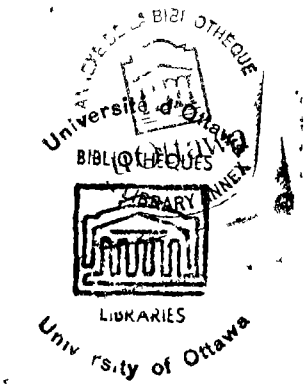
THE RELATION OF PERSONALITY, INTERESTS, AND VALUES TO FIELDS OF CONCENTRATION.

by Sister Mary Aloysius Sabacinska, CSFN

Thesis presented to the Faculty of Psychology and Education of the University of Ottawa as partial fulfillment of the requirements for the degree of Doctor of Philosophy



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CURRICULUM STUDIORUM

Sister Mary Aloysius Rubacinska was born January 16, 1913, in Worcester, Massachusetts. She received the Bachelor of Science degree in Education with a major in mathematics from The Catholic University of America, Washington, D. C., in 1943. She received the Master of Arts degree in Education from The Catholic University of America, Washington, D. C., in 1945. The title of her thesis was A Critical Evaluation of Recent Trends in the Teaching of Ninth-Grade Algebra.

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INTRODUCTION

The growing awareness of the importance of relationships among personality characteristics, interests, and values is reflected in the fields of occupational counseling and of educational counseling alike. This is understandable since anticipation of future occupation is the most weighty single factor operative in choices of curriculum where decisive consideration preceded actual entry into a concentration field. But, in striving to make this decision, these more pensive students, along with those who haphazardly follow inclinations in choosing courses, still turn to counselors to seek the estimate that would make such selection easier.

If the first year at college found students comparatively at ease about making a decision, the conclusion of the sophomore year presented them with the inescapable necessity for doing so since their final two years of study, and the curriculum to which they thereby subscribed, were to be based on that decision.

The motivation of intellectual curiosity, spurred by the challenge presented by an educational problem, inspired this study; administrative association with a liberal arts institution, where the selection of the proper field of concentration to be chosen was a problem continually encountered by each new group of sophomores and juniors, provided an

added incentive for its completion.

Interest in the gradual evolution of various theses into a tentative approach toward counseled guidance based on a more complex study of the individual in question, coupled with some direct experience in counseling the college student preparing to select a concentration field of study, served to delineate the general purpose of this study: Was there anything about the personality, or the interests, or the values of this individual which would seem to influence the selection of one specific career rather than another?

The present study, then, is an attempt to determine the personality characteristics, interests, and values as they relate to fields of concentration chosen by college women. To achieve its purpose, this study must answer four specific questions: 1) Are there differences in personality characteristics, interests, and values among college women concentrating in different subject study? 2) Are these differences, if they do exist, significant? 3) What patterns of personality, interests, and values characterize groups of students concentrating in different subject fields? and 4) What are the implications, if any, for prediction of the most appropriate field of study for an individual student?

These problems, considered in the light of the nature of the findings reached in studies previously made,

required the present study to be launched from the hypothesis that there are no significant differences in the patterns of personality characteristics, interests, and values characterizing groups of college women concentrating in different fields of study. To test this hypothesis, psychological tests measuring pertinent areas, with results treated statistically by the most accurate and objective techniques, were used to determine what differentiating relationships, if any, existed among members of the various study groups.

In addition to their independent significance, the findings of the present study, compared and/or contrasted with findings of already completed studies, could well provide a more significant clarification of these relationships than has been possible thus far.

In format, the study proceeds from the presentation in the first chapter of a broad historical review tracing the recognition of the need to define and measure the factors related to pre-vocational and vocational selection. It proceeds from the documentation of the first tentative observations of the significance of personality factors in this relationship to later, more scientific investigations involving interests and values as well.

The review of literature presented in Chapter II puts into sharper focus the various formal investigations which were undertaken. The chapter is subdivided to deal

with: 1) those studies related to the role of personality; 2) those concerned with the relationship of interests; 3) investigations of the significance of values; and 4) analyses which surveyed the correlated factors of personality, interests, and values. Within each division of the chapter the studies have been arranged in chronological sequence except, in a few instances, when more purposeful and meaningful contrasts or comparisons could be achieved by digressing from this order. Thus, the overall arrangement indicates the development, in depth and in range, of the investigations themselves and suggests the cumulative influence of earlier conclusions on those studies which were produced subsequently.

In the third chapter the design and procedures devised for the present study are described. Again, the chapter is subdivided to describe: 1) the population sample; 2) the instruments of measurement used; and 3) the statistical methodology followed in treating the accumulated data.

The results obtained through the administration of the Sixteen Personality Factor Questionnaire, the Haakman-Gaither Vocational Interest Inventory, and the Allport-Vernon-Lindzey Study of Values are detailed and discussed in respective subdivisions of Chapter IV. A final subdivision of this chapter discusses the relationships found to exist among certain of the variables from test to test. The

intercorrelations that provided this data are presented in matrix form in appendices as noted.

Finally, the fifth chapter presents the summary and conclusions of the study, suggested applications of the findings, and recommendations for additional research.

Definition of Terms

Fields of Concentration, alternately referred to as major fields of study, are precisely that: the course of study (e.g., Art, Biology, Music, English, etc.) pursued by an individual in intensive depth study.

Areas of Study indicates inclusive branches of study encompassing several specific fields. In the present study, these areas and their specific fields are:

Humanities - Art, English, French

Natural Science - Biology, Chemistry, Mathematics

Social Science - History, Psychology, Sociology

Personality Characteristics are the revealed aspects of a given individual's behavior pattern. As analyzed in this study, the personality characteristics are revealed by responses to the questions in the Sixteen Personality Factor Questionnaire.

Interests are the psychological preferences a person has for particular activities. Responses to the Hackman-Gaither Vocational Interest Inventory constitute the

expressed preferences analyzed in this study.

Values are the attitudes or judgments of merit held toward certain entities, activities, or concepts. As analyzed in this study, the values are revealed by answers to questions in the Allport-Vernon Study of Values.

CHAPTER I

HISTORICAL DEVELOPMENT OF THE APPROACH

The Twentieth Century, which produced the dynamo and discovered the fissionable atom, also set out to plumb the dynamic personality of man galvanized into action by complexities still less fathomable than the atom. Where intellectual prowess was once estimated to be the deciding factor of success or failure in any venture, man came to see that other factors, distinct from intellectual traits, could not be disregarded.

For at least a quarter of the century there was manifested a strong and enduring concern for investigating, through psychodynamic study, the relationship of man to his professional or vocational environment. The earliest call to arms in this phase of the study of man might well have been the simple, unscientific observation offered by Frank Parsons in the early part of the century:

> Power of expression with the voice is peculiarly related to success in ministry, law and public life; [...] delicacy of touch, coordination of hand and brain, fine sense of color, form and proportion, strong memory for combinations of sound are special elements in artistic and musical success.[1]

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1 Frank Parsons, Choosing a Vocation, New York, Houghton Mifflin, 1909, p. 8-9.

Man visualized an image of the typical teacher, the typical doctor, the typical business man. Was the type molded by the profession? Or, did the profession magnetically attract a given type? This was the major consideration that needed to be determined when, in the 1930's, research in the psychometric field directed its various disciplines toward the identification of plausible and possible relationships. If intelligence seemed, at one time, the definitive factor in successful-life stories, the uncovering of many and mysterious facets of the personality of the socially, economically, and educationally performing man gradually placed this consideration in proper perspective.

Man, performing in the economic world, was the first to be vivisected; economists promulgated a psychology of industry designed to insure maximum efficiency for an ambitiously productive society. To attain the acme in prosperity, they approached the consideration of their chief instrument of economy, man, with a scientific awareness of all that he represented. Over forty years ago Drever theorized:

> In any organization of human effort for any purpose whatsoever, economic or otherwise, if the best results are to be secured, account must obviously be taken of the differences in individuals in tastes, capacities, and dexterities, both general and special, both congenital and acquired.[2]

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2 James Drever, The Psychology of Industry, New York, Dutton, 1921, p. 11.

Despite this kind of psychological far-sightedness among industrial theorists, few, if any, other spheres evidenced thinking approaching such analysis. Certainly education lagged far behind if, as late as 1949, Prosser and Quigley, the authors of Vocational Education in a Democracy, found it necessary to point out that

> individuals, because of their widely differing capacities to profit by training, vary much more than has usually been assumed in their ability to meet these demands to the maximum. [...] Any agency, therefore, which could discover at an early date the fitness or the unfitness of an individual to meet the maximum demands of any job [...] would serve a very direct purpose in the conserving of human resources.[3]

That schools should be so slow in rising to a need is not clearly comprehensible especially since, as early as 1924, Stearns marked the role of youth as learners in the attainment of a full life. He noted that youth has "its God-given visions of what life can and should be," but he did not hesitate to add that youth needed "the help of its elders if it is to reach the high goals these visions challenge it to seek."[4] Within two years of this charge to "elders" to face

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3 Charles A. Prosser and Thomas H. Quigley, Vocational Education in a Democracy, Chicago, American Technical Society, 1949, p. 139.

4 Alfred Stearns, The Challenge of Youth, Boston, Wilde, 1923, p. 180.

the responsibility of guiding youth toward the realization of its visions, Blake, Personnel Director at Smith College, a liberal arts institution dating back to 1875, manifested the recognition, by educators on the college level, of student needs in this area:

> Our colleges must give to these students a wide vision, a broad understanding which will help in making their choices, a desire for a definite purpose, and above all, a high ideal of accomplishment in the field finally chosen. No lesser vision will bring out the best in each.[5]

She further asserted that Smith College was already at this time

> especially concerned with the problem of informing the students about vocational opportunities and guiding them to find the information which will help them in choosing and preparing for the same by the broadest possible foundation of studies.[6]

If Blake is to be credited with perception of a student need recognized in 1926, and if one were to recapitulate the Drever theory of selectivity mentioned previously, it becomes increasingly difficult to explain the fact that organized, scientific, psychological approach to student direction was deferred a whole decade or more.

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5 Mabelle Babcock Blake, Ed.D., Guidance for College Women, New York, Appleton, 1926, p. 154.

6 Ibid., p. 155.

Intelligence is now recognized to be but one component of the personality of man, each personality being so highly complex and individualistic that it is never duplicated, whatever the rate of universal population-explosion. But the early tentative approaches included measurement based chiefly on intelligence and only eventually were these extended to include interest and/or aptitude. Studies bearing on the relationships of vocational interests to the additional factor of personality, as an important component both of aptitude and of conceivable future success, have been noted in the literature of only the past fifteen years.

Studies of psychodynamic factors on the one hand and of career choice, or choice of field of major study, on the other, have been attempted sporadically since the 1930's. The literature in this area has accumulated gradually, although the accumulation is not one of overwhelming proportion. Yet, it serves to emphasize the need for more specific conclusions, a need which only further and deeper study can provide.

In fields of educational and vocational counseling, the call to take notice of the non-intellectual traits of man was sounded by many leaders. Writers like Roe[7]

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7 Anne Roe, "A Rorschach Study of a Group of Scientists and Technicians", in Journal of Consulting Psychology, Vol. 10, No. 6, issue of November-December 1946, p. 317-327.

recognized that there existed a relationship between personality and profession, and authors like Heath[8] attempted to trace the relationship between personality, profession, and still other possible factors. So it was that the former, in a study of the characteristics observed in a group of scientists and technicians, urged that the choice of a vocation is largely determined by the possession of particular personality characteristics. And so it was that the latter, in a study-analysis observed that career choice was not determined exclusively by rational considerations of the environment. Rather, the choice appeared to be the realization of inclinations toward certain careers which could be uniformly related to attitudes and interests.

Subsequent to these findings, Triggs[9] presented his observations on the role of personality to a national convention of the American Psychological Association. The importance of interests, attitudes, and emotional factors, which must enter educational counseling of college students, was asserted even earlier by Williamson.[10] And yet another,

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8 C. W. Heath, What People Are, Cambridge, Massachusetts, Harvard University Press, 1945, p. 39.

9 Frances O. Triggs, "A Study of the Relationship of Measured Mechanical Aptitude, Personality, and Vocabulary", in The American Psychologist, Vol. 2, issue of August 1947, p. 296.

10 E. G. Williamson, How to Counsel Students, New York, McGraw-Hill, 1939, p. 244-245.

more recent, call to counselors to learn the value system of the individual for comprehensive and significant interpretation of the individual in his present situation was made by Wrenn.[11] Taken collectively, the observations of these last three included considerations of personality, interests, and values. And, where practicable, an attempt has been made in the survey of relevant literature which follows, to maintain the subject categories in the same sequence.

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11 C. Gilbert Wrenn, The Counselor in a Changing World, Washington, American Personnel and Guidance Association, 1962, p. 62.

CHAPTER II

REVIEW OF PERTINENT LITERATURE

1. Studies Related to the Role of Personality

Whether the idea was considered from the standpoint of speculation or from the more analytical standpoint of scientific observation and study, the belief that there exists a specific relationship between individual personality and the choice and pursuit of a modus vivendi has been variously explored. It is possible that the personality-shattering experience of the first World War, followed by an almost total personal as well as compositely universal economic failure immediately preceding the period which marks the pronounced effort to study personality as a component of success in professional and pre-professional endeavors, might itself have been the psychodynamic factor triggering this research.

Be that as it may, statistical and factual data related to a scientific study of man in his vocational aspirations date back to the 1930's. From that time to the present, attempts to trace personality patterns as components of the choice of, or success in, a given professional or pre-professional field offer conclusions which both indicate a possible relationship and negate the possibility of such relationship.

One of the earliest of these studies was made in 1930 by Dashiell[1] who suggested that his results might be interpreted as an indication that no profession was a true unit with respect to the personality traits needed for success in that profession. Three years later, Stagner,[2] using the Bernreuter Personality Inventory with a group of 317 women and 355 men, tried to determine whether certain trends in personality traits motivated given students to seek out a given course of study. He succeeded in discriminating among various academic groups of women, but, unexplainably, not among men students. Nevertheless, he concluded that personality factors have a marked influence on the correlation of individual aptitude and achievement.

With the weight of factual statistics falling, thus far, to the side of relatedness, the challenge to find the proper combination of patterns in which personality had its niche was taken up by Dodge.[3] In his studies of salesmen and clerical workers, Dodge concluded that significant

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1 J. F. Dashiell, "Personality Traits and the Different Professions", in Journal of Applied Psychology, Vol. 14, issue of June 1930, p. 197-201.

2 Ross Stagner, "The Relation of Personality to Academic Aptitude and Achievement", in Journal of Educational Research, Vol. 26, issue of May 1933, p. 648-660.

3 Arthur F. Dodge, "Occupational Ability Patterns", in Teachers College Record, Vol. 37, issue of April 1936, p. 646-647.

differences do exist among occupational groups with respect to abilities and traits since most significant differences were apparent between these two groups.

A dissenting note was sounded by Lough[4] in 1946 as a result of a study of a group of prospective elementary and music teachers. She found no personality differences to differentiate one group from the other. The following year, in another study,[5] the group was expanded to include nurses and concentrators in various liberal arts fields as well as student teachers. On the basis of her findings in this study, she concluded that the Minnesota Multiphasic Personality Inventory was not a useful instrument for differentiating between those who are more suited for one occupation than another.

But even while Lough was thus renewing the negative argument pioneered by Dashiell,[6] Wells and Woods[7] completed

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4 Orpha M. Lough, "Teachers College Students and the Minnesota Multiphasic Personality Inventory", in Journal of Applied Psychology, Vol. 30, issue of June 1946, p. 241-247.

5 ———, "Women Students in Liberal Arts, Nursing, and Teacher Training Curricula and the Minnesota Multiphasic Personality Inventory", in Journal of Applied Psychology, Vol. 31, issue of August 1947, p. 437-445.

6 Dashiell, Op. Cit., p. 197-201.

7 Frederick L. Wells and W. L. Woods, "Outstanding Traits in a Selected College Population, with Some Reference to Career Interests and War Records", in Genetic Psychology Monographs, Vol. 33, issue of May 1946, p. 127-249.

their study of nine categories of Harvard students majoring in selected fields of study and found that respective groups manifested different traits in significantly different degrees from students majoring in other fields.

Perhaps the most prolific individual researcher was Anne Roe. During the period from 1946 to 1957, she produced some dozen studies, administering the Rorschach test through the years to groups of artists,[8] paleontologists,[9] biologists,[10] physical scientists,[11] and social scientists.[12] Roe's endeavors contributed to the growing fund of data pointing to the relatedness of personality to profession since she was able to differentiate groups generally. Differentiation of individuals, however, remained beyond the scope of her efforts.

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8 Anne Roe, "The Personality of Artists", in Educational and Psychological Measurement, Vol. 6, No. 3, issue of Autumn 1946, p. 401-408.

9 ———, "A Rorschach Study of a Group of Scientists and Technicians", in Journal of Consulting Psychology, Vol. 10, issue of November 1946, p. 317-327.

10 ———, "Psychological Examination of Eminent Biologists", in Journal of Consulting Psychology, Vol. 13, issue of August 1949, p. 225-246.

11 ———, "Analysis of Group Rorschachs of Physical Scientists", in Journal of Projective Techniques, Vol. 14, issue of December 1950, p. 385-398.

12 ———, "Analysis of Group Rorschachs of Psychologists and Anthropologists", in Journal of Projective Techniques, Vol. 16, issue of June 1952, p. 212-224.

But, even among the advocates of the Rorschach, the pendulum could swing in either direction for, in 1949, Reiger[13] echoed the negative conclusions of Dashiell and Lough. As a result of a study of eight groups--seven of which represented specific occupations and one made up of a miscellany--only the administrative group and the supervisory group showed a tendency to differ. Beyond this, the various groups appeared quite similar in their reaction to the Rorschach materials. Thus, Reiger concluded, no single personality type could be associated with any of the occupation groups and it cannot be assumed that any particular type of personality occurs more frequently in one occupation than in another.

Two years later this standpoint was challenged to some extent by Schmidt[14] who used the Rorschach test together with the Wechsler-Bellevue Scale of Adult Intelligence and the Minnesota Multiphasic Personality Inventory to compare the personality traits of two groups of students. Schmidt analyzed the responses of forty-six women, twenty-two in occupational therapy and twenty-four in student nursing

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13 Audrey F. Reiger, "The Rorschach Test in Industrial Selection", in Journal of Applied Psychology, Vol. 33, issue of December 1949, p. 569-571.

14 Hermann O. Schmidt, "Comparison of Women Students in Occupational Therapy and in Nursing", in Journal of Psychology, Vol. 31, issue of April 1951, p. 161-174.

programs. He held that the overall profiles provided by the Rorschach appeared to differentiate the groups; moreover, the Full Scale and the Performance Scale of the Wechsler-Bellevue Scale of Adult Intelligence reflected significant differences between the nurses and the therapists. Nevertheless, concerning the latter test, Schmidt acknowledges the impracticability of applying his findings in a predictive capacity in educational counseling. The MMPI, he concluded, indicated differences too slight for significant differentiation.

In 1952, Redlo and Norman[15] collaborated in a study of undergraduate seniors and graduate students representing ten major fields of study. This effort revealed a number of significant differences, most of them related to the course of study. Successful as the project was, the limited size of the groups (the highest group total was twenty-nine) categorized their conclusions as, at most, tentative and suggestive of trends.

Another negative conclusion appeared in 1953 when Clark[16] analyzed, in a similar study, 707 male and 763

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15 Ralph D. Norman and Miriam Redlo, "MMPI Personality Patterns for Various College Major Groups", in Journal of Applied Psychology, Vol. 36, issue of December 1952, p. 404-409.

16 Jerry H. Clark, "The Interpretation of the MMPI Profiles of College Students: A Comparison by College Major Subject", in Journal of Clinical Psychology, Vol. 9, issue of October 1953, p. 382-384.

female college students distributed in a variety of educational curricula. He determined striking similarities but only a few significant differences.

With the idea that possibly the personality of the individual in a given field of study is affected by exposure to that field, Teevan[17] studies eighty-five male students who had not been in their fields long enough to be affected by them. His conclusions demonstrated that the differences were characteristic even during the pre-professional period.

Gowan and Gowan[18] experimented with an independent group of two hundred teaching candidates and produced a teacher prognosis scale which proved both reliable and valid. In the main body of the study, correlations were .54 uncorrected and .75 corrected when the findings were compared with instructors' ratings of probable teaching effectiveness. A similar determination followed the study of an additional student group. This last yielded a correlation of .72 uncorrected and .83 corrected.

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17 Richard C. Teevan, "Personality Correlates of Undergraduate Field of Specialization", in Journal of Consulting Psychology, Vol. 18, issue of June 1954, p. 212-214.

18 John C. Gowan and May S. Gowan, "A Teacher Prognosis Scale for the MMPI", in Journal of Educational Research, Vol. 49, issue of September 1955, p. 1-12.

Mahler[19] conducted a comparative study of student nurses and members of the physical education class at Drake University in 1955 and aligned himself with the negative viewpoint. He found that student nurses were higher only on the hypochondriasis scale of the MMPI: in other factors they failed to be individualized. Using the Guilford-Zimmerman Temperament Survey to study eight principal traits, Vineyard[20] reported similar results four years later from his comparison of science majors and non-science majors. He found that the former differed from the latter in only two personality traits: science majors, in relation to non-science majors, tended to be either definitely impulsive or to be moderately serious and restrained and to be more dominant than submissive as a group. No differences between the two groups were evident in the remaining six areas according to his investigation.

In 1960, Miller,[21] in a study of Y.M.C.A. personnel which included groups of boy workers, business secretaries,

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19 I. Mahler, "Use of the MMPI with Student Nurses", in Journal of Applied Psychology, Vol. 39, issue of June 1955, p. 190-193.

20 Edwin E. Vineyard, "A Study of the Independence of Choice of Science and Non-Science Major and Measures of Personality Traits", in Science Education, Vol. 43, issue of March 1959, p. 130-133.

21 Sutherland Miller, The Relationship of Personality to Occupation, Setting and Function, doctoral thesis presented to Columbia University, New York, 1960, p. 47-49.

and controllers, supported previous conclusions that it was possible to find significant differences between occupational groups on personality variables relevant to the characteristics of the occupations. However, the limitations in his data, arising out of the inequalities of length of service, categorized Miller's results as tentative. Miller himself ventured the observation that there appeared to be little evidence that suggested a relationship between time spent in the occupation and the variables noted. In this last contention Miller is definitely voicing a judgment in keeping with the results of Teevan's study of pre-professional groups, mentioned earlier, which was specifically directed toward investigation of this relationship.

All of the research of the past quarter-century notwithstanding, the present decade finds investigators still tracing patterns of personality in the hope of finding a more conclusive explanation than past research has been able to reveal. Stagner[22] was heard from again, in 1961, when he observed that varying occupations demand different personality patterns. He urged the fact that culture and personality are intimately related. And, the already-patriarchal voice of Allport sounded again, echoing the same observation. In

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22 Ross Stagner, Psychology of Personality, New York, McGraw-Hill, 1961, p. 3.

his most recent work on personality, Allport[23] observes that his fellow psychologist, Murphy,[24] has stated that all normal people have many imponderable components. Concurring, Allport urges that the best hope for discovering coherence would seem to lie in approaching personality as a total functioning structure, that is, as a system. He defines this system of personality as a complex of elements in mutual interaction.

