x x x	31	5	0
43	x x x x x	31	5	0
58	x x x x x	31	5	0
25	x x x x ( )	30	5	1
62	x x x ( ) x	29	5	1
48	x x ( ) x x	27	5	1
63	x x ( ) x x	27	5	1
19	x x x ( ) ( )	28	5	2
13	x x x x	15	4	0
15	x x x x	15	4	0
28	x x x x	15	4	0
39	x x x x	15	4	0
46	x x x x	15	4	0
26	x x ( ) x	13	4	1
30	x x ( ) x	13	4	1
9	x x ( ) ( )	12	4	2
42	x x x	7	3	0
44	x x x	7	3	0
50	x x x	7	3	0
52	x x x	7	3	0
59	x x x	7	3	0
45	(x) x x x	23	3	1
47	(x) x x x	23	3	1
17	x ( ) x	5	3	1
5	x x	3	2	0
18	x x	3	2	0
22	x x	3	2	0
32	x x	3	2	0
33	x x	3	2	0
38	x x	3	2	0
41	x x	3	2	0

(continued on next page)

APPENDIX L (continued)

Subject number*	Items and scoring weights Item No.: 41 34 36 19 21 Weight : 16 8 4 2 1	Unique score	Scale type	Total errors
55	x x	3	2	0
56	x x	3	2	0
57	x x	3	2	0
6	(x) x x	11	2	1
7	(x) x x	11	2	1
35	(x) x x	11	2	1
61	x ( )	2	2	1
1	x	1	1	0
3	x	1	1	0
11	x	1	1	0
20	x	1	1	0
29	x	1	1	0
37	x	1	1	0
49	x	1	1	0
24	(x) x	9	1	0
2		0	0	0
8		0	0	0
12		0	0	0
14		0	0	0
23		0	0	0
27		0	0	0
36		0	0	0
51		0	0	0
53		0	0	0
54		0	0	0
60		0	0	0
21	(x)	4	0	1
34	(x) (x)	20	0	2
40	(x) (x)	20	0	2
Total errors:	4 4 5 6 4			23
% error :	6.4 6.4 7.9 9.5 6.4			7.3

* Subjects are numbered according to their CGPA rank, with 1 being assigned to the student with the highest CGPA and 63 assigned to the student with the lowest CGPA. Where subjects were tied for a particular CGPA, they were numbered in keeping with the alphabetical order of their last initials. In Appendixes M and N subjects will be found ranked in descending order.

APPENDIX M

Data Summary: Achievement, Intellective, and Attitude Measures

Subject number	CGPA	Orientation test* raw scores						Attitude scores (scale types)		
		E	A	Q	L	V	C	IIS	SCS	AVS
1	3.34	18	36	48	62	20	23	2	3	1
2	3.31	22	39	40	63	14	22	4	3	0
3	3.26	16	35	40	67	21	20	3	3	1
4	3.24	19	37	40	58	19	18	5	5	5
5	3.00	16	37	45	63	12	19	4	3	2
6	2.98	12	38	40	56	20	23	1	5	2
7	2.94	19	38	43	62	12	18	4	1	2
8	2.90	13	35	40	62	17	21	0	2	0
9	2.79	17	37	39	56	17	21	5	0	4
10	2.74	18	38	46	61	14	22	0	2	5
11	2.70	17	36	39	64	14	22	1	3	1
12	2.67	16	26	39	67	17	20	1	2	0
13	2.65	16	35	43	56	14	23	0	1	4
14	2.60	19	37	44	64	16	17	3	3	0
15	2.58	18	31	44	54	17	20	5	5	4
16	2.58	17	36	47	63	13	19	5	5	5
17	2.57	20	33	48	55	20	22	2	5	3
18	2.56	23	33	42	55	16	19	5	4	2
19	2.55	15	40	46	63	17	17	2	3	5
20	2.54	11	39	45	67	18	18	0	0	1
21	2.53	20	28	41	63	14	18	2	0	0
22	2.52	16	33	38	52	12	20	3	1	2
23	2.51	16	29	41	62	13	17	5	5	0
24	2.51	16	31	39	64	13	17	3	3	1
25	2.47	12	36	47	65	21	18	4	3	5
26	2.46	18	36	43	67	16	22	3	5	4
27	2.43	21	35	45	65	15	17	5	1	0
28	2.40	19	36	44	65	18	19	5	2	4
29	2.38	17	31	38	54	14	18	1	0	1
30	2.33	12	38	47	61	13	17	0	0	4
31	2.31	15	38	47	54	14	22	3	1	5
32	2.31	15	38	48	57	13	18	3	5	2
33	2.29	18	40	47	63	15	17	0	2	2
34	2.29	21	38	46	64	16	17	0	1	0

(continued on next page)

APPENDIX M (continued)