As recently as 1962, in an analysis and estimate of three decades of study, Super suggested that the reason for the general failure to find occupational personality patterns may be traced to the fact that personality is not related to occupation, character, and success in the commonly accepted manner.[25] Passing judgment on the value of MMPI, and on other personality inventories by inference, Super and Crites, stated that it had little value or validity for differential vocational and, by implication, pre-vocational counseling. "Occupational differences," they noted, "were either nonexistent or, when present, questionable because of too few

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23 Gordon W. Allport, Pattern and Growth in Personality, New York, Holt, Rinehart and Winston, 1961, p. 567.

24 Gardner Murphy, Personality: A Biosocial Approach to Origins and Structures, New York, Harper, 1947, p. 661.

25 Donald E. Super and John O. Crites, Appraising Vocational Fitness, Revised Edition, New York, Harper, 1962, p. 517.

cases and too great variation within groups."[26] Their argument extended to include the fact that measures devised thus far are not penetrating enough for application to pre-professional or professional populations but are devised, rather, for a "hospitalized" population.[27]

Co-existent with the attempt to determine the relationship between profession and personality was the attempt to measure the degree of relatedness of profession and interests.

2. Analyses of the Interest-Profession Relationship

Like the concern with the factor of personality, the concern with the factor of interests provoked a number of significant studies, most of which substantiated the hypothesis that interest, as such, was a relevant and indicative factor.

As early as 1931, Strong[28] engaged in psychological research related to interests and indicated that age should be considered a factor in any attempt to study interest motivation. Using two different sets of data, he established

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26 Super and Crites, Op. Cit., p. 536.

27 Ibid., p. 516.

28 E. K. Strong, Change of Interests with Age, Stanford, Stanford University Press, 1931, p. 162.

the existence of a definite and high correlation between the interests of 15, 35, or 55 year-olds. A change occurring around age 25 appears to be a slight and temporary deviation from the earlier manifested interests which, subsequently, are re-established.

As in the area of personality, variant views were presented in the realm of interests also. For example, Lehman and Witty[29] launched a broadside at the significance of vocational interest inventories in 1932, decrying the approach to the study of individuality of personality from the standpoint of interests on the grounds that interests ultimately prove unreliable. However, and significantly, their evidence for this was based on expressions of interests and not on the inventories of interests.

Whatever the cause for so negative an evaluation as that of Lehman and Witty, Estes and Horn[30] were able, before the decade of the thirties drew to a close, to establish discernible differences, within the general field of the relationship of personal interests to educational choice, between the interests of specialty groups.

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29 Harvey C. Lehman and Paul A. Witty, "Vocational Counseling: the Interest Inventory", in American Journal of Psychology, Vol. 44, issue of October 1932, p. 801-805.

30 S. G. Estes and D. Horn, "Interest Patterns as Related to Fields of Concentration Among Engineering Students", in Journal of Psychology, Vol. 7, issue of January 1939, p. 29-36.

Following almost immediately, Super[31] produced the results of his analysis of a group of engineers, stamp collectors, amateur musicians, and amateur photographers. He found a resemblance (r = .58) between interest patterns of the engineers and the amateur photographers and he noted a distinct unrelatedness (r = .02) between the interest patterns of the engineers and the amateur musicians. The musicians' patterns did correlate fairly highly (.54) however, with those of the amateur photographers, suggesting that they have an artistic factor in common. The interest patterns of the stamp collectors, Super theorized, could be only an indication, representing some kind of cross-section of subordinate interests of representative men dominated by other, more marked, interests.

Yum,[32] in 1942, offered evidence of relationship existing between interests, vocational choice, and college curricula.

The pioneer, Strong, continued his efforts and, in a subsequent experiment with vocational measurement,[33]

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31 Donald E. Super, Avocational Interest Patterns: A Study in the Psychology of Avocations, Stanford, Stanford University Press, 1940, p. 68.

32 K. S. Yum, "Student Preferences in Divisional Studies in their Preferential Activities", in Journal of Psychology, Vol. 13, issue of April 1942, p. 193-200.

33 E. K. Strong, Vocational Interests of Men and Women, Stanford, Stanford University Press, 1943, p. 49.

succeeded in establishing the fact that the inventoried interests of men engaged in specific occupations differed significantly from those of men unclassified in this regard. But, in another appraisal that year, Strong asserted that some professional groups--public administrators, for example--did not lend themselves to effective and decisive study.[34] In his evaluation of results, he proposed the possibility that the groups which could not be so classified did not represent true occupational groups. Nevertheless, the fact remains that in many instances Strong was able to establish, through positive or negative intercorrelation, that there were differentiable occupations which could, in varying degrees of correlation, be distinguished. Later studies, such as that of Mary Anderson,[35] utilizing both the Allport-Vernon Study of Values and the Kuder Preference Record, confirmed his findings. Thus, instruments other than the Strong Blank gave substance to his approach and his findings.

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34 Edward K. Strong, "Differences in Interests Among Public Administrators", in Journal of Applied Psychology, Vol. 31, issue of February 1947, p. 18-36.

35 Mary Roberdeau Anderson, A Descriptive Study of Values and Interests of Four Groups of Graduate Women at the University of Minnesota, unpublished doctoral dissertation presented to the University of Minnesota, Minneapolis, 1952, p. 67-77.

Evans,[36] in 1947, made a study of 190 college students, a female population comprising, among others, twenty-five percent introverted and twenty-five percent extroverted persons. She found social introverts characterized by few persuasive interests, whereas social extroverts ranked high on her scale. Furthermore, she concluded that thinking extroverts, as compared to thinking introverts, are significantly lower on the literary scale and significantly higher on the social scale. The persuasive scale did not seem to differentiate the groups. Other differences were not statistically significant, but there was some evidence that the extroverts ranked higher in mechanical and clerical interests than the introverts while the introverts were more interested in scientific, artistic, musical, and computational activities than were the extroverts.

Also in 1947, Baggaly[37] published the result of his work with 185 Harvard freshmen. Measuring comparatively the interest profile and fields of concentration of his subjects, he attempted to simplify his approach somewhat by grouping the various subject fields into two main categories.

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36 M. Catharine Evans, "Social Adjustment and Interest Scores of Introverts and Extroverts", in Educational and Psychological Measurement, Vol. 7, No. 1, issue of Spring 1947, p. 157-167.

37 Andrew R. Baggaly, "The Relation Between Scores Obtained by Harvard Freshmen on their Kuder Preference Record and their Fields of Concentration", in Journal of Educational Psychology, Vol. 38, issue of November 1947, p. 421-427.

Although the small number of cases and the arbitrary grouping of subjects, as Baggaly admits, weakens the value of his study, nevertheless, he did succeed in establishing that persons within various groups tend to have similar interests.

The utility of the Kuder Preference Record was affirmed by a number of reports which appeared during the years 1948 through 1953. Speer,[38] for example, using the Kuder Preference Record, determined that a comparison of the scores of engineering and of liberal arts students presented definite correlation of interests relevant to each respectively. And, in an experiment which strengthened earlier findings and which utilized sets of groups comparable to many of the Strong Vocational Interest Blank groups, Holland and his associates,[39] perceiving a need for more extensive knowledge of occupational interests by vocational counselors, used the Kuder Preference Record profile and were successful in establishing sets of interest groups. The fact that significantly different interest patterns were found for doctors, lawyers, and business men was established by means

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38 George S. Speer, "The Vocational Interests of Engineering and Non-Engineering Students", in Journal of Psychology, Vol. 25, issue of April 1948, p. 357-363.

39 John L. Holland, et al., "The Classification of Occupations by Means of Kuder Interest Profiles: The Development of Interest Groups", in Journal of Applied Psychology, Vol. 37, issue of August 1953, p. 263-269.

of the Kuder Preference Record, Form C, by Schaffer[40] in 1953.

Although the majority of studies pertaining to interest endorsed the significance of patterns of interest differentiated on the basis of occupation, vocational choice, and/or selected fields of study, other researchers, such as Gustad[41] and Barnett,[42] contributed findings which appeared to challenge these. Barnett suggested that the occupational interest level was a characteristic of the occupational level, that is, a characteristic of the level of occupation at which various types of interests manifested themselves. Hence, indirectly, the occupational interest level was a characteristic of ability, aptitudes, personality, and social evaluation. Barnett and his associates, writing in 1952, proposed that only the narrowest interpretation of occupational interests was justifiable.

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40 Robert H. Shaffer and G. Frederick Kuder, "Kuder Interest Patterns of Medical, Law and Business School Alumni", in Journal of Applied Psychology, Vol. 37, issue of October 1953, p. 367-369.

41 John W. Gustad, "Vocational Interests and Q-L Scores on the A. C. E.", in Journal of Applied Psychology, Vol. 35, issue of June 1951, p. 164-166.

42 Gordon J. Barnett, et al., "The Occupational Level Scale as a Measure of Drive", Psychological Monograph, Vol. 66, No. 342, 1952, p. 1-37.

The work of Carl Sternberg,[43] in connection with the personality traits of college students, elicited data supporting the position of Baggaly. Sternberg increased both the number of students in each category and the divisions of categories themselves. Sternberg studied the personality traits of 270 male college students, with groupings of thirty in each of nine subject areas and reached the same conclusion as had Baggaly. It was a conclusion that had been substantiated by such researchers as Kuder[44] and the team of Perry and Shuttleworth.[45] In the latter study, Perry and Shuttleworth asserted that Kuder profiles have a high degree of validity in assisting students in the selection of their educational and vocational objectives.

But the dichotomy apparent in the conclusions of studies directed to the same objective appeared to indicate that, deliberately or not, other factors, through their absence or presence, might exercise control measures in the attainment of given findings. Despite the fact that

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43 Carl Sternberg, The Relation of Interests, Values, and Personality to the Major Field of Study in College, unpublished doctoral thesis presented to the School of Education of New York University, New York, 1953, x-215 p.

44 G. Frederic Kuder, "The Use of Preference Measurement in Vocational Guidance", in The Educational Record, Vol. 29, Supplement 17, issue of January 1948, p. 65-76.

45 James D. Perry and Frank K. Shuttleworth, "Kuder Profiles of College Freshmen by Degree Objectives", in Journal of Educational Research, Vol. 41, issue of January 1948, p. 363-365.

Super and Crites[46] in 1962 could assert that when the differing approaches to the psychology of individual differences have briefly met during forty years of research the result has tended to be confusion, still, the need for correlating the approaches had been clearly defined by studies such as that of Hyman.[47] His socio-economic study of 1956 indicated that while Kuder-inventoried interests were not related to social status when considered alone, they prove to be related when intelligence is taken into account. And, his findings, in turn, were in agreement with the nature of the conclusions reached by MacArthur and Stevens[48] in the previous year. But, it was Strong[49] who, already in 1943, established the significance of the socio-economic factor in relation to interest patterns.

Thus, the various analyses of interests that appeared concurrently with those of personality through the years contributed to the general fund of knowledge, although

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46 Donald E. Super and John O. Crites, Appraising Vocational Fitness, New York, Harper, 1962, p. 377.

47 Bernard Hyman, "The Relationship of Social Status and Vocational Interests", in Journal of Counseling Psychology, Vol. 3, No. 1, issue of Spring 1956, p. 12-16.

48 Charles MacArthur and Lucia B. Stevens, "The Validation of Expressed Interests as Compared with Inventoried Interests: A Fourteen Year Follow-Up", in Journal of Applied Psychology, Vol. 39, issue of June 1955, p. 184-189.

49 Strong, Vocational Interests of Men and Women, p. 13.

final results remained in terms of variant theories.

In the meantime, other investigators were concentrating their attention on still another approach in an attempt to identify and measure the determining factor in curricular and professional selections.

3. Investigations Concerned with Values

Psychometric efforts have utilized value-study in an attempt to plumb characteristics and uncover patterns of dynamics underlying pre-professional and professional choice. Perhaps the most frequently used instrument in this area is the Allport-Vernon Study of Values. Although the instruments measuring personality and interest have been used to study both professional (occupational) and pre-professional (student groups majoring in given fields of study) levels, the Allport-Vernon, which concentrates on values, has been used more exclusively with pre-professional groups. Psychologists have found it to be a most useful device for cutting through the preconceived-image choice made by students because it is structured on items of a non-vocational nature. The results provide a profile closely related to genuine interest manifestations.

Research for the present study has revealed only one previous study of values related to pre-professional groups which to some degree contradicted other findings both

preceding and succeeding it. The early Harris[50] study of 1934 of students of medicine, law, business, chemical engineering, and teaching concluded that, on the whole, some differences exist among the various groups. But specific findings offered puzzling contradiction to other studies. For example, business and engineering students, according to Harris's finding, ranked highest in political values whereas, logically, the economic scale would appear more likely.

Save for this somewhat dissonant voice, all of the studies considered herein are a validation of what Allport and Vernon determined themselves when, in 1931, they released the first published account of the Study of Values.[51] This account reported significant differences found between students engaged in different major fields of study. Both the positive and negative indications revealed significant value patterns related to given fields of study.

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50 Daniel Harris, "Group Differences in Values Within a University", in Journal of Abnormal and Social Psychology, Vol. 29, issue of April-June 1934, p. 95-102.

51 Philip E. Vernon and Gordon W. Allport, "A Test for Personal Values", in Journal of Abnormal and Social Psychology, Vol. 26, issue of October-December 1931, p. 231-248.

Whitely[52] and Stone[53] undertook studies of values of students representing four major curricula in college. Whitely's study showed significant relationships between major fields of study and respective scores on the Study of Values. The findings of Stone, whose Dartmouth students represented business, medicine, law, and literature, were similar. Here, both the anticipated high scores and the revealed low scores followed a pattern that was logical and predictable.

Developing a kind of unity or concurrence in such conclusions was Schaefer[54] who, in 1936, determined that students of natural sciences and students of social studies ranked high in theoretical values while students of literature proved strong in aesthetic values. This was true also of the study Anderson[55] made of Y.W.C.A. secretaries, finding them high in social and religious values.

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52 Paul L. Whitely, "A Study of the Allport-Vernon Test for Personal Values", in Journal of Abnormal and Social Psychology, Vol. 28, issue of April-June 1933, p. 6-13.

53 Charles L. Stone, "The Personality Factor in Vocational Guidance", in Journal of Abnormal and Social Psychology, Vol. 28, issue of October 1933, p. 274-275.

54 Benjamin R. Schaefer, "The Validity and Utility of the Allport-Vernon Study of Values Test", in Journal of Abnormal and Social Psychology, Vol. 30, issue of January 1936, p. 419-422.

55 Rose G. Anderson, "Some Technological Aspects of Counseling Adult Women", in Journal of Applied Psychology, Vol. 22, issue of October 1938, p. 455-469.

A group of studies made in 1940, in effect, reached similar conclusions. Burgemeister,[56] working with 164 college women, found significant correlation between aesthetic values and the interests of librarians, authors, and artists, and between theoretical values and science teachers and physicists. Studying a smaller group of fifty-two college students, Sarbin and Berdie[57] found positive correlations between scientific interests and theoretical values, and welfare interests and religious values. Obtaining comparable data and upholding the hypothesis that significant differentiation is apparent when the Allport-Vernon Study of Values is utilized, a study effected by Duffy,[58] considering pre-professional groups, supported the concept of intercorrelations in the expected directions.

Seashore's study[59] in 1947 supported the validity of the Study of Values. Involved in it were 495 Health and

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56 Bessie B. Burgemeister, "The Permanence of Interests of College Students", in Archives of Psychology, No. 255, issue of July 1940, p. 1-59.

57 Theodore R. Sarbin and Ralph F. Berdie, "Relation of Measured Interests to the Allport-Vernon Study of Values", in Journal of Applied Psychology, Vol. 24, issue of June 1940, p. 287-296.

58 Elizabeth Duffy, "A Critical Review of Investigations Employing the Allport-Vernon Study of Values and Other Tests of Evaluative Attitudes", in Psychological Bulletin, Vol. 37, issue of October 1940, p. 597-612.

59 Harold G. Seashore, "Validation of the Study of Values for Two Vocational Groups at the College Level", in Educational and Psychological Measurements, Vol. 7, No. 4, issue of 1947, p. 757-763.

Physical Education majors and 252 Applied Social Science majors. The study succeeded in setting up significant differences between the patterns characterizing each group.

Twomey[60] tested 280 undergraduates engaged in teacher preparation. These represented various grade levels from the thirteenth through the sixteenth. His study revealed significant differences in values. Some values were held in common but even the similarities proved noteworthy in his interpretations. Accordingly, among other conclusions, Twomey did determine that there was a major change in values between the freshman and junior year of college.

Research in the area of values, as cited, encompassed the period from 1931 through 1962; the preponderance of evidence indicated that values peculiar to individuals were related to their selection of fields of concentration. Even more pertinent to the present study of personality, interests, and values as contributing factors to pre-vocational tendencies are studies which have been, unlike the preceding accounts, multiple-discipline investigations.

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60 Alfred E. Twomey, A Study of Values of a Select Group of Undergraduate Students, doctoral thesis presented to Colorado State College, 1962, p. 113.

4. Multiple-Discipline Investigations

Through the years dating from the onset of the thirties, investigators have studied the correlation of interest and personality, of interest and value, of interest, personality, and values, and of these correlated factors to academic, pre-vocational, and vocational selection.

Investigating the relationship existing between the patterns of interest and personality as related to academic choice, Darley[61] found that definite and rather characteristic personality and interest patterns appear to exist in the various groups.

McCarthy,[62] in 1942, attempted to determine for predictive purposes whether personality patterns could help to distinguish successful seminary candidates. He found that interests are related to personality traits. His investigation indicated that certain of these relationships could be generalized from one occupational group to another and that other relationships were unique to a particular occupational group.

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61 John G. Darley, Clinical Aspects and Interpretations of the Strong Vocational Interest Blank, New York, The Psychological Corporation, 1941, p. 56.

62 Thomas J. McCarthy, Personality Traits of Seminarians, Washington, D. C., Catholic University of America Press, 1942, p. 8.

Another study which combined the factors of personality and interests in its analysis was that of Darley and Hagenah.[63] Using the early work of Dashiell[64] as a basis for their work, Darley and Hagenah contradicted the earlier negative view by observing definite and rather characteristic personality and interest patterns existent in various occupational groups. Thus, while refuting Dashiell, they also refuted the more recent proposition advanced by Barnett.[65]

In 1942 Goodman[66] made a study of 237 male freshmen engineers and 166 female freshman liberal arts students. Conclusions revealed that interests of engineers differed from those of liberal arts students on scales for Chemist, Engineer, Production Manager, Farmer, Printer, Carpenter, and Mathematics-Physics Teacher. The engineers' interests proved similar to these of typical, successful people in each of these groups while the liberal arts students' resembled those of Y.M.C.A. Secretary, Social Science Teacher,

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63 John G. Darley and Theda Hagenah, Vocational Interest Measurement, Minneapolis, University of Minnesota Press, 1955, p. 132-133.

64 See p. 9.

65 See p. 24.

66 Charles H. Goodman, "A Comparison of the Interests and Personality Traits of Engineers and Liberal Arts Students", in Journal of Applied Psychology, Vol. 26, issue of December, 1942, p. 721-737.

Musician, Banker, and Office Manager. The engineers' scores on the Bernreuter showed them to be more stable and more self-sufficient than the liberal arts students.

Making a study of career choice, Heath[67] noted that inclination toward a certain career during college life could be uniformly related to attitudes and interests. Two years later, in 1947, Lewis[68] found significant relationships between vocational interests and personality tendencies. He used the Kuder Preference Record and the MMPI in studying life insurance salesmen and social workers. Among other results, he concluded that persons engaged in occupations for which they have no measured interest tend to make more abnormal scores on the MMPI than those who are relatively interested.

Substantiating such findings, in the same year Triggs[69] correlated the scores of thirty-five male and sixty-two female college students, utilizing the Kuder Preference and the MMPI. In men, she found significantly negative

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67 C. W. Heath, What People Are, Cambridge, Harvard University Press, 1945, p. 39.

68 John A. Lewis, "Kuder Preference Record and MMPI Scores for Two Occupational Groups", in Journal of Consulting Psychology, Vol. 11, issue of July 1947, p. 194-201.

69 Frances O. Triggs, "A Study of the Relationship of Measured Interests to Measured Mechanical Aptitudes, Personality, and Vocabulary", in American Psychologist, Vol. 2, issue of August 1947, p. 296-297.

correlations between: mechanical interests and psychopathic and feminine tendencies; computational interests and paranoid; scientific interests and paranoid and psychosthenic; social service and depressed tendencies. But, in women, she found no significant relationship between interests and personality traits although two relationships with validating scores appeared significant. These two relationships were between the lie score and musical and social service interests.

A study of personality-interest correlation which proved that a relationship between the two factors does exist was that produced by Cottle.[70] In this study a high score on the M-F scale of the MMPI was associated with an interest in people, languages, and music, and with a dislike for activities involving manipulation of material objects. To explain the low Pearson product-moment correlation he obtained, he suggested that the relationship may be curvilinear.

The sole dissenting voice that research has elicited in this investigation is that of Klugman[71] who, in 1950, found no relationship between the spread of interest scores

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70 William C. Cottle, "A Factorial Study of the Multiphasic, Strong, Kuder, and Bell Inventories Using a Population of Adult Males", in Psychometrika, Vol. 15, issue of March 1950, p. 25-47.

71 Samuel F. Klugman, "Spread of Vocational Interests and General Adjustment Status", in Journal of Applied Psychology, Vol. 34, issue of April 1950, p. 108-114.

and adjustment. However, even in this case, there were indications that stronger scientific interests tended to correlate with better adjustment.

More recently, Springob[72] determined that, in general, scientific interests are found to relate with a lesser concern for people and social activities and a lesser degree of maturity; business interests and verbal-linguistic interest patterns tend to relate to a greater social interest, social adjustment, and greater maturity. Athletic types of interests generally are found to be related to maladjustment, he found. Artistic and musical interests revealed few significant correlations with the personality variables. Clerical interests tended to correspond to the expected characteristics by being accompanied by more feminine interests, shallowness, caution, submissiveness, perseverance but minimal ambition, and a lack of self-insight and self-direction.

Among investigators seeking the clue to success in vocational and pre-vocational pursuits undertaken by individuals, there were a number who explored the interaction of

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72 H. Karl Springob, "Relationship of Interests as Measured by the Kuder Preference Record to Personality as Measured by the California Psychological Inventory Scales", in Personnel and Guidance Journal, Vol. 41, issue of March 1963, p. 624-626.

personal values and interests. Duffy and Crissy[73] published, in 1940, conclusions of a study involving 108 women students at Sarah Lawrence College. Their data revealed a definite correlation between interests and values, even though no correlation was above .45. The authors noted that the study tested a freshman group and observed that freshmen might still be at a stage when interests and values had not yet crystallized. They felt that higher correlations might be expected with a group more advanced in age and educational career. Working at almost the same time, Sarbin and Berdie[74] conducted a similar study and realized conclusions which substantiated the findings of Duffy and Crissy. According to their study, the measured masculinity-femininity on the Strong correlated .38 with theoretical and -.49 with aesthetic, indicating a much stronger interest in feminine activities on the part of those who score high on the aesthetic scale than is found among those scoring high on the theoretical scale.

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73 Elizabeth Duffy and J. E. Crissy, "Evaluative Attitudes as Related to Vocational Interests and Academic Achievement", in Journal of Abnormal Psychology, Vol. 35, issue of April 1940, p. 226-245.

74 Sarbin and Berdie, Op. Cit., p. 287-296.

A multi-discipline study by Gaudet and his associates[75] yielded a number of significant factors which were confirmed by clinical interviews. Then, they compared the factors extracted from this study of 165 male military veterans to those reported in two other factor analyses[76] finding that, with few exceptions, each factor was indentifiable in similar form in all three studies.

Investigating along the same lines, Ginsberg and his colleagues[77] conducted a multi-discipline study to determine the way in which occupational choices were made. They explored four basic areas of the backgrounds of the individuals selected for the study: (1) the socio-economic factors determining environment; (2) education; (3) emotional determinants; and (4) values. Their published conclusions, unfortunately, lacked statistical data but asserted that it

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75 F. J. Gaudet, W. H. Helme, and A. V. Williams, Factor Analysis of the Kuder Preference Record, Allport-Vernon Study of Values, and ACE Psychological Examinations, unpublished study, Hoboken, New Jersey, Stevens Institute of Technology, 1948, p. 1-22.

76 (1) Leonard W. Ferguson, L. G. Humphries, and F. W. Strong, "A Factorial Analysis of Interests and Values", in Journal of Educational Psychology, Vol. 32, issue of March 1941, p. 197-204.

(2) W. A. Lurie, "A Study of Spranger's Value Types by the Method of Factor Analysis", in Journal of Sociological Psychology, Vol. 8, issue of February 1937, p. 17-37.

77 E. Ginsberg, S. W. Ginsburg, S. Axelrod, and J. L. Herma, "The Problem of Occupational Choice", in American Journal of Orthopsychiatry, Vol. 20, issue of January 1950, p. 166-201.

was clear from the work of earlier investigators as well as from their own interviews that occupational choices were frequently formed around interests and values.

Wrenn,[78] interested in studying the individuality of college students, concluded that the value system of the individual must be understood if meaningful interpretation of present interests is to be achieved.

The following year, 1952, Mary Anderson[79] drew a sample population from the Graduate School, the Law School, the Medical School, and from women in the fifth year of Medical Technology at the University of Minnesota. Using the Strong Vocational Inventory Blank for Men and Women and the Allport-Vernon Study of Values, she classified the population according to value patterns and then studied the revealed interest profiles in correlation. In line with findings of other investigators, she found that the interest blank was an effective instrument differentiating chiefly the men in the technical-scientific group. Furthermore, in general she found the interlinear correlations of the interest and values profiles significant in setting one group apart from another. On the basis of her study, it was concluded that values as well as interests played a part in the

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78 C. G. Wrenn, Student Personnel Work in College, New York, The Ronald Press, 1951, p. 91.

79 Mary Roberdeau Anderson, Op. Cit., p. 67-134.

vocational decision of the individuals she studied. Nevertheless, in some instances values differentiated groups whereas interests did not.

Numbered among those who sought to determine the effect of interaction between values and personality, Pintner and Forlano[80] gave the Allport-Vernon and the Thurstone Personality Schedule to one hundred women college students in 1939. They failed to find significant differences between the group they had set up, but they did note some tendencies toward correlation.

The developing tendency in more recent studies has been toward an even more comprehensive, multi-discipline approach to the recognition and analysis of the factors which influence career selection. Perhaps the earliest investigation which credited the complexity of the problem by considering interests, personality, and values was that of Strong[81] in 1943. This revealed that attitudes, social adjustments, and values were related to interests but that the relationship between interests and deeper layers of personality had not yet been demonstrated.

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80 R. Pintner and C. Forlano, "Dominant Interests and Personality Characteristics", in Journal of General Psychology, Vol. 21, issue of October 1939, p. 251-260.

81 Strong, Vocational Interests of Men and Women, xxix-746 p.

Somewhat closer to the nature of the present study was one made by Philippus and Fleigler,[82] in 1962, which set out to determine similarities and differences in personality, value, and interest patterns between student teachers in the areas of elementary, secondary, and special education. The most obvious result of this study was that the special education student teachers tended to separate significantly from the other two groups. The differences, appearing on half of the twenty-two measures when compared with the elementary, and seven of the scales when compared with secondary school student teachers were significant from the one-tenth percent to the five percent level of confidence. Adding to the significance of the findings is the fact that all three groups scored high on the five social scales of interest inventory, but all except the special education students scored low on the five scientific scales of this measure. The investigators concluded that this last was due to the psychological orientation which the special education group received.

A study that considered the same areas from the same approach, with an apparently greater concern for control groups in a far more varied cross-section of pre-vocational choice, was one that preceded that of Philippus and Fleigler.

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82 Marion J. Philippus and Louis Fleigler, "A Study of Personality, Value, and Interest Patterns of Student Teachers in the Areas of Elementary, Secondary, and Special Education", in Science Education, Vol. 46, issue of April 1962, p. 247-252.

The study conducted by Carl Sternberg[83] in 1953 utilized the Kuder Preference Record, the Allport-Vernon Study of Values, and the MMPI on a population of 270 male students--thirty in each of nine major areas of study, namely: pre-medical, chemistry, economics, English, history, mathematics, music, political science, and psychology. Sternberg set out to analyze the relationship of interests, values, and personality traits and the subject matter choices made by college students.

Seven factors or trait patterns were determined and Sternberg was able to find the significant positive and negative loadings for each factor. The constellations of interests and attitudes at the opposite poles for each factor proved to be antagonistic. Sternberg carried the study far enough to classify the entire population into four area groups according to characteristic traits.

Later, Sternberg reported his findings[84] to be that majors in English and Music had high aesthetic values and tended to reject activities having to do with business or with the scientific attitude. Also, this group tended more

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83 Carl Sternberg, The Relation of Interests, Values, and Personality to the Major Field of Study in College, unpublished doctoral thesis presented to the School of Education of New York University, New York, 1953, p. 191-195.

84 ———, "Personality Trait Patterns of College Students Majoring in Different Fields", Psychological Monograph, Vol. 69, No. 18, issue of 1955, 1-21 p.

toward maladjustment than did the others. Majors in chemistry and mathematics were found to value scientific, mechanical, and quantitative activities. They showed aversions for aesthetics, business contacts, and social service activities. Members of the pre-medical and psychology group showed a merging of scientific interest and interest in helping people. As pre-professionals, they also showed stronger values for prestige and power than was anticipated by the investigator. Sternberg found that members of the economics, political science, and history group scored differently on many factors but they were alike in having high materialistic and low aesthetic values. The author also reported that the aesthetic group (English and music majors) were almost directly opposite the natural science group (chemistry and mathematics majors) on most factors.

The foregoing survey illustrates the manner and scope of investigations of the factors influencing career selection. The diversity and/or inconclusiveness of the findings of those studies restricted to any one aspect (personality, interest, or values), or even to a combination of any two, precipitated acceptance of the more comprehensive approach which utilized all three.

The absence of dissenting voices and the significance of the findings of those who used the multi-discipline approach would appear to establish this method as the appropriate

one. However, these studies were relatively few in number and require the validation of further documented research. Furthermore, they remain isolated in the sense that each researcher dealt with a specific type of study group; no two investigations studied comparable groups. For example: Strong's[85] was a study of men and women in occupations; Anderson's[86] work involved graduate women; Sternberg[87] tested male college students; and Philippus and Fleigler[88] were concerned with male and female student teachers.

It may be concluded then, as did Sternberg[89] in regard to his own work, that additional studies, conducted under similar conditions and dealing with groups comparable to those previously analyzed, held promise not only to make a contribution of additional knowledge, but to corroborate or contradict present information.

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85 Strong, Vocational Interests of Men and Women, xxix-746 p.

86 Mary Roberdeau Anderson, Op. Cit., ix-134 p.

87 Sternberg, The Relation of Interests, Values, and Personality to the Major Field of Study in College, x-215 p.

88 Philippus and Fleigler, Op. Cit., p. 247-252.

89 Sternberg, The Relation of Interests, Values, and Personality to the Major Field of Study in College, p. 213

CHAPTER III

THE PROCEDURE AND DESIGN OF THE STUDY

This chapter concerns itself with a description of the procedures followed to test the hypothesis that there are no significant differences in the patterns of personality characteristics, interests, and values characterizing groups of college women concentrating in different fields of study. The experimental design conceived for this study will be presented in three subdivisions of the chapter: 1) a description of the population sample used in this study; 2) a description of the instruments used and the rationale governing their selection; and 3) the statistical procedures employed in the experimental processes.

1. The Population Sample

Initially, the study population consisted of 1,380 students of liberal arts colleges for women. A Personal Data Sheet (see Appendix A, p.146) supplied information pertaining to the student's date of birth and curricular status, and to the economic status of her parents. It also provided information relative to the student's field of concentration and related field, inquiring, in addition, whether or not she would select this same field of concentration, given the opportunity to choose again. When a negative answer was

made to this query, the student was eliminated from the final study population. Moreover, students majoring in certain fields--physics, music, and economics--were eliminated since a sufficiently representative number of these specialists was not found among students registered at the women's colleges contacted.

The remaining 810 students, who made up the final study group, represented nine liberal arts colleges for women and were treated in nine groups of ninety each. The students were in their third or fourth year of college work. They were concentrators in the areas of humanities, social sciences, and natural sciences. Specifically, their major fields were: art, biology, chemistry, English, French, history, mathematics, psychology, and sociology.

The curriculum in these colleges was so designed as to give the students an opportunity to experience foundational courses in those fields of concentration selected for this study.

The colleges are located in the states of New York, New Jersey, Massachusetts, and Pennsylvania and in the District of Columbia. The distribution of population and the percent of the total population from each college included is shown in Table I (p. 47).

Entrance requirements of the colleges were uniformly high: the average entering freshman scores on the College

Table I.- Distribution of Population of the Study

College	Art	Biol.	Chem.	Eng.	Fren.	Hist.	Math.	Psych.	Soc.	Total	% of Total
Cabrini	0	5	5	5	1	5	7	6	0	34	4.20
Holy Family	9	30	14	13	10	13	12	16	0	117	14.45
Immaculata	10	10	14	5	5	8	12	29	9	102	12.59
Marywood	21	5	7	11	7	9	17	9	1	87	10.74
Mercyhurst	10	10	3	4	7	1	3	0	9	47	5.80
Rosary Hill	17	1	15	1	13	0	0	0	36	83	10.25
Rosemont	12	16	22	35	22	36	30	24	0	197	24.32
St. Elizabeth	11	0	7	0	13	0	0	0	25	56	6.91
Trinity	0	13	3	16	12	18	9	6	10	87	10.74
Total	90	90	90	90	90	90	90	90	90	810	100.00

Entrance Examination ranged from 498 to 610 on the verbal and from 465 to 572 on the mathematical scores. Of the entering freshmen, forty-four to seventy percent were in the top first quintile of their class and eighty-five to ninety-five percent were in the top half of their class. (See Appendix B, p. 148.)

The chronological age of the subjects (see Appendix C, p.149) ranged from nineteen years of age to twenty-five years. The mean age was twenty years and eleven months.

The attested economic background of the participants (see Appendix D, p.150) reflected relative similarity: 80.2% were from families dependent upon skilled, executive, or professional occupations. Only 12.5% of the total could be classified as dependent upon unskilled occupations; another 7.3% so described their situations that, at best, the category could be labelled only as "miscellaneous."

2. The Instruments Used

To accumulate the necessary data, the Sixteen Personality Factor Questionnaire was used to determine each candidate's personality profile; the Hackman-Gaither Vocational Interest Inventory was used to determine the interest profile; and the Allport-Vernon-Lindzey Study of Values was selected to measure values.

The Sixteen Personality Factor Questionnaire was selected from among the various personality tests available because of its comprehensiveness and relation to actual personality structure. As such, it is reported to be

> the psychologist's answer, in the questionnaire realm, to the demand for a test giving fullest information in the shortest time about most personality traits...all the main dimensions along which people can differ, according to basic factor analytic research.[1]

C. J. Adcock, Senior Lecturer in Psychology at the Victoria University of Wellington, New Zealand, has suggested certain improvements to the Handbook for the Sixteen Personality Factor Questionnaire. He has pointed out, for example, the desirability of including additional factors in the test itself, and has cautioned against the possibility of motivational distortion. Nevertheless, at the same time he asserted:

> This test is undoubtedly a major development in the personality areas.... A prodigious amount of statistical work has gone into it. No other test covers such a wide range of personality dimensions and never before have the dimensions been so meticulously determined.[2]

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1 R. B. Cattell, D. R. Saunders, and G. Stice, Handbook for the Sixteen Personality Factor Questionnaire, Champaign, Illinois, Institute for Personality and Ability Testing, 1957, p. 1.

2 C. J. Adcock, "Sixteen Personality Factor Questionnaire", The Fifth Mental Measurements Yearbook, Oscar K. Buros, Ed., Highland Park, N. J., The Gryphon Press, 1959, p. 112.

The test is accommodated to the complexity of the human personality; yet, it answers the demands of both industry and clinic for a time-saving measuring device as opposed to the alternative of a time-consuming battery of tests for each factor. To this end, after considerable research aimed at determining unitary, independent, and practically important source traits, the authors constructed a questionnaire measuring sixteen dimensions of personality. These sixteen dimensions, or at least a majority of them, are involved in most criterion predictions. For this reason, the authors believe that, although the selected dimensions present a quantitative complexity of sub-scores, they do mirror the true complexity of human nature and their complexity, therefore, should be respected.

The questionnaire yields sixteen factors; using Cattell's own terminology, these are:[3]

Factor A. Cyclothymia (Warm, Sociable) vs. Schizothymia (Aloof, Stiff)

Factor B. General Intelligence (Bright) vs. Mental Defect (Dull)

Factor C. Emotional Stability or Ego Strength (Mature, Calm) vs. Dissatisfied Emotionality (Emotional, Immature, Unstable)

Factor E. Dominance or Ascendance (Aggressive, Competitive) vs. Submission ("Milk-Toast," Mild)

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3 Cattell, Op. Cit., p. 11-19.

Factor F. Surgency (Enthusiastic, Happy-go-lucky) vs. Desurgency (Glum, Sober, Serious)

Factor G. Character or Super-ego Strength (Conscientious, Persistent) vs. Lack of Rigid Internal Standards (Casual, Undependable)

Factor H. Parmia (Adventurous, "Thick-skinned") vs. Threctia (Shy, Timid)

Factor I. Premsia (Sensitive, Effeminate) vs. Harria (Tough, Realistic)

Factor L. Protension (Paranoid Tendency) (Suspecting, Jealous) vs. Relaxed Security (Accepting, Adaptable)

Factor M. Autia (Bohemian Introverted, Absent-minded) vs. Praxernia (Practical, Concerned with facts)

Factor N. Shrewdness (Sophisticated, Polished) vs. Naiveté (Simple, Unpretentious)

Factor O. Guilt Proneness (Timid, Insecure) vs. Confident Adequacy (Confident, Self-secure)

Factor Q_1. Radicalism vs. Conservatism of Temperament

Factor Q_2. Self-sufficiency (Self-Sufficient, Resourceful) vs. Group Dependency (Sociably Group Dependent)

Factor Q_3. High Self-Sentiment Formation (Controlled, Exacting Will Power) vs. Poor Self-Sentiment Formation (Uncontrolled, Lax)

Factor Q_4. High Ergic Tension (Tense, Excitable) vs. Low Ergic Tension (Phlegmatic, Composed)

The present study, for purposes of concentration as well as semantic clarity, adopted the following terminology for the personality factors:

Factor A. Aloof vs. Sociable

Factor B. Dull vs. Bright

Factor C. Emotional vs. Calm

Factor E. Submissive vs. Dominant

Factor F. Languid vs. Enthusiastic

Factor G. Casual vs. Conscientious

Factor H. Shy vs. Adventurous

Factor I. Tough vs. Sensitive

Factor L. Trusting vs. Suspicious

Factor M. Practical vs. Imaginative

Factor N. Simple vs. Sophisticated

Factor O. Confident vs. Insecure

Factor Q_1. Conservative vs. Experimenting

Factor Q_2. Group-dependent vs. Self-sufficient

Factor Q_3. Self-complacent vs. Self-disciplined

Factor Q_4. Relaxed vs. Tense

The value of the Sixteen Personality Factor Questionnaire is further enhanced with the realization that, in addition to the economy of time it represents in the measurement of personality, its accuracy and effectiveness are remarkable. Split-half reliabilities for each of the sixteen factor scales range from +.71 to +.93, averaging about +.83 or +.84. Furthermore, internal construct validities have been estimated for each of the sixteen scales from known factor leadings of test items on the factors and also separately for the correlation of two factor halves, the A and B forms together. Thirty-two validity estimates, which have resulted from computing in two different ways for each of the

sixteen factor scales, range from +.73 to +.96 and average approximately +.88.[4]

The Hackman-Gaither Vocational Interest Inventory has been used to determine the psychodynamic factor of interest motivating the members of a given pre-professional or pre-vocational group--in this instance, students embarked upon a given major field of study.

This test was selected for use in the present study because of its recognized position in the guidance and counseling fields and because it is easily administered and economical to score.

In form, the Hackman-Gaither Inventory consists of ten job titles and ten job descriptions for each of eight keys devised by the authors. These represent 160 items selected because of their high factor loadings with the respective keys. The eight keys include the following areas:[5]

1. Business Contact Field, representing jobs concerned with selling, where ability to deal with people is important. Some principal characteristics include a preference for domination, independence, and variety.

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4 Cattell, Op. Cit., p. 4.

5 Roy B. Hackman and James W. Gaither, Hackman-Gaither Vocational Interest Inventory, Examiner's Manual, Easton, Pennsylvania, Palmer Associates, 1963, p. 15-17.

2. Scientific-Technical Field, representing jobs concerned with the control and measurement of things. Principal characteristics include a liking for accurate and efficient methods.

3. Artistic Field, where the possession of some special talent is essential and self-discipline and originality are of great importance.

4. Health and Welfare Field, which represents jobs concerned with health, social welfare, and education. The ability to speak or write with a high degree of communication are of utmost importance.

5. Business-Clerical Field representing jobs concerned with making and the keeping of business records. Accurate and orderly methods and willingness to do routine work under supervision are important.

6. Mechanical Field, representing jobs concerned with machines and tools, requires a liking for physical activity and precision in workmanship as well as good coordination.

7. Service Field, represents jobs generally concerned with physical welfare, health, and happiness of customers or employers and requires the ability to change to meet the needs and tastes of others.

8. Outdoor Field, represents jobs of physical strength and coordination, with an interest in plants,

animals, or nature being highly desirable.

With the conviction that the negative as well as the positive responses provided a clue to tracing the fields to which a subject is attracted (positive valence) and those to which he is not attracted (negative valence), the authors developed a method for analyzing individual scores for the sum total of positive and negative responses.

One feature of this test which makes it differ from previous achievements by Strong and others, is the fact that a given individual's consistency in response may be studied by estimating a profile based on the first ten items, the second and/or third ten items, and so on.

This inventory also makes use of normative comparison in addition to a self-comparison scale. Both of these measures are important to dynamic evaluation of the student in relation to the world of occupations.

This consideration, and the added fact that the arrangement and length of the test both facilitate its administration and economize on demands on the time of the subjects, have especially recommended this test for the purpose of this study.

The value of the Hackman-Gaither Inventory as an effective measuring device of great accuracy and reliability, is substantiated by the following facts:

1. Split-half reliabilities for the individual keys consistently average .85 to .95 in repeated studies on various samples.

2. Test-retest reliability (stability) coefficients for individual keys average .70 to .85. It was also found that approximately 80 per cent of scores remain in the same quartile upon repeated testing over a one- to two-year period.

3. A study of the individual pattern consistencies for males and females showed average split-half reliability coefficients of .90 and .94 respectively.

Thus, it appears that the first requirement for the validity of a test or inventory, namely, that it is reliable (internally consistent and stable), is satisfied.

The validity of the inventory as developed is based upon two general approaches:

1. In terms of content validity (and logical validity), the items are all directly related to the world of work, since they were taken from the Dictionary of Occupational Titles.[6] In addition, a group of expert vocational counselors examined the items (before the factor analyses) and judged them for relevancy and representativeness. The whole procedure also resulted in "face" validity, since it

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6 Hackman and Gaither, Op. Cit., p. 2.

is obvious to the respondent that he is evincing his vocational interests.

2. In terms of factorial validity, only those items which had satisfactory loadings and communalities were included. With few exceptions, the cut-off point for the communalities of items was .50 and for factor loadings .30. The average communality was .70; the average factor loading (all keys combined) was .58 for job titles and .59 for job descriptions. These compare very favorably with validity coefficients (predictive validity) obtained for aptitude tests under favorable conditions. However, they cannot be interpreted in the same way--they do not predict any future performance as is the case with the usual "validity" coefficient. The factor loadings represent the correlation between the individual items and the factor which is common to the items making up a particular key. Thus, each factor loading on an item is a coefficient of validity for measuring that factor (represented by a key on the inventory, e.g., "Business Contact").

The 1960 edition of the Allport-Vernon-Lindzey Study of Values was selected because it was the only structured test of values that has been rather thoroughly studied. It has proved easy to administer, reliable, and valid in differentiating among majors in college, workers in different occupations, adherents of different religious faiths, and

students with differing patterns of vocational interests. Unquestionably, it is a good test and will continue to serve well for classroom demonstration, for counseling, for vocational guidance, and for research on a wide variety of psychological questions.[7]

The Study of Values measures the relative strength of attitudes toward values in the following six areas: theoretical, economic, aesthetic, social, political, and religious. Theoretical value concerns itself with the discovery of truth; it is characterized by an empirical, critical, and rational "intellectual" approach. Economic value characterizes its possessor with an interest in that which is useful or practical; it ranges from satisfaction of bodily needs to interest in the practical affairs of the business world. Aesthetic value enables its possessor to find highest value in form and harmony and causes him to regard life as a manifold of events in which each single impression conveys its own enjoyment, for its own sake. Social value places highest esteem on love for people. Its possessor prizes other persons as ends and is, therefore, kind, sympathetic, and unselfish. Political value is expressed in the attainment of personal power, influence, renown although not necessarily

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7 N. L. Gage, "Study of Values: A Scale for Measuring the Dominant Interests in Personality", Revised Edition, The Fifth Mental Measurements Yearbook, Oscar K. Buros, Ed., Highland Park, N. J., The Gryphon Press, 1959, p. 114-115.

within the limited field of politics. Religious value inclines its possessor to seek self-transcendence and to establish the ultimate meaning of life and existence; the individual seeks higher satisfaction than that which is achieved on the purely human plane by the average human.[8]

Consisting of a number of questions based upon a variety of familiar situations, two alternative answers in Part I and four alternative answers in Part II are provided. One hundred and twenty answers in all, twenty for each value, constitute the test. Subjects' scores are transcribed from the test sheet onto a separate score sheet and are then summed and submitted to certain simple corrections. The final resulting scores represent the subject's scores on all six of the values. These may be plotted so as to get a profile of the subject's interests.

The test is constructed in such a way that a score of 30 is the average score for any single value; a score greater than 37 or less than 23 is considered by the authors as probably significant.

The general norms are based on a college population and are reported separately for men and women. Comparative data are also provided on samples from different types of

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8 Gordon W. Allport, Philip E. Vernon, and Gardner Lindsey, Manual for the Study of Values, Boston, Houghton Mifflin, 1960, p. 4-5.

colleges and on various occupational groups. The split-half reliabilities of the six scores range from .84 to .95. Re-tests after one or two months yielded reliabilities between .77 and .93 for the six scales.[9]

3. The Statistical Treatment of the Data

Originally, it was the intention of the writer to administer all tests personally, but because of difficulties in scheduling the tests, it appeared more feasible to have a qualified person responsible for testing in each college to administer the tests. Adherence to directions and uniformity of procedure were encouraged by means of personal correspondence between the administrator and the experimenter.