Subject number	CGPA	Orientation test* raw scores						Attitude scores (scale types)		
		E	A	Q	L	V	C	IIS	SCS	AVS
35	2.24	14	39	40	55	16	21	4	0	2
36	2.22	14	34	41	57	20	20	0	3	0
37	2.22	21	38	40	63	18	19	4	1	1
38	2.20	15	35	43	62	14	17	3	5	2
39	2.20	17	39	45	60	14	18	3	0	4
40	2.18	16	34	38	52	16	22	0	2	0
41	2.18	17	31	44	53	20	19	0	4	2
42	2.15	14	37	39	60	20	19	2	0	3
43	2.14	14	27	44	67	17	17	0	2	5
44	2.13	19	35	45	59	19	21	5	5	3
45	2.10	20	35	48	64	13	20	3	1	3
46	2.09	22	40	44	52	12	19	5	2	4
47	2.08	13	35	45	60	18	21	1	5	3
48	2.07	16	27	41	67	15	17	5	2	5
49	2.04	15	36	47	63	15	23	4	0	1
50	2.04	20	36	46	62	19	20	4	2	3
51	2.00	16	39	44	58	12	23	3	3	0
52	1.98	12	38	47	62	13	23	4	5	3
53	1.98	16	34	43	61	19	18	0	0	0
54	1.98	14	30	47	53	13	23	0	0	0
55	1.92	21	39	47	54	12	20	4	5	2
56	1.88	15	31	48	63	13	17	1	0	2
57	1.87	20	38	45	53	14	22	5	4	2
58	1.83	14	36	48	53	14	18	5	3	5
59	1.71	21	36	40	63	16	22	0	0	3
60	1.68	17	34	39	66	15	18	0	0	0
61	1.68	16	32	46	58	18	18	3	4	2
62	1.62	11	37	41	59	21	20	3	5	5
63	1.08	19	34	46	66	20	23	5	4	5

* See page 48 for names of Orientation Tests.

APPENDIX N

Data Summary: Time Spent in Outside Work, Field of Specialization, and Credits Carried

Subject number	Aver. outside work load (hrs. per wk.)	Major field*	Previous major field*	Credits carried (1 year)
1	0	Pre-M	Pre-V	47
2	14	E E	N C	48
3	0	For	N C	54
4	29	Econ	N P	49
5	0	Civ E	N C	52
6	0	Engin	N C	52
7	17	Pol A	G B	50
8	0	N P	N C	42
9	13	D Mfg	N C	43
10	0	Pre-V	N C	50
11	0	Ind D	M E	50
12	0	Journ	Pol A	49
13	0	Hist	N C	43
14	0	M E	N C	50
15	10	Art	N C	48
16	0	M E	N C	55
17	0	E E	N C	56
18	0	Pre-V	N C	48
19	10	Engin	N C	55
20	0	M E	N C	50
21	0	N P	N C	49
22	0	Engin	N P	50
23	0	Art	N C	45
24	11	Civ E	For	49
25	0	E E	N C	55
26	0	G B	N C	44
27	21	Pre-V	N C	49
28	20	Ag Ed	N C	45
29	0	Sp Co	N P	45
30	0	Res B	N C	49
31	0	G B	N C	49
32	10	G B	N P	48
33	15	Pre-D	N C	45
34	0	G B	N C	48
35	0	D Mfg	N C	46
36	0	M E	N C	45
37	0	F Dis	N C	49

(continued on next page)

APPENDIX N (continued)

Subject number	Aver. outside work load (hrs. per wk.)	Major field*	Previous major field*	Credits carried (1 year)
38	0	N P	N C	46
39	0	Geol	N P	45
40	14	G B	N C	50
41	0	Hotel	N C	51
42	0	Int R	Bact	48
43	8	Pre-V	N C	43
44	12	G Agr	N C	47
45	4	G B	N C	49
46	0	For	Pol A	53
47	0	Markt	F Dis	49
48	0	Pol S	N C	46
49	0	M E	N C	51
50	7	G B	Ph Ed	49
51	12	N P	N C	48
52	0	M E	N C	43
53	3	G B	Hotel	49
54	10	Adv	N C	49
55	4	Pol A	N C	53
56	8	Draft	M E	49
57	0	N P	Engin	54
58	8	Ph Ed	G B	48
59	22	N P	Cem E	48
60	0	Pre-M	N C	47
61	0	Hotel	N C	50
62	3	N P	Pre-M	45
63	0	G B	Hotel	49

* Key to abbreviations used:

Adv :	Advertizing	F Dis:	Food distrib.	M E :	Mech. engin.
Ag ed:	Agric. educ.	For :	Forestry	N C :	No change
Art :	Art	G Agr:	Gen. agric.	N P :	No preference
Bact :	Bacteriology	G B :	Gen. business	Ph Ed:	Phys. educ.
Cem E:	Chem. engin.	Geol :	Geology	Pol A:	Police admin.
Civ E:	Civil engin.	Hist :	History	Pol S:	Polit. sci.
D Mfg:	Dairy manuf.	Hotel:	Hotel admin.	Pre-D:	Pre-dental
Draft:	Drafting	Ind D:	Indust. design	Pre-M:	Pre-medical
Econ :	Economics	Int R:	Internat. relat.	Pre-V:	Pre-vet. med.
E E :	Elect. engin.	Journ:	Journalism	Res B:	Resid. bldg.
Engin:	Engineering	Markt:	Marketing	Sp Co:	Speech corr.