After the raw scores were obtained, the means and standard deviations on each factor of each test for the total group and for each of the nine fields of concentration were computed on the IBM 1620 Model 1 Computer at the Hahnemann Computer Center in Philadelphia. The means and standard deviations are presented in Table II (p. 64) for personality factors, in Table III (p. 65) for interest factors, and in Table IV (p. 66) for values.

The computer was also used for the analysis of variance in order to obtain the F ratio for each factor. Analysis

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9 Allport, Vernon, and Lindzey, Op. Cit., p. 9-10.

of variance, of course, merely indicated that a difference did or did not exist. Where a significant F at .001, .01, and .05 level was found, the t tests were run in order to determine where the differences existed.

The t tests were made following the procedure suggested by Guilford; if the variances within sets are quite uniform, then the within variance, as the estimate of the population variance, is used.[10] This gives a more stable estimate of population variance and only one SE of a difference to compute. The Standard Error of a difference between means from within variance is given by the following formula:[11]

$$SE_{dM} = \sqrt{\frac{2V_W}{n}}$$

To illustrate this procedure, one might consider, for example, Factor A of the Sixteen Personality Factor Questionnaire. Table V, for Factor A (p. 67) gives 9.09 as the variance within groups; then,

$$SE_{dM} = \sqrt{\frac{2(9.09)}{90}} = .449$$

Next, what differences would be significant at the .05, .01, and .001 levels? Table VIII (p. 72) indicates

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10 J. P. Guilford, Fundamental Statistics in Psychology and Education, New York, McGraw-Hill, 1956, p. 263.

11 Ibid., p. 264.

that t is significant at the .05, .01, and .001 levels with 801 degrees of freedom when t is 1.96, 2.58, or 3.29 respectively. Multiplying these three levels by the SE_{dM} (.449), differences of .88, 1.16, and 1.48 are significant. In other words, for a difference between two means on Factor A to be significant at the .001 level, the difference must exceed 1.48.

The analyses of variance for factors concerning personality, interests, and values appear in Tables V, VI, and VII, respectively (p. 67-70). The t tests applied to the significant ratios are interpreted in the following chapter. Graphic profiles, Figures 1-4 (p. 157-160), are added to aid in showing the similarities and differences of the study group in relation to the nine fields of concentration.

CHAPTER IV

PRESENTATION OF RESULTS AND DISCUSSION

As mentioned earlier, included in the specific problems of this study were those of 1) determining the differences found in personality factors, interests, and values among the nine groups, and 2) if any differences were found, how significant they were.

The tables included in this chapter represent the resolution of these problems in terms of the thirty scales utilized. Tables II through IV (p. 64-66) present the mean raw scores and standard deviation. Of the twenty-nine tables which follow, three represent analyses of variance in the scales; twenty-six reflect the results of t tests of factors whose F ratio indicated the existence of significant differences.

Degrees of freedom of 8, between groups, and 801 within groups, have not been noted in Tables V through VII (p. 67-70) since it was the same for all thirty factors. Examination of these analyses of variance reveals that on twelve scales of the Sixteen Personality Factor test, all eight scales of the Hackman-Gaither test, and all six scales of the Allport-Vernon, inter-group differences statistically significant at .05 level, did in fact exist. At .01 level, ten scales of the Sixteen Personality Factor test, all eight

Table II.- Means and Standard Deviations of Scores on the Sixteen Personality Factor Questionnaire

		A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3	Q4
Art	Mean	11.11	9.08	14.48	12.53	16.88	12.54	12.87	10.98	6.13	14.69	9.66	10.07	8.33	11.63	10.97	13.09
N = 90	S.D.	2.49	1.71	3.36	4.10	3.83	3.23	3.94	2.50	3.08	3.65	2.68	3.32	2.55	3.02	3.22	4.24
English	Mean	12.44	9.60	14.42	12.92	16.10	13.08	13.16	13.18	7.64	14.90	10.71	9.67	8.23	11.86	10.51	13.18
N = 90	S.D.	3.11	1.70	3.97	4.45	3.96	3.59	4.69	2.41	3.02	3.30	2.81	4.14	2.60	2.98	2.93	4.95
French	Mean	12.17	9.28	14.28	10.56	14.98	13.18	11.33	13.20	6.07	14.76	10.86	10.22	8.60	11.67	11.11	13.46
N = 90	S.D.	3.34	2.04	3.62	4.16	4.14	3.35	5.10	2.42	3.29	3.56	2.55	3.72	2.62	3.55	2.93	4.67
Biology	Mean	10.82	9.12	16.36	12.16	15.57	13.71	12.30	11.37	6.62	13.56	10.97	10.50	8.74	10.83	11.50	13.14
N = 90	S.D.	3.09	1.72	3.56	3.42	4.69	3.38	5.10	2.70	3.15	2.99	2.48	4.19	2.69	3.37	2.87	4.97
Chemistry	Mean	9.68	9.77	15.04	11.73	15.12	13.68	11.00	10.13	8.22	13.33	10.69	10.62	9.37	12.26	10.86	13.12
N = 90	S.D.	3.23	1.73	3.82	4.00	4.72	2.73	5.02	2.94	2.72	3.55	2.45	3.48	2.54	3.30	2.89	4.97
Mathematics	Mean	12.02	10.19	15.21	11.82	15.60	13.98	11.47	9.61	7.67	12.36	10.80	9.40	8.66	10.74	11.06	12.77
N = 90	S.D.	3.07	1.32	3.95	4.01	3.83	3.37	4.77	3.09	3.26	3.24	2.64	3.82	2.93	3.28	2.95	4.75
History	Mean	12.81	9.17	14.91	12.41	16.42	13.06	13.36	12.20	7.71	14.26	11.94	9.24	7.66	10.97	11.22	12.41
N = 90	S.D.	2.96	1.78	3.48	4.27	3.77	3.38	4.91	2.53	2.85	3.50	2.69	3.53	2.34	3.39	2.91	4.55
Psychology	Mean	13.94	9.46	15.08	11.30	16.99	13.20	12.09	11.92	7.10	13.49	11.06	10.20	8.21	9.67	10.50	12.76
N = 90	S.D.	2.77	1.65	3.89	4.27	4.24	3.55	4.82	2.70	3.00	3.27	2.37	3.46	2.57	3.26	2.99	4.89
Sociology	Mean	13.52	9.22	14.76	11.83	17.17	13.04	13.29	12.59	7.47	12.67	10.61	9.76	8.46	9.72	10.40	12.74
N = 90	S.D.	2.83	1.86	3.49	3.84	4.12	3.29	5.07	2.67	2.77	2.90	2.50	3.44	2.69	3.44	2.65	4.45
Total	Mean	12.08	9.43	14.95	11.92	16.09	13.28	12.32	11.69	7.65	13.80	10.81	9.96	8.46	11.04	10.90	12.96
N = 810	S.D.	3.24	1.77	3.74	4.12	4.23	3.35	4.93	2.93	3.05	3.44	2.64	3.72	2.66	3.40	2.95	4.75

A Aloof/Sociable
B Dull/Bright
C Emotional/Calm
E Submissive/Dominant
F Languid/Enthusiastic
G Casual/Conscientious
H Shy/Adventurous
I Tough/Sensitive
L Trusting/Suspicious
M Practical/Imaginative
N Simple/Sophisticated
O Confident/Insecure
Q1 Conservative/Experimenting
Q2 Group-dependent/Self-sufficient
Q3 Self-complacent/Self-disciplined
Q4 Relaxed/Tense

Table III.- Means and Standard Deviations of Scores on the Hackman-Gaither Vocational Interest Inventory

		I	II	III	IV	V	VI	VII	VIII
Art	Mean	-19.26	-10.36	21.01	7.60	-24.66	-21.64	- .94	- 9.70
N = 90	S.D.	12.00	14.90	11.16	12.29	14.01	11.94	14.19	17.33
English	Mean	-17.29	-18.23	18.26	9.49	-26.77	-32.77	- 4.18	-16.61
N = 90	S.D.	13.89	14.13	13.45	11.72	12.96	7.59	16.67	17.78
French	Mean	-18.83	-18.94	15.92	9.74	-22.78	-31.58	.52	-16.69
N = 90	S.D.	11.88	13.81	15.45	11.33	14.74	9.55	13.18	18.35
Biology	Mean	-24.98	-1.87	10.88	14.40	-30.19	-28.52	- 5.40	- 6.04
N = 90	S.D.	12.02	14.63	16.03	12.81	10.87	13.91	15.26	20.54
Chemistry	Mean	-22.52	- 8.28	11.03	12.91	-25.96	-22.42	- 6.87	-11.63
N = 90	S.D.	12.51	14.99	15.53	11.41	14.89	17.65	16.04	18.46
Mathematics	Mean	-15.22	3.42	5.57	9.46	-18.92	-24.14	- 4.72	-20.64
N = 90	S.D.	12.74	19.59	19.99	13.11	17.68	17.17	16.08	17.64
History	Mean	-14.03	-15.60	16.12	9.90	-21.87	-31.66	- 2.46	-14.29
N = 90	S.D.	13.92	13.01	13.98	13.90	17.37	10.79	16.91	16.93
Psychology	Mean	-11.43	-14.13	12.93	14.23	-22.19	-32.17	.57	-19.39
N = 90	S.D.	15.06	14.69	16.87	10.54	16.56	8.87	16.04	17.14
Sociology	Mean	-16.97	-20.56	9.33	11.52	-24.53	-33.63	- 2.67	-19.20
N = 90	S.D.	12.05	14.27	16.45	11.86	12.82	9.25	14.19	17.31
Total	Mean	-17.84	- 9.78	13.45	11.03	-24.21	-28.73	- 2.90	-14.91
N = 810	S.D.	13.53	17.99	16.25	12.35	15.13	13.13	15.73	18.56

I Business - Contact
II Scientific - Technical
III Artistic
IV Health and Welfare
V Business - Clerical
VI Mechanical
VII Service
VIII Outdoor

Table IV.- Means and Standard Deviations of Scores on the Allport-Vernon-Lindzey Study of Values

		Theo.	Econ.	Aest.	Soc.	Pol.	Rel.
Art	Mean	35.11	31.77	49.08	39.53	38.33	46.46
N = 90	S.D.	5.59	6.70	6.62	5.97	6.97	6.77
English	Mean	33.24	32.34	47.16	40.76	39.32	46.98
N = 90	S.D.	5.25	7.77	7.19	7.50	6.73	6.10
French	Mean	32.26	32.87	44.76	43.17	38.56	48.29
N = 90	S.D.	5.57	7.45	7.56	7.04	5.88	6.48
Biology	Mean	43.12	30.14	39.48	41.30	38.84	48.02
N = 90	S.D.	6.37	7.09	7.37	6.70	5.82	6.16
Chemistry	Mean	44.71	30.41	40.99	39.47	36.60	47.83
N = 90	S.D.	7.20	7.26	7.37	7.36	5.68	7.76
Mathematics	Mean	41.14	34.22	38.00	40.74	38.20	47.69
N = 90	S.D.	7.02	7.34	7.68	7.89	5.61	7.00
History	Mean	32.21	34.56	42.44	40.34	44.97	45.37
N = 90	S.D.	7.02	7.45	7.36	7.27	5.98	6.72
Psychology	Mean	33.56	34.97	39.46	44.56	39.09	48.09
N = 90	S.D.	6.41	7.48	8.10	7.13	5.81	6.02
Sociology	Mean	33.23	33.26	40.40	47.01	39.23	46.83
N = 90	S.D.	6.17	6.12	5.44	6.44	6.39	6.87
Total	Mean	36.51	32.73	42.42	41.88	39.13	47.33
N = 810	S.D.	7.90	7.38	8.06	7.45	6.50	6.74

Theo. Theoretical — Soc. Social

Econ. Economic — Pol. Political

Aest. Aesthetic — Rel. Religious

Table V.- Analysis of Variance Concerning Personality Factors

Factor	Sources of Variation	Sum of Squares	Variance	F Ratio
A	Between Groups	1224.45	153.06	16.84 ***
	Within Groups	7281.34	9.09	
B	Between Groups	96.60	12.07	3.97 ***
	Within Groups	2432.03	3.04	
C	Between Groups	275.56	34.45	2.50 *
	Within Groups	11028.27	13.77	
E	Between Groups	357.79	44.72	2.67 **
	Within Groups	13404.84	16.74	
F	Between Groups	484.72	60.59	3.47 ***
	Within Groups	13998.51	17.48	
G	Between Groups	137.63	17.20	1.54 x
	Within Groups	8972.63	11.20	
H	Between Groups	585.54	73.19	3.06 **
	Within Groups	19123.92	23.88	
I	Between Groups	1155.24	144.41	20.03 ***
	Within Groups	5777.60	7.21	

A Aloof/Sociable
B Dull/Bright
C Emotional/Calm
E Submissive/Dominant
F Languid/Enthusiastic
G Casual/Conscientious
H Shy/Adventurous
I Tough/Sensitive

x Not significant
* Significant at .05 level
** Significant at .01 level
*** Significant at .001 level

Table V.- (Continued)
Analysis of Variance Concerning Personality Factors

Factor	Sources of Variation	Sum of Squares	Variance	F Ratio
L	Between Groups	150.00	18.75	2.03 *
	Within Groups	7388.32	9.22	
M	Between Groups	580.72	72.59	6.44 ***
	Within Groups	9026.87	11.27	
N	Between Groups	249.37	31.17	4.64 ***
	Within Groups	5375.36	6.71	
O	Between Groups	163.91	20.49	1.49 x
	Within Groups	11020.06	13.76	
Q_1	Between Groups	157.00	19.62	2.83 **
	Within Groups	5553.01	6.93	
Q_2	Between Groups	598.09	74.76	6.81 ***
	Within Groups	8785.72	10.97	
Q_3	Between Groups	99.02	12.38	1.43 x
	Within Groups	6954.28	8.68	
Q_4	Between Groups	70.90	8.86	.39 x
	Within Groups	18227.84	22.76	

L Trusting/Suspicious
M Practical/Imaginative
N Simple/Sophisticated
O Confident/Insecure
Q_1 Conservative/Experimenting
Q_2 Group-dependent/Self-sufficient
Q_3 Self-complacent/Self-disciplined
Q_4 Relaxed/Tense

x Not significant
* Significant at .05 level
** Significant at .01 level
*** Significant at .001 level

Table VI.- Analysis of Variance Concerning Interests Factors

Factor	Sources of Variation	Sum of Squares	Variance	F Ratio
I	Between Groups	12538.51	1567.31	9.25 ***
	Within Groups	135671.98	169.38	
II	Between Groups	79894.47	9986.81	43.92 ***
	Within Groups	182128.08	227.38	
III	Between Groups	16680.04	2085.01	8.46 ***
	Within Groups	197322.48	246.35	
IV	Between Groups	4045.27	505.66	3.39 ***
	Within Groups	119535.08	149.23	
V	Between Groups	7669.94	958.74	4.32 ***
	Within Groups	177712.63	221.86	
VI	Between Groups	16189.23	2023.65	13.13 ***
	Within Groups	123481.93	154.16	
VII	Between Groups	4926.87	615.86	2.52 **
	Within Groups	195620.81	244.22	
VIII	Between Groups	17484.40	2185.55	6.69 ***
	Within Groups	261615.20	326.61	

I	Business-Contact	V	Business-Clerical
II	Scientific-Technical	VI	Mechanical
III	Artistic	VII	Service
IV	Health and Welfare	VIII	Outdoor

* Significant at .05 level
** Significant at .01 level
*** Significant at .001 level

Table VII.- Analysis of Variance Concerning Values Factors

Factor	Sources of Variation	Sum of Squares	Variance	F Ratio
Theo.	Between Groups	18101.20	2265.65	55.95 ***
	Within Groups	32393.30	40.44	
Econ.	Between Groups	2159.63	269.95	5.51 ***
	Within Groups	41985.53	52.42	
Aest.	Between Groups	10378.50	1297.31	24.57 ***
	Within Groups	42290.40	52.80	
Soc.	Between Groups	4654.80	581.85	11.56 ***
	Within Groups	40325.60	50.34	
Pol.	Between Groups	3960.00	495.00	13.09 ***
	Within Groups	30282.00	37.81	
Rel.	Between Groups	730.20	91.28	2.03 *
	Within Groups	36072.40	45.03	

Theo. Theoretical
Econ. Economic
Aest. Aesthetic
Soc. Social
Pol. Political
Rel. Religious

* Significant at .05 level
** Significant at .01 level
*** Significant at .001 level

scales of the Gaither-Hackman test, and five scales of the Allport-Vernon were statistically significant. At .001 level, seven scales of the personality test, seven scales of the interest test, and five scales of the value test were statistically significant. In instances where the F ratio was significant, t tests were run to discover the significance of differences between means of the individual subgroups on the various scales. The greatest F ratio obtained in this study was that of Theoretical values (55.95) and that of Scientific-Technical interests (43.92).

1. Sixteen Personality Factor Questionnaire

The analysis of variance concerning factor A (Aloof vs. Sociable), as measured by the Sixteen Personality Factor Questionnaire is shown in Table V (p. 67). An F ratio of 16.84, one highly significant even at the .001 level of confidence, is evidenced. A series of t tests was run, as shown in Table VIII (p. 72), to determine the significance of differences between the mean scores obtained by the different major areas.

The concentrators in the three fields representing the social sciences ranked highest; psychology and sociology students led with mean scores of 13.94 and 13.52 respectively and history students followed closely with 12.81. The two lowest-ranking groups, with mean scores of 10.82 and 9.88,

Table VIII.- t Test of Significance of Factor A: Aloof/Sociable

Sub-Groups	Means	Difference	Level of Significance
Psych. - Chem.	13.94 - 9.88	4.06	P < .001
Psych. - Biol.	13.94 - 10.82	3.12	
Psych. - Art	13.94 - 11.11	2.83	
Psych. - Math.	13.94 - 12.02	1.92	
Psych. - Fren.	13.94 - 12.17	1.77	
Psych. - Eng.	13.94 - 12.44	1.50	
Soc. - Chem.	13.52 - 9.88	3.64	
Soc. - Biol.	13.52 - 10.82	2.70	
Soc. - Art	13.52 - 11.11	2.41	
Soc. - Math.	13.52 - 12.02	1.50	
Hist. - Chem.	12.81 - 9.88	2.93	
Hist. - Biol.	12.81 - 10.82	1.99	
Hist. - Art	12.81 - 11.11	1.70	
Eng. - Chem.	12.44 - 9.88	2.56	
Eng. - Biol.	12.44 - 10.82	1.62	
Fren. - Chem.	12.17 - 9.88	2.29	
Math. - Chem.	12.02 - 9.88	2.14	
Soc. - Fren.	13.52 - 12.17	1.35	P < .01
Eng. - Art	12.44 - 11.11	1.33	
Fren. - Biol.	12.17 - 10.82	1.35	
Math. - Biol.	12.02 - 10.82	1.20	
Art - Chem.	11.11 - 9.88	1.23	
Psych. - Hist.	13.94 - 12.81	1.13	P < .05
Soc. - Eng.	13.52 - 12.44	1.08	
Fren. - Art	12.17 - 11.11	1.06	
Math. - Art	12.02 - 11.11	.91	
Biol. - Chem.	10.82 - 9.88	.94	

SE of a difference between means: .449
Mean difference significant at .001 level: 1.48
" " " .01 " : 1.16
" " " .05 " : .88

were majors in the fields of biology and chemistry respectively.

Differences between the social sciences and natural sciences groups were highly significant at the .001 level. This was true also of the differences found between students majoring in the social sciences and those in art; between those in English and those in chemistry; those in English and those in biology. Similarly, significant difference was registered between those students whose field of concentration was French or mathematics and those majoring in chemistry.

At the .01 level, there were significant differences between sociology and French, between English and art, between French or mathematics majors and biology concentrators, and between art and chemistry majors.

At the .05 level, significant differences, with evidence of some intra-group differentiation, were apparent. For example, within the social science group, differences occurred between psychology and history concentrators; within the humanities group, between French and art majors; and within the natural science group, between biology and mathematics concentrators.

Findings in this portion of the study appear to be consonant with those of the authors of the 16 PF test who noted that the highest expression of the warmth factor (factor A) is found in the social interest groups; the authors

found the lowest degree of expression of this factor in the natural science oriented group.[1]

The analysis of variance (p. 67) concerning factor B (Dull vs. Bright), resulted in an F ratio of 3.97. This led to further analysis to determine the differences between the sub-groups means by applying the t tests shown in Table IX.

Mathematics concentrators ranked highest, with a mean score of 10.19, whereas history (9.17), biology (9.12), and art (9.08) ranked lowest. The only remaining groups which ranked high enough to contrast with majors in other fields of study were chemistry concentrators (9.77) and English majors (9.60).

Comparison of sub-group means revealed mathematics and chemistry concentrators significantly different in relation to the remaining seven fields. On the .001 level, mathematics concentrators stood in sharp contrast to art, biology, history, sociology, and French concentrators. On the .01 level, mathematics and psychology majors differed significantly; chemistry and art concentrators also recorded a significant difference at this level. On the .05 level, significant differences were apparent between mathematics and English majors, between English and art majors, and

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1 Raymond B. Cattell and Herbert W. Eber, Handbook for the Sixteen Personality Factor Questionnaire, 1957 Edition, Champaign, Illinois, Institute for Personality and Ability Testing, 1962, p. 11.

Table IX.- t Test of Significance of Factor B: Dull/Bright

Sub-Groups	Means	Difference	Level of Significance
Math. - Art	10.19 - 9.08	1.11	P < .001
Math. - Biol.	10.19 - 9.12	1.07	
Math. - Hist.	10.19 - 9.17	1.02	
Math. - Soc.	10.19 - 9.22	.97	
Math. - Fren.	10.19 - 9.28	.91	
Math. - Psych.	10.19 - 9.46	.73	P < .01
Chem. - Art	9.77 - 9.08	.69	
Math. - Eng.	10.19 - 9.60	.59	P < .05
Chem. - Biol.	9.77 - 9.12	.65	
Chem. - Hist.	9.77 - 9.17	.60	
Chem. - Soc.	9.77 - 9.22	.55	
Eng. - Art	9.60 - 9.08	.52	

SE of a difference between means:	.26
Mean difference significant at .001 level:	.86
" " " .01 " :	.67
" " " .05 " :	.51

between concentrators in the field of chemistry and those in biology, history, and sociology.

According to the authors of the test, the associations of this factor are not very highly loaded. The rationale for its inclusion in the test, they aver, is to provide some measurement of general ability or capacity which would influence, even though moderately, a corresponding interest and tendency to persevere.[2] Hence, it would appear that among the sub-groups comprising the present study, the three high-ranking groups--mathematics, chemistry, and English concentrators--are characterized to a greater degree by the tendency to be more persistent and to display greater strength of interest than are the remaining sub-groups.

Concerning factor C (Emotional vs. Calm), the analysis of variance (p. 67) resulted in the relatively low F ratio of 2.50. Sub-group means tended to cluster between the high score of 16.36 for biology concentrators and the low score of 14.28 for French majors.

However, as indicated in Table X on the following page, significant differences on the .05 level were apparent between biology concentrators and majors in the other eight fields of concentration.

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2 Cattell and Eber, Op. Cit., p. 11.

Table X.- t Test of Significance of Factor C: Emotional/Calm

Sub-Groups	Means	Difference	Level of Significance
Biol. - Fren.	16.36 - 14.28	2.08	$P < .05$
Biol. - Eng.	16.36 - 14.42	1.94	
Biol. - Art	16.36 - 14.48	1.88	
Biol. - Soc.	16.36 - 14.76	1.60	
Biol. - Hist.	16.36 - 14.91	1.45	
Biol. - Chem.	16.36 - 15.04	1.32	
Biol. - Psych.	16.36 - 15.08	1.28	
Biol. - Math.	16.36 - 15.21	1.15	

SE of a difference between means .553
Mean difference significant at .05 level: 1.08

The higher score of the biology concentrators may be associated with the need for adjustment to situational exigencies characteristic of this field of natural science. The lower-scoring French majors, on the other hand, reflect the less demanding aspects of a field in which sudden adjustments are not required and wherein one is more or less free to set his own pace.

The analysis of variance concerning factor E (Submissive vs. Dominant) resulted in an F ratio of 2.67, significant at the .01 level of confidence. The t tests on the following page revealed the greatest difference to be between the English and French concentrators. The same degree of difference, significant at the .01 level, was manifest between concentrators in the fields of art and history and those in French, between English majors and psychology concentrators, and between biology majors and French majors. Of the nine sub-groups comprising the population of the study, only French and psychology concentrators were low-scoring enough to prove significantly different from the remaining groups on either the .01 or the .05 level.

Again, the more passive French majors, now joined by the psychology concentrators, were marked by low scores for this factor. The two groups were differentiated from the higher scorers with whom they were compared by responses evidencing less assertive and courageous personality traits.

Table XI.- t Test of Significance of Factor E: Submissive/Dominant

Sub-Groups	Means	Difference	Level of Significance
Eng. - French	12.92 - 10.56	2.36	P < .01
Art - Fren.	12.53 - 10.56	1.97	
Hist. - Fren.	12.41 - 10.56	1.85	
Eng. - Psych.	12.92 - 11.30	1.62	
Biol. - Fren.	12.16 - 10.56	1.60	
Soc. - Fren.	11.83 - 10.56	1.27	P < .05
Math. - Fren.	11.82 - 10.56	1.26	
Art - Psych.	12.53 - 11.30	1.23	

SE of a difference between means:	.61
Mean difference significant at .01 level:	1.57
" " " .05 " :	1.20

A significant F ratio of 3.47, resulting from the analysis of variance concerning factor F (Languid vs. Enthusiastic) indicated the advisability of t tests to determine the differences between the sub-group means. These analyses are exhibited in Table XII (p. 81).

Of the three high scorers, sociology concentrators placed first with a mean of 17.17; psychology major followed closely with 16.99; and art had a mean score of 16.88. The lowest means were found among chemistry students (15.12) and French majors (14.98). Evaluation of the differences revealed that significant mean differences on the .001 level of confidence existed between the sociology students and the two low groups, namely, chemistry and French.

Significant differences on the .01 level of confidence obtained between psychology and art majors--ranking second and third highest respectively--and the two last groups. The aforementioned three highest groups, together with history concentrators, showed significant differences on the .05 level when evaluated against the remaining groups.

Factor F is apparently of considerable importance in distinguishing the sub-groups comprising the field of social sciences, as well as art concentrators, from the remaining five groups making up the study population.

The analysis made in the present study reveals that areas representing social science groups, those tending to

Table XII.- t Test of Significance of Factor F: Languid/Enthusiastic

Sub-Groups	Means	Difference	Level of Significance
Soc. - Fren.	17.17 - 14.98	2.19	P < .001
Soc. - Chem.	17.17 - 15.12	2.05	
Psych.- Fren.	16.99 - 14.98	2.01	P < .01
Psych.- Chem.	16.99 - 15.12	1.87	
Art - Fren.	16.88 - 14.98	1.90	
Art - Chem.	16.88 - 15.12	1.76	
Soc. - Biol.	17.17 - 15.57	1.60	P < .05
Soc. - Math.	17.17 - 15.60	1.57	
Soc. - Eng.	17.17 - 16.10	1.07	
Psych.- Biol.	16.99 - 15.57	1.42	
Psych.- Math.	16.99 - 15.60	1.39	
Art - Biol.	16.88 - 15.57	1.31	
Art - Math.	16.88 - 15.60	1.28	
Hist. - Fren.	16.42 - 14.98	1.44	
Hist. - Chem.	16.42 - 15.12	1.30	

SE of a difference between means: .623
Mean difference significant at .001 level: 2.05
" " " .01 " : 1.61
" " " .05 " : 1.22

be the more active and expressive, are the highest scorers. On the other hand, the concentrators in the natural science fields, where deliberation and introspection are necessary, proved to be the lowest as a group in the sub-group mean listing. Nevertheless, the lowest mean by individual subject area was that of the students majoring in French, a position entirely consistent with the findings concerning these students with regard to factors C and E.

The analysis of variance for factor G (Casual vs. Conscientious) revealed a relatively low F ratio of 1.54, and thus, short of significance. The low F ratio, indicative of the homogeneity of the study group with respect to energy and persistence, precluded the running of t tests.

An F ratio of 3.06, significant at the .01 level of confidence, resulted from the analysis of variance (Table V, p. 67) of factor H (Shy vs. Adventurous). The concentrators in history (13.36), sociology (13.29), English (13.16), and art (12.87) ranked highest; the concentrators in mathematics (11.47), French (11.33), and chemistry (11.00) scored lowest.

T tests, as indicated in Table XIII (p. 83), revealed the fact that differences significant on the .01 level obtained between history majors and the three lowest groups, namely, chemistry, French, and mathematics; between sociology majors and chemistry and French concentrators;

Table XIII.- t Test of Significance of Factor H: Shy/Adventurous

Sub-Groups	Means	Difference	Level of Significance
Hist. - Chem.	13.36 - 11.00	2.36	P < .01
Hist. - Fren.	13.36 - 11.33	2.03	
Hist. - Math.	13.36 - 11.47	1.89	
Soc. - Chem.	13.29 - 11.00	2.29	
Soc. - Fren.	13.29 - 11.33	1.96	
Eng. - Chem.	13.16 - 11.00	2.16	
Soc. - Math.	13.29 - 11.47	1.82	P < .05
Eng. - Fren.	13.16 - 11.33	1.83	
Eng. - Math.	13.16 - 11.47	1.69	
Art - Chem.	12.87 - 11.00	1.87	
Art - Fren.	12.87 - 11.33	1.54	

SE of a difference between means: .728
Mean difference significant at .01 level: 1.88
" " " .05 " : 1.43

and between English and chemistry groups. Differences significant on the .05 level were recorded also between sociology and mathematics majors, between English and both French and mathematics majors, as well as between art concentrators and both chemistry and French majors.

The authors venture that a high H factor indicates a "constitutional insusceptibility to inhibition" and is presumably important in distinguishing "suitability for those occupations demanding ability to face wear and tear in dealing with people and gruelling emotional situations." They note, further, that high H persons have a history of greater frequency in organizational leadership.[3]

The present study establishes history and sociology majors as high, and French and chemistry majors as low scorers. Unquestionably, occupational pursuits and interests demand a greater degree of the specified "suitability" from those in the area of social sciences, which are almost completely concerned with human inter-action and inter-relationship, than from those in the field of natural sciences. And the pattern already established in the present study by the students majoring in French is adhered to once more as their low scores indicate an opposition to involvement in critical situations of this nature.

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3 Cattell and Eber, Op. Cit., p. 14.

The analysis of variance concerning factor I (Tough vs. Sensitive) resulted in the highest *F* ratio yielded by the 16 PF in this study--20.03. The t tests shown on the following page recorded highly significant differences on the .001 level between the relatively low scores of students of chemistry (10.18) and mathematics (9.61) and the scores of those concentrating in all other fields. Among the latter seven sub-groups, highest and most significantly different means obtained at this level in tests of French (13.20), English (13.18), sociology (12.59), and history (12.20) majors. At the .01 level, very significant differences obtained between French, sociology, history and biology majors as respectively compared to psychology, biology, art, and chemistry concentrators. And, the .05 level revealed significant differences which existed among the high scoring sub-groups themselves, namely, between French, history, psychology, and art to the respective fields of history, biology, art, and chemistry.

Concentrators in the fields of French and English proved to be highest scorers, establishing significant differences.

To summarize the findings of the present study with regard to this factor, the cultural areas of the humanities scored high and the scientifically precise and regulated areas of the natural sciences scored low by comparison.

Table XIV.- t Test of Significance of Factor I: Tough/Sensitive

Sub-Groups	Means	Difference	Level of Significance
Fren. - Math.	13.20 - 9.61	3.59	P < .001
Fren. - Chem.	13.20 - 10.18	3.02	
Fren. - Art	13.20 - 10.98	2.22	
Fren. - Biol.	13.20 - 11.37	1.83	
Eng. - Math.	13.18 - 9.61	3.57	
Eng. - Chem.	13.18 - 10.18	3.00	
Eng. - Art	13.18 - 10.98	2.20	
Eng. - Biol.	13.18 - 11.37	1.81	
Soc. - Math.	12.59 - 9.61	2.98	
Soc. - Chem.	12.59 - 10.18	2.41	
Soc. - Art	12.59 - 10.98	1.61	
Hist. - Math.	12.20 - 9.61	2.59	
Hist. - Chem.	12.20 - 10.18	2.02	
Psych. - Math.	11.92 - 9.61	2.31	
Psych. - Chem.	11.92 - 10.18	1.74	
Biol. - Math.	11.37 - 9.61	1.76	
Art - Math.	10.98 - 9.61	1.37	
Fren. - Psych.	13.20 - 11.92	1.28	P < .01
Soc. - Biol.	12.59 - 11.37	1.22	
Hist. - Art	12.20 - 10.98	1.22	
Biol. - Chem.	11.37 - 10.18	1.19	
Fren. - Hist.	13.20 - 12.20	1.00	P < .05
Hist. - Biol.	12.20 - 11.37	.83	
Psych. - Art	11.92 - 10.98	.94	
Art - Chem.	10.98 - 10.18	.80	

SE of a difference between means:			.40
Mean difference significant at	.001	level:	1.32
" " "	.01	"	1.03
" " "	.05	"	.78

Apparently, this factor is particularly applicable in distinguishing majors in the fields of the humanities and social sciences, although biology, a natural science, tends to align itself with these.

It is not immediately apparent why art, one of the fields of the humanities, should, in this instance as in others, align itself with the natural scisnce area rather than its own domain of humanities. One might venture that, though art deals with an end-product which is creative and the result of inventiveness in expression, yet it is governed as a discipline by inner laws which associate it with the more scientific areas.

Proceeding to the consideration of factor L (Trusting vs. Suspicious), the relatively low F ratio of 2.03, significant only at the .05 level of confidence, established the fact that this personality dimension was a far less distinguishing factor in this study than the majority of dimensions concerned with the study of personality. Significantly, the authors themselves have pointed out that "this pattern has rather larger variance in male than female populations."[4]

Be that as it may, t tests (Table XV) indicate that the four highest scoring groups, i.e., biology (8.62),

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4 Cattell and Eber, Op. Cit., p. 16.

Table XV.- t Test of Significance of Factor L: Trusting/Suspicious

Sub-Groups	Means	Difference	Level of Significance
Biol. - Psych.	8.62 - 7.10	1.52	P < .05
Biol. - Soc.	8.62 - 7.47	1.15	
Biol. - Eng.	8.62 - 7.64	.98	
Biol. - Math.	8.62 - 7.67	.95	
Biol. - Hist.	8.62 - 7.71	.91	
Chem. - Psych.	8.22 - 7.10	1.12	
Art - Psych.	8.13 - 7.10	1.03	
Pren. - Psych.	8.07 - 7.10	.97	

SE of a difference between means: .453
Mean difference significant at .05 level: .89

chemistry (8.22), art (8.13), and French (8.07) concentrators proved significantly different from the remaining groups, viz., history (7.71), mathematics (7.67), English (7.64), sociology (7.47), and psychology (7.10) majors.

In the present study, the analysis of variance concerning factor M (Practical vs. Imaginative) resulted in the 6.44 F ratio, a relatively high one, and significant on the .001 level.

The three fields representing the area of humanities ranked as highest scorers--English concentrators leading positively with 14.90, French following with 14.76, and, finally, art with 14.69. Lowest scorers were the sociology (12.87) and mathematics (12.36) majors.

On the .001 level, a comparison of the sub-group means (Table XVI) established the fact that highly significant differences were found between all three high-scoring fields of the humanities, each respectively, with both mathematics and sociology majors. This was also true, at the same level, between history and mathematics concentrators.

At the .01 level, English majors proved significantly different from chemistry, psychology, and biology concentrators. French and art majors proved significantly different from chemistry majors, as did history from sociology concentrators. At the .05 level, French concentrators registered means significantly different from psychology and

Table XVI.- t Test of Significance of Factor M: Practical/Imaginative

Sub-Groups	Means	Difference	Level of Significance
Eng. - Math.	14.90 - 12.36	2.54	P < .001
Eng. - Soc.	14.90 - 12.87	2.03	
Fren. - Math.	14.76 - 12.36	2.40	
Fren. - Soc.	14.76 - 12.87	1.89	
Art - Math.	14.69 - 12.36	2.33	
Art - Soc.	14.69 - 12.87	1.82	
Hist. - Math.	14.26 - 12.36	1.90	
Eng. - Chem.	14.90 - 13.33	1.57	P < .01
Eng. - Psych.	14.90 - 13.49	1.41	
Eng. - Biol.	14.90 - 13.56	1.34	
Fren. - Chem.	14.76 - 13.33	1.43	
Art - Chem.	14.69 - 13.33	1.36	
Hist. - Soc.	14.26 - 12.87	1.39	
Fren. - Psych.	14.76 - 13.49	1.27	P < .05
Fren. - Biol.	14.76 - 13.56	1.20	
Art - Psych.	14.69 - 13.49	1.20	
Art - Biol.	14.69 - 13.56	1.13	
Biol. - Math.	13.56 - 12.36	1.20	
Psych. - Math.	13.49 - 12.36	1.13	

SE of a difference between means: .500
Mean difference significant at .001 level: 1.65
" " " .01 " : 1.29
" " " .05 " : .98

biology majors, as also did art concentrators from the same two groups. Biology and psychology majors proved significantly different from mathematics majors.

According to the study made by the test's authors, a high M is related to more creative occupations where work is accomplished without much group participation—as among artists and researchers. Moreover, they state that this factor has been found to distinguish even the more creative among artists, researchers, and teachers.[5]

It would appear that among the sub-groups comprising the study population, this factor is especially effective in distinguishing English, French, and art majors among the humanities, and history concentrators from among the social science groups.

The analysis of variance of factor N (Simple vs. Sophisticated) resulted in an F ratio of 4.64, significant at the .001 level. The highest scores were made by history (11.94), psychology (11.06), and biology (10.97) concentrators and lowest means by art concentrators (9.66) with sociology (10.61) ranking next to last.

Differences in sub-group means, significant at the .001 level, were evident, as indicated in Table XVII (p. 92), between the three highest scoring groups and the two lowest.

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5 Cattell and Eber, Op. Cit., p. 16.

Table XVII.- t Test of Significance of Factor N: Simple/Sophisticated

Sub-Groups	Means	Difference	Level of Significance
Hist. - Art	11.94 - 9.66	2.28	P < .001
Hist. - Soc.	11.94 - 10.61	1.33	
Psych. - Art	11.06 - 9.66	1.40	
Biol. - Art	10.97 - 9.66	1.31	
Hist. - Chem.	11.94 - 10.69	1.25	P < .01
Hist. - Eng.	11.94 - 10.71	1.23	
Hist. - Math.	11.94 - 10.80	1.14	
Hist. - Fren.	11.94 - 10.86	1.08	
Fren. - Art	10.86 - 9.66	1.20	
Math. - Art	10.80 - 9.66	1.14	
Eng. - Art	10.71 - 9.66	1.05	
Chem. - Art	10.69 - 9.66	1.03	
Hist. - Biol.	11.94 - 10.97	.97	P < .05
Hist. - Psych.	11.94 - 11.06	.88	
Soc. - Art	10.61 - 9.66	.95	

Se of a difference between means: .386
Mean difference significant at .001 level: 1.27
" " " .01 " : 1.00
" " " .05 " : .76

On the .01 level, very significant differences obtained among eight groups compared, namely, between majors in history and concentrators in chemistry, English, mathematics, and French. Also on the same level of significance, differences obtained between concentrators in French, mathematics, English, and chemistry and majors in art.

At the .05 level, differences of some significance were evident even between history and the other two groups of high scorers--biology and psychology--and also between the two low-scoring groups, viz., sociology and art concentrators.

It follows that the history, psychology, and biology majors are certainly involved to a greater extent in areas calling for highly analytical, goal-oriented performance in the pursuit of solutions, than are the low-scoring sociology and art concentrators for whom success lies in the direction of the gregarious, warm, tolerant approach to people and circumstances.

The very low F ratio of 1.49 for factor O (Confident vs. Insecure) manifests clearly the inapplicability of this factor as a distinguishing one in this study. The analysis of variance indicated that the running of t tests for the O factor was not warranted.

This very low F ratio reflects a homogeneity among the students making up the study population. The combination

of repetition and innovation in their training, which is generally characteristic of the college environment, probably conditioned all groups to adopt the medial position between confidence and insecurity.

The analysis of variance for factor Q_1 (Conservative vs. Experimenting) yielded an F ratio of 2.83, significant at the .01 level of confidence. T tests revealed especially significant differences (Table XVIII) particularly between chemistry majors, scoring 9.37, and low-scoring history concentrators (7.66).

Significant differences at the .01 level were found between the chemistry (9.37), biology (8.74), and mathematics (8.68) concentrators on the one hand, and low-scoring psychology (8.21), English (8.23), art (8.33), and history (7.66) majors, respectively, on the other.

At the .05 level, significant differences were prevalent between French and history students and between chemistry and sociology majors. On the same level of significance, differences were noted between sociology and history majors and concentrators in chemistry and French.

The test authors have found that a high score on factor Q_1 is effective in distinguishing occupational groups with scientific and analytical tendencies from groups with more humanitarian or philosophical interests. Hence, among their study groups, executives, directors, and scientific

Table XVIII.- t Test of Significance of Factor Q_1
Conservative/Experimenting

Sub-Groups	Means	Difference	Level of Significance
Chem. - Hist.	9.37 - 7.66	1.71	$P < .01$
Chem. - Psych.	9.37 - 8.21	1.16	
Chem. - Eng.	9.37 - 8.23	1.14	
Chem. - Art	9.37 - 8.33	1.04	
Biol. - Hist.	8.74 - 7.66	1.08	
Math. - Hist.	8.68 - 7.66	1.02	
Fren. - Hist.	8.60 - 7.66	.94	$P < .05$
Chem. - Soc.	9.37 - 8.46	.91	
Soc. - Hist.	8.46 - 7.66	.80	
Chem. - Fren.	9.37 - 8.60	.77	

SE of a difference between means: .392
Mean difference significant at .01 level: 1.01
" " " .05 " : .77

researchers were high scorers while with priests, nurses, and more successful psychiatric technicians, the factor ranked low.[6]

The natural science sub-groups of the present study appear to be categorically comparable to the formerly enumerated high Q_1 groups. These stand in contrast to representative groups from the fields of the humanities and social sciences. In the latter two fields, it was noted that French majors from among humanities and sociology concentrators from among the social sciences, tended to align themselves with the high Q_1 groups, if only on the .05 level.

A relatively high F ratio of 6.82 recorded for factor Q_2 (Group-dependent vs. Self-sufficient) was highly significant even at the .001 level, and led to a closer study of the sub-group means which contributed to it.

The t tests revealed differences of highest significance at the .001 level between the high-scoring and low-scoring groups, namely, between chemistry (12.26), English (11.86), French (11.67), and art (11.63) and the concentrators in sociology (9.72) and psychology (9.67).

Significant differences at the .01 level were obtained between history (10.97) and both chemistry (12.26) and psychology (9.67). Also at this level, differences

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6 Cattell and Eber, Op. Cit., p. 18.

Table XIX.- t Test of Significance of Factor Q_2
Group-dependent/Self-sufficient

Sub-Groups	Means	Difference	Level of Significance
Chem. - Psych.	12.26 - 9.67	2.59	P < .001
Chem. - Soc.	12.26 - 9.72	2.54	
Eng. - Psych.	11.86 - 9.67	2.19	
Eng. - Soc.	11.86 - 9.72	2.14	
Fren. - Psych.	11.67 - 9.67	2.00	
Fren. - Soc.	11.67 - 9.72	1.95	
Art - Psych.	11.63 - 9.67	1.96	
Art - Soc.	11.63 - 9.72	1.91	
Chem. - Math.	12.26 - 10.74	1.52	P < .01
Chem. - Biol.	12.26 - 10.83	1.43	
Chem. - Hist.	12.26 - 10.97	1.29	
Hist. - Psych.	10.97 - 9.67	1.30	
Hist. - Soc.	10.97 - 9.72	1.25	P < .05
Biol. - Psych.	10.83 - 9.67	1.16	
Biol. - Soc.	10.83 - 9.72	1.11	
Eng. - Math.	11.86 - 10.74	1.12	
Eng. - Biol.	11.86 - 10.83	1.03	
Math. - Psych.	10.74 - 9.67	1.07	
Math. - Soc.	10.74 - 9.72	1.02	

SE of a difference between means: .494
Mean difference significant at .001 level: 1.63
" " " .01 " : 1.27
" " " .05 " : .97

were noted between chemistry and each of the following: history, mathematics (10.74), and biology (10.83).

At the .05 level, history concentrators showed significant differences from sociology concentrators as did biology majors from concentrators in psychology and sociology, English majors from concentrators in mathematics and biology, and mathematics majors themselves from concentrators in psychology and sociology.

Findings of this study signify that chemistry majors, scoring highest of all sub-groups on this factor, display elements of self-reliance occupationally related to scientists while the socially-oriented sociology and psychology students reveal their group consciousness in the low scores recorded.

The remaining two factors in the 16 PF, Q_3 (Self-complacent vs. Self-disciplined) and Q_4 (Relaxed vs. Tense), registered the low F ratios of 1.43 and .39 respectively on the analyses of variance. Since neither indicated significance, further analysis was unnecessary. It might be noted, however, that the latter, Q_4 scored the lowest of all sixteen factors.

The authors of the test indicate that a high Q_3 factor distinguishes socially-approved potential leaders; a high Q_4, on the other hand, is related to those individuals who rarely achieve leadership. Furthermore, they

note, there have been indications that, academically, the q_4 factor was effective in distinguishing over-achievers from under-achievers of the same intelligence level.[7]

The students comprising the study population, it will be remembered, were college juniors and seniors already pursuing specialized interests. Accordingly, the achievement and situation common to all members already postulated that homogeneity among the groups which is reflected in the low F ratios of these two factors.

2. Hackman-Gaither Vocational Interest Inventory

It will be noted that the following tables present ratings representing negative interests by making use of negative integers. The authors believe that this, their "valence approach" to rating, makes possible a profile of the determined relative strengths of interests in different fields. They also note that negative responses are useful since it is possible "that a person's dislikes are more important than his likes in defining interest patterns."[8]

Table VI (p. 69), presenting the analysis of variance concerning Business-Contact Interests shows an

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7 Cattell and Eber, Op. Cit., p. 18-19.

8 Roy B. Hackman and James W. Gaither, Hackman-Gaither Vocational Interest Inventory, Examiner's Manual, Easton, Pennsylvania, Palmer Associates, 1963, p. 14.

F ratio of 9.25, significant even at the .001 level and indicates the pertinence of this factor to this particular study.

Five of the sub-group means (see Table XX, p. 101), for majors in psychology (-11.43), history (-14.03), mathematics (-15.22), sociology (-16.97), and English (-17.29), manifested a more significant degree of preference for occupations oriented to this interest than did negative-scoring biology (-24.98), chemistry (-22.52), art (-19.26), and French (-18.83) majors.

At the .001 level, biology concentrators especially were distinguished when compared with psychology, history, mathematics, sociology, and English majors. The first three groups manifested an attitude rated within the -16.30 mean determined by the authors to be the female norm, and the latter two only slightly exceeded the norm.[9] And, chemistry majors proved much more averse to such occupations when compared to concentraters in psychology, history, and mathematics.

A number of significant differences at the .01 level were manifested when means were compared between psychology and higher negative-scoring English and sociology groups,

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9 Roy B. Hackman and James W. Gaither, Hackman-Gaither Vocational Interest Inventory, Technical Bulletin, Easton, Pennsylvania, Palmer Associates, 1963, p. 19.

Table XX.- t Test of Significance of Business-Contact Interests

Sub-Groups	Means	Difference	Level of Significance
Psych. - Biol.	-11.43 - (-24.98)	13.55	P < .001
Psych. - Chem.	-11.43 - (-22.52)	11.09	
Psych. - Art	-11.43 - (-19.26)	7.83	
Psych. - Fren.	-11.43 - (-18.83)	7.40	
Hist. - Biol.	-14.03 - (-24.98)	10.95	
Hist. - Chem.	-14.03 - (-22.52)	8.49	
Math. - Biol.	-15.22 - (-24.98)	9.76	
Math. - Chem.	-15.22 - (-22.52)	7.30	
Soc. - Biol.	-16.97 - (-24.98)	8.01	
Eng. - Biol.	-17.29 - (-24.98)	7.69	
Psych. - Eng.	-11.43 - (-17.29)	5.86	P < .01
Psych. - Soc.	-11.43 - (-16.97)	5.54	
Hist. - Art	-14.03 - (-19.26)	5.23	
Soc. - Chem.	-16.97 - (-22.52)	5.55	
Eng. - Chem.	-17.29 - (-22.52)	5.23	
Fren. - Biol.	-18.83 - (-24.98)	6.15	
Art - Biol.	-19.26 - (-24.98)	5.72	
Math. - Art	-15.22 - (-19.26)	4.04	P < .05
Hist. - Fren.	-14.03 - (-18.83)	4.80	

SE of a difference between means:	1.940
Mean difference significant at .001 level:	6.38
" " " .01 " :	5.01
" " " .05 " :	3.80

between history and art groups, between sociology and English with chemistry majors, and between low negative-scoring French and art groups and biology concentrators.

Additionally, at the .05 level, a significant difference was evidenced between lower negative-scoring mathematics and history majors and, respectively, higher negative-scoring art and French concentrators.

In the present study, this factor effectively distinguished the sub-groups. Appropriately, the psychology majors exhibited the greatest interest in the variety offered by person-to-person contacts while the biology and chemistry concentrators reflected the greatest aversion.

The very high F ratio of 43.92, resulting from the analysis of variance shown in Table VI (p. 69) concerning Scientific-Technical Interests, points out that this factor is a highly significant one and pertinent to the present study.

A series of t tests was run and sub-group means revealed highly significant differences on the .001 level of confidence (see Table XXI). The three fields representing the natural sciences, together with art, manifested the strongest affinity for this interest. When chemistry (8.28), mathematics (3.42), and biology (-1.87) sub-group means were compared separately with the means of sociology (-20.56), French (-18.94), English (-18.23), history (-15.60),

Table XXI.- t Test of Significance of Scientific-Technical Interests

Sub-Groups	Means	Difference	Level of Significance
Chem. - Soc.	8.28 - (-20.56)	28.84	P < .001
Chem. - Fren.	8.28 - (-18.94)	27.22	
Chem. - Eng.	8.28 - (-18.23)	26.51	
Chem. - Hist.	8.28 - (-15.60)	23.88	
Chem. - Psych.	8.28 - (-14.13)	22.41	
Chem. - Art	8.28 - (-10.36)	18.64	
Chem. - Biol.	8.28 - (- 1.87)	10.15	
Math. - Soc.	3.42 - (-20.56)	23.98	
Math. - Fren.	3.42 - (-18.94)	22.36	
Math. - Eng.	3.42 - (-18.23)	21.65	
Math. - Hist.	3.42 - (-15.60)	19.02	
Math. - Psych.	3.42 - (-14.13)	17.55	
Math. - Art	3.42 - (-10.36)	13.78	
Biol. - Soc.	- 1.87 - (-20.56)	18.69	
Biol. - Fren.	- 1.87 - (-18.94)	17.07	
Biol. - Eng.	- 1.87 - (-18.23)	16.36	
Biol. - Hist.	- 1.87 - (-15.60)	13.73	
Biol. - Psych.	- 1.87 - (-14.13)	12.26	
Biol. - Art	- 1.87 - (-10.36)	8.49	
Art - Soc.	-10.36 - (-20.56)	10.20	
Art - Fren.	-10.36 - (-18.94)	8.58	
Art - Eng.	-10.36 - (-18.23)	7.87	
Psych. - Soc.	-14.13 - (-20.56)	6.43	P < .01
Math. - Biol.	3.42 - (- 1.87)	5.29	P < .05
Art - Hist.	-10.36 - (-15.60)	5.24	
Hist. - Soc.	-15.60 - (-20.56)	4.96	
Psych. - Fren.	-14.13 - (-18.94)	4.81	
Chem. - Math.	8.28 - (3.42)	4.86	

SE of a difference between means:	2.248
Mean difference significant at .001 level:	7.40
" " " .01 " :	5.80
" " " .05 " :	4.41

psychology (-14.13), and art (-10.36) concentrators, significant differences were obtained. This was the case even when the means of highest rating chemistry majors were compared with third highest biology concentrators. Similarly, means of the art group, when compared separately with those of sociology, French, and English concentrators revealed differences on the same level.

On the .01 level, significant differences obtained only between psychology and sociology majors. On the .05 level, however, significant differences obtained between second and third highest sub-groups, namely, mathematics and biology majors and also between means of art and history concentrators, between those of history and sociology majors, between means of psychology and French concentrators, and between means of the highest and second highest sub-groups--chemistry and mathematics majors.

These results, so strongly emphasizing the Scientific-Technical interest as a particularly distinguishing factor where the areas of the natural sciences are concerned, are not surprising in view of the fact that this factor is associated with professional or semi-professional careers "primarily concerned with physical science and mathematics and the efficient application of scientific principles, dealing with data and things rather than people."[10]

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10 Hackman and Gaither, Examiner's Manual, p. 15.

The mean for female norm groups was established at -21.75[11] and, although the areas of the natural sciences and art are emphatically distinguished from the remaining sub-groups, it is noteworthy that all sub-groups comprising the study population reflected means above, some by far above, the average group mean.

While art on the surface appears to be a purely creative field, as a training or a discipline it is governed by "efficient application of scientific principles" proper to its own field. From this viewpoint, the affinity for this factor manifested by the art group is not unusual.

A high F ratio of 8.46, significant at the .001 level, indicated the pertinence of Artistic interests when the analysis of variance concerning this factor was tabulated (Table VI, p. 69). The test authors determined +1.07 to be the mean for a female study population.[12] It will be noted that all of the sub-group means obtained are well above the average norm.

Nevertheless, as illustrated in Table XXII highly significant differences at the .001 level were manifested when the sub-group means for high-scoring art majors (21.01) were compared with mathematics (5.57), sociology (9.33),

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11 Hackman and Gaither, Technical Bulletin, p. 19.

12 Ibid.

Table XXII.- t Test of Significance of Artistic Interests

Sub-Groups	Means	Difference	Level of Significance
Art - Math.	21.01 - 5.57	15.44	P < .001
Art - Soc.	21.01 - 9.33	11.68	
Art - Biol.	21.01 - 10.88	10.13	
Art - Chem.	21.01 - 11.03	9.98	
Art - Psych.	21.01 - 12.93	8.08	
Eng. - Math.	18.26 - 5.57	12.69	
Eng. - Soc.	18.26 - 9.33	8.93	
Hist. - Math.	16.12 - 5.57	10.55	
Fren. - Math.	15.92 - 5.57	10.35	
Eng. - Biol.	18.26 - 10.88	7.38	P < .01
Eng. - Chem.	18.26 - 11.03	7.23	
Hist. - Soc.	16.12 - 9.33	6.79	
Fren. - Soc.	15.92 - 9.33	6.59	
Psych. - Math.	12.93 - 5.57	7.36	
Art - Fren.	21.01 - 15.92	5.09	P < .05
Art - Hist.	21.01 - 16.12	4.89	
Eng. - Psych.	18.26 - 12.93	5.33	
Hist. - Biol.	16.12 - 10.88	5.24	
Hist. - Chem.	16.12 - 11.03	5.09	
Fren. - Biol.	15.92 - 10.88	5.04	
Fren. - Chem.	15.92 - 11.03	4.89	
Chem. - Math.	11.03 - 5.57	5.46	
Biol. - Math.	10.88 - 5.57	5.31	

SE of a difference between means:	2.340
Mean difference significant at .001 level:	7.70
" " " .01 " :	6.04
" " " .05 " :	4.59

biology (10.88), chemistry (11.03), and psychology (12.93) majors. Moreover, the high score (18.26) of English concentrators when compared with those of mathematics and sociology concentrators, and the high scores of both history (16.12) and French (15.92) majors, when compared with the score of mathematics concentrators, registered differences at the same level.

At .01 level, very significant differences were apparent between the score of English majors when compared with biology and chemistry concentrators; between scores of history and French sub-groups compared with those of sociology; and between psychology and mathematics majors.

Again, differences significant at the .05 level obtained means of art concentrators when compared with those of French and history majors; between scores of English and psychology majors; between scores of history majors when compared with those of biology and chemistry concentrators; between scores of French majors when compared with those of biology and chemistry sub-groups; and between scores of chemistry and biology majors themselves when these were compared with the mean of the mathematics group.

Although all groups registered positively, the gradation of the means for this factor--from the high interest of the art majors through to the relative antipathy of the mathematics students--parallels recognizable aspects of

the fields themselves. As an illustration, art, history, and English are fields offering opportunity for self-expression, variety, and freedom whereas biology, sociology, and mathematics rely on the functioning of specific rules and laws.

With an F ratio of 3.39, significant at the .001 level, the analysis of variance concerning Health and Welfare interests shown on page 69, places this factor among the significant ones pertaining to this study. The authors have determined -1.28 to be the mean for female norm groups;[13] Table XXIII makes it immediately apparent that the present study population is considerably higher than the average group. High-scoring biology (14.40) and psychology (14.23) sub-groups proved significantly different from the art group (7.60) at the .001 level.

But, when considered at the .01 level, means of chemistry (12.91) majors differed significantly from art (7.60); means of biology (14.40) majors proved significantly different from those of mathematics (9.46) and English (9.49) concentrators; and means of psychology majors proved significantly different from those of mathematics and English concentrators.

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13 Hackman and Gaither, Technical Bulletin, p. 19.

Table XXIII.- t Test of Significance of Health and Welfare Interests

Sub-Groups	Means	Difference	Level of Significance
Biol. - Art	14.40 - 7.60	6.80	P < .001
Psych. - Art	14.23 - 7.60	6.63	
Chem. - Art	12.91 - 7.60	5.31	P < .01
Biol. - Math.	14.40 - 9.46	4.94	
Biol. - Eng.	14.40 - 9.49	4.91	
Psych. - Math.	14.23 - 9.46	4.77	
Psych. - Eng.	14.23 - 9.49	4.74	
Biol. - Fren.	14.40 - 9.74	4.66	P < .05
Biol. - Hist.	14.40 - 9.90	4.50	
Psych. - Fren.	14.23 - 9.74	4.49	
Psych. - Hist.	14.23 - 9.90	4.33	
Soc. - Art	11.52 - 7.60	3.92	

SE of a difference between means:		1.821
Mean difference significant at	.001 level:	5.99
" " "	.01 " :	4.70
" " "	.05 " :	3.57

At the .05 level, further significant differences were in evidence when means of biology concentrators were compared with French and history majors; means of psychology concentrators, when compared with French and history majors, and means of sociology compared to art majors also manifested the same degree of difference.

Biology and chemistry students, together with psychology and sociology groups, representative of the natural and social sciences respectively, were most readily distinguished and differentiated by their scores.

The analysis of variance concerning Business-Clerical interests resulted in an F ratio of 4.32, one significant at the .001 level of confidence.

A study of the individual sub-groups through a series of t tests (see Table XXIV) reveals that mathematics (-18.92), history (-21.87), psychology (-22.19), and French (-22.78) majors showed significant differences on the .001 level of confidence when compared with biology (-30.19) and English (-26.77) concentrators.

At the .01 level, significant differences were in evidence when mathematics majors were compared with chemistry (-25.96) and art (-24.66) concentrators.

The .05 level brings to light differences between mathematics as compared with sociology majors; sociology and art concentrators as compared with biology (-30.19);

Table XXIV.- t Test of Significance of Business-Clerical Interests

Sub-Groups	Means	Difference	Level of Significance
Math. - Biol.	-18.92 - (-30.19)	11.27	P < .001
Math. - Eng.	-18.92 - (-26.77)	7.85	
Hist. - Biol.	-21.87 - (-30.19)	8.32	
Psych. - Biol.	-22.19 - (-30.19)	8.00	
Fren. - Biol.	-22.78 - (-30.19)	7.41	
Math. - Chem.	-18.92 - (-25.96)	7.04	P < .01
Math. - Art	-18.92 - (-24.66)	5.74	
Math. - Soc.	-18.92 - (-24.53)	5.61	P < .05
Soc. - Biol.	-24.53 - (-30.19)	5.66	
Art - Biol.	-24.66 - (-30.19)	5.53	
Hist. - Eng.	-21.87 - (-26.77)	4.90	
Psych. - Eng.	-22.19 - (-26.77)	4.58	

SE of a difference between means:	2.220
Mean difference significant at .001 level:	7.30
" " " .01 " :	5.73
" " " .05 " :	4.35

and between history and psychology majors as compared with English concentrators.

The indications, according to this study, are that biology, English, and Chemistry majors proved more averse to clerical occupations. They showed highly significant differences in the degree of dislike for activities of such routine nature even though this might be detail work with high standards of accuracy. Sub-groups seemingly less averse to such occupation were mathematics, history, psychology, and French majors.

The analysis of variance concerning Mechanical interests resulted in a 13.13 F ratio, one significant at the .001 level.

As tabulated in the succeeding table (XXV), a comparison of sub-group means revealed a number of highly significant contrasts at the .001 level. The areas of art (-21.64), chemistry (-22.42), and mathematics (-24.14), along with biology (-28.52) concentrators, show the least degree of aversion for Mechanical interests by their ratings. When art, chemistry, and mathematics sub-groups means were compared, each separately, to the means obtaining for sociology (-33.63), English (-32.77), psychology (-32.17), history (-31.66), and French (-31.58), differences, highly significant at the .001 level, were apparent. This was true, also, when the means of art and chemistry, each separately, were

Table XXV.- t Test of Significance of Mechanical Interests

Sub-Groups	Means	Difference	Level of Significance
Art - Soc.	-21.64 - (-33.63)	11.99	P < .001
Art - Eng.	-21.64 - (-32.77)	11.13	
Art - Psych.	-21.64 - (-32.17)	10.53	
Art - Hist.	-21.64 - (-31.66)	10.02	
Art - Fren.	-21.64 - (-31.58)	9.94	
Art - Biol.	-21.64 - (-28.52)	6.88	
Chem. - Soc.	-22.42 - (-33.63)	11.21	
Chem. - Eng.	-22.42 - (-32.77)	10.35	
Chem. - Psych.	-22.42 - (-32.17)	9.75	
Chem. - Hist.	-22.42 - (-31.66)	9.24	
Chem. - Fren.	-22.42 - (-31.58)	9.16	
Chem. - Biol.	-22.42 - (-28.52)	6.10	
Math. - Soc.	-24.14 - (-33.63)	9.49	
Math. - Eng.	-24.14 - (-32.77)	8.63	
Math. - Psych.	-24.14 - (-32.17)	8.03	
Math. - Hist.	-24.14 - (-31.66)	7.52	
Math. - Fren.	-24.14 - (-31.58)	7.44	
Biol. - Soc.	-28.52 - (-33.63)	5.11	P < .01
Math. - Biol.	-24.14 - (-28.52)	4.36	P < .05
Biol. - Eng.	-28.52 - (-32.77)	4.25	
Biol. - Psych.	-28.52 - (-32.17)	3.65	

SE of a difference between means:	1.851
Mean difference significant at .001 level:	6.09
" " " .01 " :	4.78
" " " .05 " :	3.63

compared with the means of the biology group.

At the .01 level, a very significant difference was revealed between the means of biology and sociology concentrators. And, at the .05 level, significant differences obtained between two lower-scoring groups, mathematics and biology. The same also was true for a comparison of the biology group means with those of English and psychology sub-groups.

These contrasts point out that art, of the nine sub-groups comprising the study population, followed closely by chemistry and mathematics majors, displayed the strongest affinity for engagement in activity which, according to the description of the test's authors,[14] strives for precise attainment of set limits usually through physical activity of a sensory-motor type. Usually requiring special aptitude and training, occupations within this area are concerned primarily with machines and tools. Categorically comparable sub-groups within this study indicated this tendency. Various phases of art rely upon such aptitude, as is the case to considerable degree with various phases in the different fields of the natural science areas.

The analysis of variance concerning Service interests, manifests a relatively low F ratio, 2.52, significant only at

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14 Hackman and Gaither, Examiner's Manual, p. 16.

Table XXVI.- t Test of Significance of Service Interests

Sub-Groups	Means	Difference	Level of Significance
Psych. - Chem.	.57 - (-6.87)	7.44	P < .01
Fren. - Chem.	.52 - (-6.87)	7.39	
Psych. - Biol.	.57 - (-5.40)	5.97	P < .05
Psych. - Math.	.57 - (-4.72)	5.29	
Psych. - Eng.	.57 - (-4.18)	4.75	
Art - Chem.	-.94 - (-6.87)	5.93	
Fren. - Biol.	.52 - (-5.40)	5.92	
Fren. - Math.	.52 - (-4.72)	5.24	
Fren. - Eng.	.52 - (-4.18)	4.70	

SE of a difference between means:	2.33
Mean difference significant at .01 level:	6.01
" " " .05 " :	4.57

the .01 level.

Differences, significant at the .01 level, obtain between psychology (.57) and French (.52) majors and chemistry (-6.87) concentrators. Also, when the means of psychology majors were compared with those of biology (-5.40), mathematics (-4.72), and English (-4.18) concentrators, differences significant at the .05 level obtained. This was true again, in a comparison of the means of art (-.94) majors and chemistry concentrators, and of French majors (+.52) when these were compared with the means of biology, mathematics, and English concentrators.

The negative-valence image indicates that none of the sub-groups are favorably disposed toward routine and repetition: their training in independent thinking and almost sub-conscious attuning of goals toward prestige positions, doubtless, are elements influencing this attitude.

Significant at the .001 level, the F ratio of 6.69 resulting from the analysis of variance concerning Outdoor interests indicates that the factor is an important one within the present study. A comparison of the sub-group means revealed that the greatest affinity for this interest was found among the biology and art groups. Highly significant differences at the .001 level were in evidence when sub-group means of biology (-6.04) and art (-9.70)

Table XXVII.- t Test of Significance of Outdoor Interests

Sub-Groups	Means	Difference	Level of Significance
Biol. - Math	- 6.04 - (-20.64)	14.60	P < .001
Biol. - Psych.	- 6.04 - (-19.39)	13.35	
Biol. - Soc.	- 6.04 - (-19.20)	13.16	
Biol. - Fren.	- 6.04 - (-16.69)	10.65	
Biol. - Eng.	- 6.04 - (-16.61)	10.57	
Art - Math.	- 9.70 - (-20.64)	10.94	
Art - Psych.	- 9.70 - (-19.39)	9.69	
Art - Soc.	- 9.70 - (-19.20)	9.50	
Chem. - Math.	-11.63 - (-20.64)	9.01	
Biol. - Hist.	- 6.04 - (-14.29)	8.25	P < .01
Chem. - Psych.	-11.62 - (-19.39)	7.77	
Chem. - Soc.	-11.62 - (-19.20)	7.58	
Art - Fren.	- 9.70 - (-16.69)	6.99	
Art - Eng.	- 9.70 - (-16.61)	6.91	P < .05
Hist. - Math.	-14.29 - (-20.64)	6.35	
Biol. - Chem.	- 6.04 - (-11.62)	5.58	

SE of a difference between means:	2.694
Mean difference significant at .001 level:	8.86
" " " .01 " :	6.95
" " " .05 " :	5.28

concentrators were compared with those of mathematics (-20.64), psychology (-19.39), sociology (-19.20), French (-16.69), and English (-16.61) majors. Significantly, the same level of difference obtained between the means of chemistry (-11.63) and mathematics (-20.64) concentrators.

At the .01 level, biology, chemistry, and art majors stood in contrast to history, psychology, sociology, and French concentrators.

Art, history, and biology majors showed differences, significant at the .05 level, from peers in the fields of English, mathematics, and chemistry.

According to the results of the present study, the biology and art concentrators exhibited, appropriately, the strongest inclination toward outdoor occupations.

3. The Allport-Vernon-Lindzey Study of Values

The analysis of variance concerning the theoretical values, as measured by the Allport-Vernon Study of Values and summarized in Table VII (p. 70), shows a highly significant F ratio of 55.92, significant at the .001 level.

An examination of sub-group means reveals that only chemistry (44.71), biology (43.12), and mathematics (41.14) concentrators exceeded the established 36.50 norm for

Table XXVIII.- t Test of Significance of Theoretical Values

Sub-Groups	Means	Difference	Level of Significance
Chem. - Hist.	44.71 - 32.21	12.50	P < .001
Chem. - Fren.	44.71 - 32.26	12.45	
Chem. - Soc.	44.71 - 33.23	11.48	
Chem. - Eng.	44.71 - 33.24	11.47	
Chem. - Psych.	44.71 - 33.56	11.15	
Chem. - Art	44.71 - 35.11	9.60	
Chem. - Math.	44.71 - 41.14	3.57	
Biol. - Hist.	43.12 - 32.21	10.91	
Biol. - Fren.	43.12 - 32.26	10.86	
Biol. - Soc.	43.12 - 33.23	9.89	
Biol. - Eng.	43.12 - 33.24	9.88	
Biol. - Psych.	43.12 - 33.56	9.56	
Biol. - Art	43.12 - 35.11	8.01	
Math. - Hist.	41.14 - 32.21	8.93	
Math. - Fren.	41.14 - 32.26	8.88	
Math. - Soc.	41.14 - 33.23	7.91	
Math. - Eng.	41.14 - 33.24	7.90	
Math. - Psych.	41.14 - 33.56	7.58	
Math. - Art	41.14 - 35.11	6.03	
Art - Hist.	35.11 - 32.21	2.90	P < .01
Art - Fren.	35.11 - 32.26	2.85	
Biol. - Math.	43.12 - 41.14	1.98	P < .05
Art - Soc.	35.11 - 33.23	1.88	
Art - Eng.	35.11 - 33.24	1.87	

SE of a difference between means: .948
Mean difference significant at .001 level: 3.12
" " " .01 " : 2.45
" " " .05 " : 1.86

college women.[15] And it is precisely these means which proved to be highly significant at the .001 level in differing from means established by lowest-scoring history (32.21), French (32.26), sociology (33.23), English (33.24), psychology (33.56), and art (35.11) majors.

Differences, significant at the .01 level, were noted between art concentrators and history and French majors; at the .05 level, significant differences were apparent even between high-scoring biology and mathematics majors, and between art concentrators and sociology and English majors.

According to the present study, the concentrators in the fields representing the natural sciences were definitely characterized by the sense of theoretical value. In contradistinction to these, the majors in fields of the humanities and social sciences--the social science majors to some slight degree less so--displayed a less than average degree of this value.

The F ratio of 5.15 concerning economic values, is significant at the .001 level. It is to be noted, however, that all groups within this study fall below the 36.85 norm recognized for college women. Nevertheless, of

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15 Gordon W. Allport, Philip E. Vernon, and Gardner Lindzey, Manual, Study of Values: A Scale for Measuring the Dominant Interests in Personality, 3rd ed., Boston, Houghton Mifflin, 1960, p. 11.

Table XXIX.- t Test of Significance of Economic Values

Sub-Groups	Means	Difference	Level of Significance
Psych. - Biol.	34.97 - 30.14	4.83	P < .001
Psych. - Chem.	34.97 - 30.41	4.56	
Hist. - Biol.	34.56 - 30.14	4.42	
Hist. - Chem.	34.56 - 30.41	4.15	
Math. - Biol.	34.22 - 30.14	4.08	
Math. - Chem.	34.22 - 30.41	3.81	
Psych. - Art	34.97 - 31.77	3.20	P < .01
Soc. - Biol.	33.26 - 30.14	3.12	
Soc. - Chem.	33.26 - 30.41	2.85	
Hist. - Art	34.56 - 31.77	2.79	
Fren. - Biol.	32.87 - 30.14	2.73	P < .05
Psych. - Eng.	34.97 - 32.34	2.63	
Fren. - Chem.	32.87 - 30.41	2.46	
Math. - Art	34.22 - 31.77	2.45	
Hist. - Eng.	34.56 - 32.34	2.22	
Eng. - Biol.	32.34 - 30.14	2.20	

SE of a difference between means:	1.079
Mean difference significant at .001 level:	3.55
" " " .01 " :	2.78
" " " .05 " :	2.11

the sub-groups tested, psychology (34.97), history (34.56), and mathematics (34.22) concentrators obtained highest means, presenting differences significant at the .001 level, when compared to means obtained by low-scoring biology (30.14) and chemistry (30.41) majors. Significant differences at the .01 level were noted between sociology concentrators and biology and chemistry majors and between psychology and history concentrators and art majors.

Further study reveals that differences, significant at the .05 level, exist between French majors and biology and chemistry concentrators, between psychology and history majors and English concentrators, as well as between mathematics and art majors and between English and biology concentrators.

Authors of the test found the variable highest scoring with business men but actually third highest with their female counterparts, indicating that it is somewhat subordinated to other values where a female study group is considered.[16] Though all groups indicated a less-than-average degree of this characteristic, there is yet some measure of differentiation. It is interesting to note that the social science field concentrators displayed the factor in more prevailing measure than their peers in areas of the physical

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16 Allport, Vernon, and Lindzey, Manual, p. 14.

sciences and thus equated themselves to some degree with the business men of the authors' study.

The analysis of variance of aesthetic values resulted in a high 24.57 F ratio, significant at the .001 level, and evidenced the pertinence of this variable to the present study. A study of sub-group means (see Table XXX) established that differences, highly significant at the .001 level existed between three high scorers: art (49.08), English (47.16), and French (44.76) majors and the remaining concentrators, all of whom fell below the 43.86 norm[17] recognised for college women.

Differences, significant at the .01 level, were noted between history majors and psychology and biology concentrators as well as between majors in chemistry and those in mathematics. At the .05 level, significant differences existed between sociology and mathematics majors, between English and French majors, and between French and history concentrators.

The sub-groups comprising the area of humanities in the present study clearly gave precedence to their esteem for the harmonious relationship of order, beauty, and experience. The more theoretically-oriented science groups, on the other hand, reacted to the aesthetic factor with

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17 Allport, Vernon, and Lindzey, Manual, p. 11

Table XXX.- t Test of Significance of Aesthetic Values

Sub-Groups	Means	Difference	Level of Significance
Art - Math.	49.08 - 38.00	11.08	P < .001
Art - Psych.	49.08 - 39.46	9.62	
Art - Biol.	49.08 - 39.48	9.60	
Art - Soc.	49.08 - 40.40	8.68	
Art - Chem.	49.08 - 40.99	8.09	
Art - Hist.	49.08 - 42.44	6.64	
Art - Fren.	49.08 - 44.76	4.32	
Eng. - Math.	47.16 - 38.00	9.16	
Eng. - Psych.	47.16 - 39.46	7.70	
Eng. - Biol.	47.16 - 39.48	7.68	
Eng. - Soc.	47.16 - 40.40	6.76	
Eng. - Chem.	47.16 - 40.99	6.17	
Eng. - Hist.	47.16 - 42.44	4.72	
Fren. - Math.	44.76 - 38.00	6.76	
Fren. - Psych.	44.76 - 39.46	5.30	
Fren. - Biol.	44.76 - 39.48	5.28	
Fren. - Soc.	44.76 - 40.40	4.36	
Fren. - Chem.	44.76 - 40.99	3.77	
Hist. - Math.	42.44 - 38.00	4.44	
Chem. - Math.	40.99 - 38.00	2.99	P < .01
Hist. - Psych.	42.44 - 39.46	2.98	
Hist. - Biol.	42.44 - 39.48	2.96	
Soc. - Math.	40.40 - 38.00	2.40	P < .05
Eng. - Fren.	47.16 - 44.76	2.40	
Fren. - Hist.	44.76 - 42.44	2.32	

SE of a difference between means:	1.083
Mean difference significant at .001 level:	3.56
" " " .01 " :	2.79
" " " .05 " :	2.12

much less emphasis.

Since the analysis of variance related to Social values produced an *F* ratio of 11.56, one highly significant at the .001 level, t tests were run, as illustrated in Table XXXI, to determine differences among sub-group means.

As a result, it was found that the three groups which exceeded the female college norm of 41.62[18]--sociology (47.01), psychology (44.56), and French (43.17) majors--evidenced differences, significant at the .001 level, from the six remaining sub-groups which were below the 41.62 norm.

At the .01 level, significant differences obtained between psychology and biology (41.30) majors as well as between French and history (40.34) majors. Moreover, French majors proved significantly different from both mathematics (40.74) and English (40.76) majors at the .05 level, as did sociology from the psychology group.

The authors of the Study of Values have redefined the Social factor to eliminate all elements but "the altruistic or philanthropic aspect of love."[19] As so refined, its pre-eminence among the students concentrating in sociology and psychology might properly be anticipated. And,

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18 Allport, Vernon, and Lindzey, Manual, p. 11.

19 Ibid., p. 5.

Table XXXI.- t Test of Significance of Social Values

Sub-Groups	Means	Difference	Level of Significance
Soc. - Chem.	47.01 - 39.47	7.54	P < .001
Soc. - Art	47.01 - 39.53	7.48	
Soc. - Hist.	47.01 - 40.34	6.67	
Soc. - Math.	47.01 - 40.74	6.27	
Soc. - Eng.	47.01 - 40.76	6.25	
Soc. - Biol.	47.01 - 41.30	5.71	
Soc. - Fren.	47.01 - 43.17	3.84	
Psych. - Chem.	44.56 - 39.47	5.09	
Psych. - Art	44.56 - 39.53	5.03	
Psych. - Hist.	44.56 - 40.34	4.22	
Psych. - Math.	44.56 - 40.74	3.82	
Psych. - Eng.	44.56 - 40.76	3.80	
Fren. - Chem.	43.17 - 39.47	3.70	
Fren. - Art	43.17 - 39.53	3.64	
Psych. - Biol.	44.56 - 41.30	3.26	P < .01
Fren. - Hist.	43.17 - 40.34	2.83	
Soc. - Psych.	47.01 - 44.56	2.45	P < .05
Fren. - Math.	43.17 - 40.74	2.43	
Fren. - Eng.	43.17 - 40.76	2.41	

SE of a difference between means:	1.058
Mean difference significant at .001 level:	3.48
" " " .01 " :	2.73
" " " .05 " :	2.07

the students of French, viewed as representatives of the entire area of foreign languages, displayed a similarly assignable breadth of humanistic interest.

Another factor pertinent to the present study is that dealing with Political values. The F ratio of 13.09, elicited by the analysis of variance indicated significance at the .001 level.

Further analysis (see Table XXXII) revealed that seven of the nine sub-groups' means exceeded the 38.00 norm for college women.[20] History majors (44.97) were distinguishable, with mean differences significant at the .001 level, from all other groups.

At the .01 level, chemistry concentrators (36.60) evidenced significant differences when compared to majors in the fields of English (39.32), sociology (39.23) and psychology (39.09). And, at the .05 level, the means of French (38.56) and chemistry concentrators registered significant difference.

As indicated, the three fields representing the social sciences manifested Political values to a significantly strong degree as, among the humanities, did English and French. Again, art aligned itself with the physical sciences in this measurement.

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20 Allport, Vernon, and Lindzey, Manual, p. 11.

Table XXXII.- t Test of Significance of Political Values

Sub-Groups	Means	Difference	Level of Significance
Hist. - Chem.	44.97 - 36.60	8.37	P < .001
Hist. - Biol.	44.97 - 37.84	7.13	
Hist. - Math.	44.97 - 38.20	6.77	
Hist. - Art	44.97 - 38.33	6.64	
Hist. - Fren.	44.97 - 38.56	6.41	
Hist. - Psych.	44.97 - 39.09	5.88	
Hist. - Soc.	44.97 - 39.23	5.74	
Hist. - Eng.	44.97 - 39.32	5.65	
Eng. - Chem.	39.32 - 36.60	2.72	P < .01
Soc. - Chem.	39.23 - 36.60	2.63	
Psych. - Chem.	39.09 - 36.60	2.49	
Fren. - Chem.	38.56 - 36.60	1.96	P < .05

SE of a difference between means: .917
Mean difference significant at .001 level: 3.02
" " " .01 " : 2.37
" " " .05 " : 1.80

A relatively low F ratio of 2.03 concerning the last factor included in the Study of Values indicated that there was a difference only at the .05 level. As Table XXXIII shows (p. 130) group means clustered between the 48.49 mean of psychology students and the 45.37 mean of the history majors; therefore no significant differences were obtained on the .001 and .01 levels.

At the .05 level, however, history majors (45.37) and art concentrators (46.49) manifested significantly lower ratings on this scale than did their academic peers in the three areas of the physical sciences and in psychology and French.

Doubtless, there is some correlation between the low F ratio for this factor of Religious values and the fact that the study population consisted, exclusively, of students from Catholic colleges for women. The religious orientation to which the entire population had been exposed during its scholastic career, would have that quality of uniformity which would effect minimum differentiation in these values.

4. Intercorrelation of Results

To determine the relationship among the variables of all three tests, intercorrelations of the thirty variables were calculated. Marked relationships may be noted in the matrix included as Appendix C (p. 153); thus, the

Table XXXIII.- t Test of Significance of Religious Values

Sub-Groups	Means	Difference	Level of Significance
Psych. - Hist.	48.49 - 45.37	3.12	P < .05
Fren. - Hist.	48.29 - 45.37	2.92	
Biol. - Hist.	48.02 - 45.37	2.65	
Chem. - Hist.	47.83 - 45.37	2.46	
Math. - Hist.	47.69 - 45.37	2.32	
Psych. - Art	48.49 - 46.46	2.03	

SE of a difference between means: 1.00
Mean difference significant at .05 level: 1.96

dependability of each test is strengthened by relevant data discovered in another. Moreover, these correlations function reciprocally, to support the study findings as well as the tests.

It was noted that positive correlations existed between certain factors of the Sixteen Personality Factor Questionnaire and certain factors included in the Hackman-Gaither Vocational Interest Inventory, between some factors of the personality questionnaire and others of the Study of Values, and, finally, between most of the factors of the Interest Inventory and those of the Study of Values.

To outline only the most significant of these inter-correlations--between the personality and interests measures a correlation was noted between the A personality factor (Aloof vs. Sociable) and the Business-Contact interest factor; a similar relationship exists between factor M (Practical vs. Imaginative) and the Artistic interest factor.

Among the most significant of the correlations found to exist between factors included in the personality questionnaire and the Study of Values were: between I (Tough vs. Sensitive), M (Practical vs. Imaginative), and Q_2 (Group-dependent vs. Self-sufficient) of the Sixteen Personality Factor Questionnaire, and the values factor labelled Aesthetic; between the E (Submissive vs. Dominant) and F (Languid vs. Enthusiastic) personality factors and Political

values factor; and, between Q_1 (Conservative vs. Experimenting) of the personality scale and the Theoretical area of values.

The most notable positive correlations between factors of the interest inventory and the values instrument related the Business-Contact and Business-Clerical interests to Economic values, the Technical and Mechanical interest factors to Theoretical values, the Health and Welfare and Service interests to values labelled Social, and, finally Artistic interests to Aesthetic values.

In addition to the foregoing, very significant negative correlations were found to exist between the A personality factor (Aloof vs. Sociable) and three interest factors--Technical, Mechanical, and Outdoor--and also between I (Tough vs. Sensitive) and the Technical interest factor. The A factor (Aloof vs. Sociable), again, was found to correlate negatively with Theoretical values and factor M (Practical vs. Imaginative) correlated negatively with the Study of Values' Economic factor.

The significance of these intercorrelations in supporting the test results may be seen when applied to one of the fields covered by the present study--humanities, for example. Figure 4, included in the Appendix (p. 160), is a graphic profile of humanities, natural sciences, and social sciences. The figure indicates high scores on the

part of the humanities group for the following factors: I, M, Q2, III, and A. These factors represent all three tests and the high scores achieved associate students pursuing studies in the humanities with Sensitive, Imaginative, and Self-sufficient personality traits, Artistic interests, and Aesthetic values. It is immediately recognized that these personality traits, interests, and values are particularly relevant to the general area of the humanities.

Similar patterns, based on other related factors of the three tests, may be traced for the natural sciences and social sciences groups, also. The fact that the groups of the present study established such consistent basic patterns seems to lend added support to the findings. A more detailed discussion of the relationships and differences noted within and between groups is included in the summary chapter that follows.

CHAPTER V

SUMMARY AND CONCLUSIONS OF THE STUDY

1. Summary and Conclusions

To achieve its purpose, this study attempted to answer four specific questions: 1) Are there differences in personality characteristics, interests, and values among college women concentrating in different subject study? 2) Are these differences, if they do exist, significant? 3) What patterns of personality, interests, and values characterize groups of students concentrating in different subject fields? and 4) What are the implications, if any, for prediction of the most appropriate field of study for an individual student through the use of this battery of tests?

The testing instruments selected provided a range of thirty factors designed to elicit existing patterns of personality, interests, and values characterizing persons engaged in a specific area of study. Differences between the groups of students majoring in different areas were statistically significant on twenty-six of the thirty scales. Frequently the extent of these identified differences was beyond the .001 level of significance thus evidencing the existence of basic differences in personality, interests, and values within the study population.

In fact, even in as fine a discrimination as that provided by the .001 level, only ten of the factors failed to manifest significant differences; at the .01 level, only six; and only four of the thirty factors failed to discriminate significantly between sub-groups at the .05 level.

Therefore, it is apparent that the tests administered in the present study effectively distinguished characteristic differences and also that these differences were significant.

As suggested in the preceding chapter, and as illustrated by Figure 4 (p. 160), a composite of the sub-group scores within the areas of humanities, natural sciences, and social sciences produced patterns which distinguished each of those three areas.

Collectively, the students representing the humanities scored high on the Tough/Sensitive, Practical/Imaginative, Group-dependent/Self-sufficient, Artistic, and Aesthetic scales and their scores were low for Technical interests and Theoretical values. The pattern of the natural sciences participants, conversely, elicited peaks for Technical interests and Theoretical values and registered negatively for four of the other five factors. These students produced a profile generally opposite to that of the humanities. This was especially manifested by their interest in activities of a highly theoretical and deeply

technical nature and their characteristic display of a low level of sensitivity which placed them at the pole opposite that of the humanities on this scale.

More in accord with the profile of the humanities, that of the social science students displayed an affinity for activities offering opportunity for the expression of a sensitive personality bent and an accompanying disinterest in technical or theoretical areas. Nevertheless, they tended to align themselves with the natural sciences by evidencing a low level of affinity for the aesthetic. However, a polarity of difference existed between their very high scores on factor A (Aloof vs. Sociable) and the very low scores of the natural sciences group, the humanities occupying a medial position.

The profile shows that the social sciences concentrators distinguished themselves by positive scores on the Aloof/Sociable, Languid/Enthusiastic, Simple/Sophisticated, Business-Contact, Business-Clerical, Economic, Social, and Political measurements. In contrast to this, both the humanities and the natural sciences groups registered negatively in each case. And, the negative scores of the social sciences majors for Trusting/Suspicious, Group-dependent/Self-sufficient, and Mechanical factors were offset by the positive scores of the humanities and natural sciences groups for these same factors.

But even beyond the distinctions established among the three comprehensive areas, the present study was successful in tracing the patterns which differentiate students concentrating in the different subject fields within each area.

In order to identify characteristic patterns of groups of students concentrating in different subject fields, standard scores were determined from raw scores (see Appendix E, p. 151) and these, in turn, were organized into a series of graphic profiles. Figures 1 through 3, representing the graphic compilation of data for the respective areas of humanities, natural sciences, and social sciences, are presented in the Appendix (p. 157-159).

As shown in Figure 1, the patterns of all three groups comprising the humanities tended to coincide with relatively high scores for factors M (Practical vs. Imaginative), Q_2 (Group-dependent vs. Self-sufficient), Artistic interests, and Aesthetic values. All three groups showed agreement in registering lower scores for Health and Welfare interests and for Theoretical values.

English and French concentrators diverged sharply on the profile in regard to factor E (Submissive vs. Dominant), the former achieving high scores in contrast to the scores of the latter. They differed to some degree, also, in relation to the H factor (Shy vs. Adventurous),

the English majors reflecting more adventurous personality traits. The scores of the French students, on the other hand, deviated positively from the negative scores of English majors in the instances of Service interests and Social values.

The pattern of the art majors differed from that of the students of English and French on the following scales: Aloof/Sociable, Languid/Enthusiastic, Tough/Sensitive, Simple/Sophisticated, Technical, Mechanical, and Outdoor.

Figure 2 (p. 158) graphically illustrates the personality, interests, and values patterns of the natural sciences groups of the study population.

Biology, chemistry, and mathematics concentrators concurred in adopting a medial position with regard to factor B (Submissive vs. Dominant), factor N (Simple vs. Sophisticated), the Q_4 factor (Relaxed vs. Tense), and Religious values. Further concurrence was noted in the lower scores recorded for the F factor (Languid vs. Enthusiastic), for Service interests, and for Aesthetic, Social, and Political values. Higher scores were common to all three in the cases of factor G (Casual vs. Conscientious) and the Technical and Theoretical interest factors.

The patterns of the individual subject groups were seen to diverge in several instances. With regard to factor A, for example, biology concentraters took a position midway between the extremely low scores of chemistry majors and the scores of the mathematics group at the mean. But, considering the I factor (Tough vs. Sensitive), the scores of the biology students ranged well above those of the other two groups. The biology group's stance at the mean for Mechanical interests is significantly below the positions of both chemistry and mathematics concentraters.

The mathematics concentraters produced a profile distinguishable by significantly lower scores for the I factor (Tough vs. Sensitive), for factor M (Practical vs. Imaginative), for the O factor (Confident vs. Insecure), and for Artistic and Outdoor interests. The mathematics students registered the lowest score of the three for Aesthetic values. Business-Contact and Business-Clerical interest factors sharply influenced the distinction of the mathematics group's high scores from the expressed disinclination of the biology and chemistry students.

Rather sharp divergence was evidenced in the case of chemistry majors who appeared to be more experimenting (Q_1), and much more self-sufficient (Q_2) than their associates and who achieved the highest scores for Technical and Mechanical interests and Theoretical values.

The compilation of data on the sub-groups making up the social sciences segment of the study population is graphically presented in Figure 3 (p. 159).

The profiles of history, psychology, and sociology sub-groups tended to merge around the mean for factor C (Emotional vs. Calm), E (Submissive vs. Dominant), G (Casual vs. Conscientious), Q_4 (Relaxed vs. Tense), and the Business-Clerical interest factor.

The personality pattern of the history majors differed from the other two sub-groups very markedly by its high rating in connection with factor M (Simple vs. Sophisticated). And, on the values scale, history students were differentiated by a lower score on the Social factor and an extremely high score for Political. Concentraters in history, furthermore, showed considerably less weight than the psychology majors when rated on the A factor (Aloof vs. Sociable) and diverged from them also with respect to Health and Welfare interests.

Despite the relative congruence of the patterns of psychology and sociology students, several distinguishing notes were evidenced by the profiles. With regard to factor H (Shy vs. Adventurous), for example, the sociology concentraters appeared as much more adventurous than the students of psychology and exhibited a somewhat higher degree of sensitivity when I factor (Tough vs. Sensitive)

was considered. They scored significantly lower than the psychology group, however, in both Business-Contact and Technical interests but recovered their lead significantly on the Social value scale.

It is submitted that the foregoing description of the patterns of personality traits, interests, and values which characterize groups of students concentrating in different subject fields satisfies the requirement of the third problem posed in the present study.

2. Possible Applications of Findings

The final problem concerned the implications for predicting the most appropriate field of study for an individual. The present study has succeeded in producing distinguishing personality, interests, and values patterns in students specializing in different fields of study.

Often the college curriculum offers a year or two of liberal arts foundation to be followed by an additional number of years of special concentration in some specific academic area. Thus, students are faced with the need to select--irrevocably, in terms of credits and graduation--one particular area in which to complete study requirements. In some instances, students drift along with the general curriculum, finding no one area particularly engaging; yet, they are obliged to select an area of specialization. In

other instances, personal preference and substantial promise of success are divided between two fields and the resultant conflict makes a choice even more difficult.

From this viewpoint, it is submitted that the findings of the present study have definite application as guidelines to be used by counselors in interpreting student profiles. At the time of preliminary selection of a field of concentration, a student's profile which evidenced radical differences from the general pattern for that field, would indicate the need for further interpretative counseling. Nevertheless, because of the recognized complexity of the individual, it would be imprudent to suggest that this study has produced standard patterns to be used in predictive capacity, eliminating the element of student-choice altogether.

3. Recommendations for Additional Research

Since the findings of the present study offer the general promise that definite patterns of personality, interests, and values are discernible among pre-professional groups preparing for life careers, further research in three possible areas is warranted and recommended:

1) A follow-up comparison of the personality, interests, and values of academically successful and unsuccessful students in the same fields of concentration. This

would refine the patterns found to exist in the present study still further and thus, would produce profiles which, in the positive sense, would approach ideal patterns.

2) A comparison of patterns of personality, interests, and values on an international scale, whereby patterns characteristic of students in various areas of study in American colleges would be compared with patterns of their counterparts abroad.

3) A similar investigation conducted within domestic limits but diversified with regard to the study population to include co-educational and/or technical-training institutions.

4) A longitudinal study regarding the stability of such patterns, making use of the same instruments, could measure the relationships of personality, interests, and values, comparing patterns elicited in the freshman year with those established upon graduation from college.

BIBLIOGRAPHY

Allport, Gordon W., Philip E. Vernon, and Gardner Lindzey, Manual for the Study of Values, Boston, Houghton Mifflin, 1960, 19 p.

This is an instructive manual concerned with the purposes, administration, and scoring of the test. It facilitated the amassing of data used in this study.

In its presentation of collegiate and special norms, as determined by the authors, the Manual served as a constant reference for the drawing of inferences and conclusions as the processing of data was accomplished.

Of great aid to the present study was the pattern of tables, arranged to depict comparability between male and female members of the population. Also most helpful was the arrangement of means according to occupational categories.

Cattell, Raymond B. and Herbert W. Eber, Handbook for the Sixteen Personality Factor Questionnaire, Champaign, Illinois, Institute for Personality and Ability Testing, 1957, ii-54 p.

This is a highly detailed handbook with an extensive introduction to the utility, objectives, and characteristics of the tests. The instructions for the administration, processing, and application of data proved most useful in the foundational stage of the present study.

The norms, together with the explanation of the sixteen primary source traits, provided by the authors permitted comparisons and assisted interpretation of the findings.

The representative occupational profiles included in the Handbook, while of value in themselves, had only limited application to the study.

Guilford, J. P., Fundamental Statistics in Psychology and Education, New York, McGraw-Hill, 1956, xi-565 p.

Covers a broad spectrum of theory and methods; the clear and comprehensive treatment of the areas of descriptive statistics, hypothesis testing, and statistical inference are particularly valuable. The discussion of analysis of variance in Chapter 12 and the procedure for computing the standard error of a difference between means from within variance when a uniform population is being studied were specifically pertinent.

Hackman, Roy B. and James W. Gaither, Hackman-Gaither Vocational Interest Inventory, Examiner's Manual, Easton, Pennsylvania, Palmer Associates, 1963, 20 p.

This manual describes and illustrates standard procedures for scoring the test and offers interpretative data concerning the results.

The group comparison profiles of the present study were modeled, in construction and arrangement, on those presented in the Manual and the analyses and interpretations of the authors provided a pivot for observations and conclusions.

Sternberg, Carl, The Relation of Interests, Values, and Personality to the Major Field of Study in College, unpublished doctoral thesis presented to the School of Education of New York University, New York, 1953, x-215 p.

The author used the Kuder Preference Test, the Minnesota Multiphasic Personality Inventory, and the Allport-Vernon Study of Values to investigate 270 male college students. Employing the analysis of variance and a factor analysis technique, the study differentiated groups in different fields.

Some limitation is apparent in that the study population was restricted to a small number of male students from one metropolitan liberal arts college.

APPENDIX A

Dear Student:

You are asked to participate in a scientific investigation. Upperclassmen are chosen specifically because it is believed that your three or four years of college training enable you to fully understand the importance of conscientious and serious cooperation in an experimental research.

Although neither you nor your college will be identified in any manner whatsoever, the following data are necessary for the study being conducted. Your name, for example, is needed only in the event that you will be chosen for further participation. Your answers on this data sheet as well as on the inventory will be of value to the degree that your responses reflect <u>your</u> <u>true</u> <u>opinion</u>.

It is extremely important that <u>all</u> blanks and questions be adequately filled out. Incomplete inventories are of no value to an investigator as you well know. Only the investigator will process your answers.

May God bless you for your generous cooperation!

Sincerely in J.M.J.

The Experimenter

P.S. Work quickly but thoughtfully.

<u>Part I</u>

1. Name _____
   Surname First

2. Date of Birth _____ Age _____
   Month Day Year

3. Were you born in the United States? ____ ____ _____ _____
   Yes No City State

4. How many brothers _____ and sisters _____ have you?

   Where do you rank _____?

5. Race _____ Religion _____ Single _____ Married _____

Part I (Continued)

6. Father's Occupation _____
Be Specific Please

7. Mother's Occupation _____

8. Degree in Progress | Major Field | Minor Field

_____ _____ _____

1. Is your major field of study the field you consider "first choice"?

Yes_____No_____

2. Have you selected it because of the interest and appeal it had for you personally?

Yes_____No_____

If NO is checked, have you selected this field because of practical reasons such as the following: (Please check)

_____1. This field seems to offer concrete promise of a specific career.

_____2. Economic considerations such as availability of jobs, good salaries, steady and rewarding employments.

_____3. Following the advice or influence of some confidante.

_____4. Others _____

3. If you had the choice to make over again, what would you select for your major field of study?

_____

APPENDIX B

ADMISSION STANDARDS*

College	Average Score		Top 20%	Top 50%
	Verbal	Math	First Quintile	First Half
Holy Family	556	530	58%	89%
Immaculata	534	516	53	88
Marywood	524	498	50	85
Mercyhurst	498	465	45	88
Rosemont	574	537	66	90
St. Elizabeth	548	520	44	87
Trinity	610	572	70	95

* Cowles Comprehensive Encyclopedia, 488 Madison Avenue, New York, N.Y.

APPENDIX C

Average Age of the Study Groups

	Youngest	Oldest	Median
Art	19-0	23-11	20-10
Biology	19-0	23-4	20-10
Chemistry	19-6	23-11	20-9
English	19-0	22-2	20-10
French	19-1	23-3	20-11
History	19-5	23-4	21-1
Mathematics	19-0	22-10	21-0
Psychology	19-9	23-9	20-11
Sociology	19-0	25-0	20-10
Average	19-2	23-6	20-11

APPENDIX D

Economic Status

College	Executives	Professionals	Skilled	Unskilled	Miscellaneous
Cabrini	28%	14%	34%	14%	10%
Holy Family	22	17	37	15	9
Immaculata	21	26	35	11	7
Marywood	12	12	50	16	10
Mercyhurst	20	13	38	21	8
Rosary Hill	24	9	50	12	5
Rosemont	30	30	30	5	5
St. Elizabeth	22	30	36	9	3
Trinity	28	42	19	6	5
MEAN	22.7%	20.9%	36.6%	12.5%	7.3%

APPENDIX E

Standard Scores

	Art	Eng	Fren	Biol	Chem	Math	Hist	Psy	Soc
A	47.0	51.1	50.3	46.1	43.2	49.8	52.3	55.7	54.4
B	48.0	51.0	49.2	48.3	51.9	54.3	48.5	50.2	48.8
C	48.7	48.6	48.2	53.8	50.2	50.7	49.9	50.4	49.5
E	51.5	52.4	46.7	50.6	49.5	49.8	51.2	48.5	49.8
F	51.9	50.0	47.4	48.8	47.7	48.8	50.8	52.1	52.6
G	47.8	49.4	49.7	51.3	51.2	52.1	49.3	50.0	49.3
H	51.1	51.7	48.0	50.0	47.3	48.3	52.1	49.5	52.0
I	47.6	55.1	55.2	48.9	44.9	42.9	51.7	50.8	53.1
L	50.9	49.3	50.7	52.5	51.2	49.4	49.5	47.5	48.8
M	52.6	53.2	52.8	49.3	48.6	45.8	51.3	49.1	47.3
N	45.6	49.6	50.2	50.6	49.6	50.0	54.3	51.0	49.2
O	50.3	49.2	50.7	51.5	51.8	48.5	48.1	50.7	49.5
Q_1	49.4	49.1	50.5	51.0	53.4	50.8	46.9	49.0	49.9
Q_2	51.7	52.4	51.9	49.4	53.6	49.1	49.8	46.0	46.1
Q_3	50.2	48.7	50.7	52.0	49.9	50.5	51.1	48.6	48.3
Q_4	50.3	50.4	51.1	50.4	50.3	49.6	48.8	49.6	49.5
I	49.0	50.4	49.3	44.7	46.5	51.9	52.8	54.7	50.6
II	49.7	45.3	44.9	54.4	60.0	57.3	46.8	47.6	44.0
III	54.7	53.0	51.5	48.4	48.5	45.2	51.6	49.7	47.5
IV	47.2	48.8	49.0	52.7	51.5	48.7	49.1	52.6	50.4
V	49.7	48.3	51.0	46.1	48.8	53.5	51.6	51.3	49.8
VI	55.4	46.9	47.8	50.2	54.8	53.5	47.8	47.4	46.3
VII	51.3	49.2	52.2	48.4	47.5	48.8	50.3	52.2	50.2
VIII	52.8	49.1	49.0	54.8	51.8	46.9	50.3	47.6	47.7
T	48.2	45.9	44.6	58.4	60.4	55.9	44.6	46.3	45.9
E	48.7	49.5	50.2	46.5	46.9	52.0	52.5	53.0	50.7
A	58.3	55.9	52.9	46.4	48.2	44.5	50.0	46.3	47.5
S	46.9	48.5	51.7	49.2	46.8	48.5	47.9	53.6	56.9
P	48.8	50.3	49.1	49.6	46.1	48.6	59.0	49.9	50.2
R	48.7	49.5	51.4	51.0	50.7	50.5	47.1	51.1	49.3

APPENDIX F

Standard Scores

	Factors	Humanities	Natural Sciences	Social Sciences
A	Aloof vs. Sociable	49.5	46.4	54.2
B	Dull vs. Bright	49.4	51.5	49.2
C	Emotional vs. Calm	48.5	51.6	49.9
E	Submissive vs. Dominant	50.2	50.0	49.8
F	Languid vs. Enthusiastic	49.8	48.4	51.8
G	Casual vs. Conscientious	49.0	51.5	49.6
H	Shy vs. Adventurous	50.3	48.5	51.2
I	Tough vs. Sensitive	52.6	45.6	51.9
L	Trusting vs. Suspicious	50.3	51.1	48.6
M	Practical vs. Imaginative	52.9	47.9	49.3
N	Simple vs. Sophisticated	48.5	50.0	51.5
O	Confident vs. Insecure	50.1	50.6	49.4
Q_1	Conservative vs. Experimenting	49.7	51.7	48.6
Q_2	Group-dependent vs. Self-sufficient	52.0	50.7	47.3
Q_3	Self-complacent vs. Self-disciplined	49.9	50.8	49.4
Q_4	Relaxed vs. Tense	50.6	50.1	49.3
I	Business-Contact Interests	49.6	47.7	52.7
II	Technical Interests	46.6	57.3	46.1
III	Artistic Interests	53.1	47.4	49.6
IV	Health and Welfare Interests	48.3	51.0	50.7
V	Business-Clerical Interests	49.7	49.5	50.9
VI	Mechanical Interests	50.1	52.8	47.1
VII	Service Interests	50.9	48.3	50.9
VIII	Outdoor Interests	50.3	51.2	48.5
T	Theoretical Values	46.2	58.2	45.6
E	Economic Values	49.5	48.5	52.1
A	Aesthetic Values	55.7	46.4	48.0
S	Social Values	49.0	48.2	52.8
P	Political Values	49.4	47.6	53.0
R	Religious Values	49.9	50.8	49.4

APPENDIX G

Intercorrelation of Results

	A	B	C	E	F	G	H	I
A								
B	-.098							
C	-.003	.055						
E	.090	.001	.001					
F	.333	-.058	.008	.325				
G	.082	.034	.239	-.181	-.069			
H	.312	-.139	.269	.396	.444	.014		
I	.121	-.035	-.123	-.035	-.097	-.177	-.043	
L	-.117	-.071	-.275	.151	.069	-.211	-.093	.048
M	-.144	-.004	-.175	.082	-.092	-.189	-.058	.306
N	.061	.006	.186	-.023	-.080	.142	.076	-.026
O	-.062	-.099	-.399	-.004	.052	-.151	-.216	.091
Q_1	-.177	.082	.046	.193	-.050	-.056	.057	.034
Q_2	-.389	.091	-.045	-.023	-.391	-.169	-.244	.139
Q_3	-.051	.024	.320	-.255	-.198	.344	.043	-.040
Q_4	-.088	.002	-.504	.061	.041	-.222	-.277	.087
I	.319	-.031	.037	.056	.224	.037	.203	-.069
II	-.394	.103	.130	.012	-.070	.079	-.096	-.368
III	.003	-.008	-.011	.178	.170	-.113	.173	.167
IV	.093	.005	.117	.017	.032	.111	.110	.026
V	.155	-.032	-.047	-.113	.059	.114	-.011	-.099
VI	-.310	.077	.060	.029	-.024	-.019	-.060	-.252
VII	.214	-.059	.046	-.110	.144	.038	.137	.022
VIII	-.294	.009	.098	-.002	-.054	-.048	-.026	-.027
Theo	-.385	.064	.122	.096	-.186	.016	-.063	-.261
Ec	.166	-.124	-.028	-.010	.126	.037	.037	-.213
Aes	-.293	.030	-.034	.071	-.030	-.198	-.022	.230
Soc	.270	.027	-.062	-.219	.009	.063	-.052	.165
Pol	.202	-.099	-.016	.251	.250	-.077	.223	-.033
Rel	.011	.091	.012	-.186	-.170	.174	-.107	.109

APPENDIX G

Intercorrelation of Results

	L	M	N	O	Q_1	Q_2	Q_3	Q_4
A								
B								
C								
E								
F								
G								
H								
I								
L								
M	.149							
N	-.073	-.049						
O	.325	.016	-.194					
Q_1	.033	.225	.029	-.113				
Q_2	.100	.328	.001	-.020	.191			
Q_3	-.303	-.080	.202	-.308	-.034	.003		
Q_4	.406	.123	-.195	.551	-.099	.031	-.419	
I	-.074	-.121	.054	-.033	-.069	-.177	-.024	-.076
II	.067	-.072	.030	-.024	.151	.069	.043	-.027
III	.029	.268	-.025	.003	.063	.002	-.001	-.023
IV	-.018	.017	.035	-.080	.061	-.123	.080	-.100
V	-.062	-.220	-.000	.058	-.140	-.182	.031	.024
VI	.082	-.019	-.090	.000	.088	.095	-.009	.005
VII	-.086	-.087	-.048	-.013	-.111	-.173	.026	-.033
VIII	.063	.097	-.112	-.024	.097	.092	.007	-.022
Theo	.115	.015	.042	.011	.252	.184	.042	-.023
Ec	-.005	-.302	.029	.089	-.208	-.213	-.077	.066
Aes	.015	.336	-.058	-.002	.108	.283	-.041	-.014
Soc	-.113	-.079	-.046	-.028	-.075	-.208	.012	.018
Pol	.081	-.071	.102	.007	-.069	-.121	-.065	-.016
Rel	-.097	.060	-.069	-.083	-.039	.034	.130	-.034

APPENDIX G

Intercorrelation of Results

	I	II	III	IV	V	VI	VII	VIII
A								
B								
C								
E								
F								
G								
H								
I								
L								
M								
N								
O								
P								
Q1								
Q2								
Q3								
Q4								
I								
II	.109							
III	.146	.096						
IV	.187	.317	.311					
V	.523	.155	.020	.122				
VI	.180	.644	.175	.228	.311			
VII	.483	.111	.302	.382	.512	.308		
VIII	.101	.427	.301	.347	.114	.527	.424	
Theo	-.209	.565	-.144	.081	-.091	.236	-.198	.144
Es	.240	-.106	-.192	-.241	.231	-.061	.077	-.190
Aes	-.113	-.107	.381	-.169	-.135	.037	-.034	.155
Soc	.010	-.233	-.087	.276	.073	-.108	.218	-.058
Pol	.149	-.138	.053	-.121	-.027	-.115	-.095	-.133
Rel	-.042	-.025	-.031	.177	-.039	-.014	.036	.044

APPENDIX G

Intercorrelation of Results

	Theo	Es	Aes	Soc	Pol	Rel
A						
B						
C						
E						
F						
G						
H						
I						
L						
M						
N						
O						
Q_1						
Q_2						
Q_3						
Q_4						
I						
II						
III						
IV						
V						
VI						
VII						
VIII						
Theo						
Es	-.209					
Aes	-.176	-.279				
Soc	-.355	-.186	-.341			
Pol	-.219	.139	-.145	-.265		
Rel	-.131	-.433	-.163	.182	-.383	

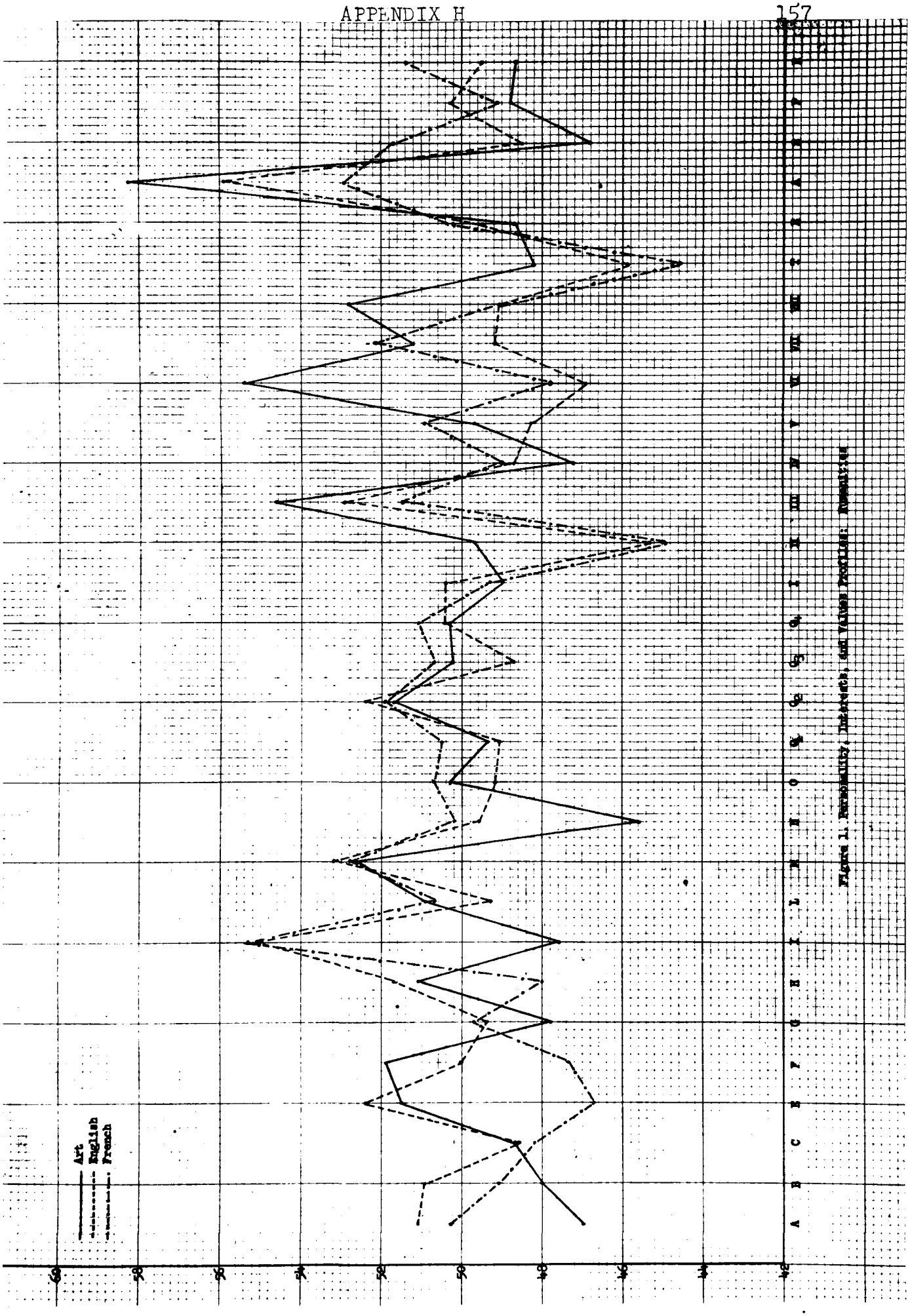
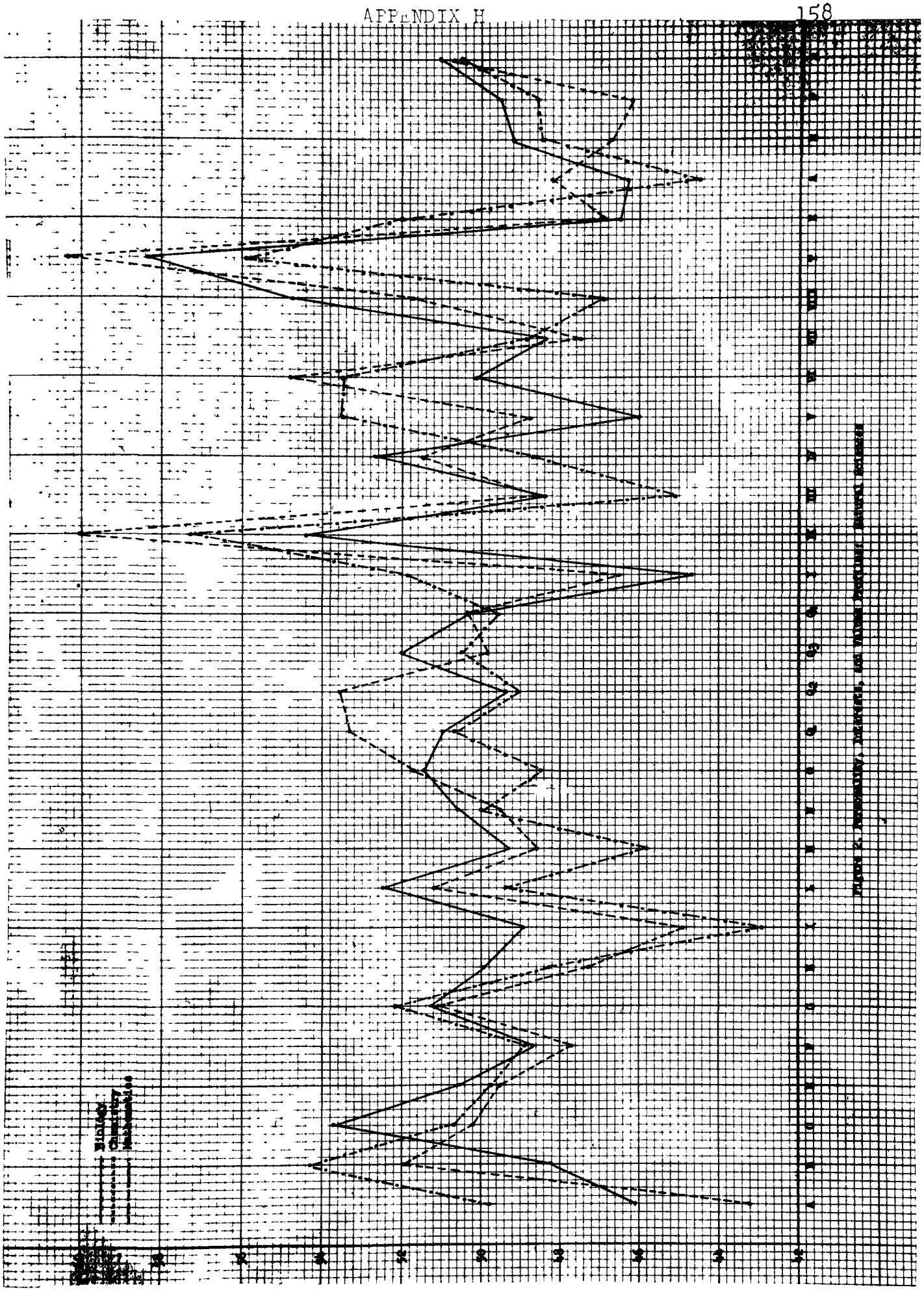


Figure 11. Personality Interests, and Values Profiles: Humanities


Biology
Chemistry
Mathematics

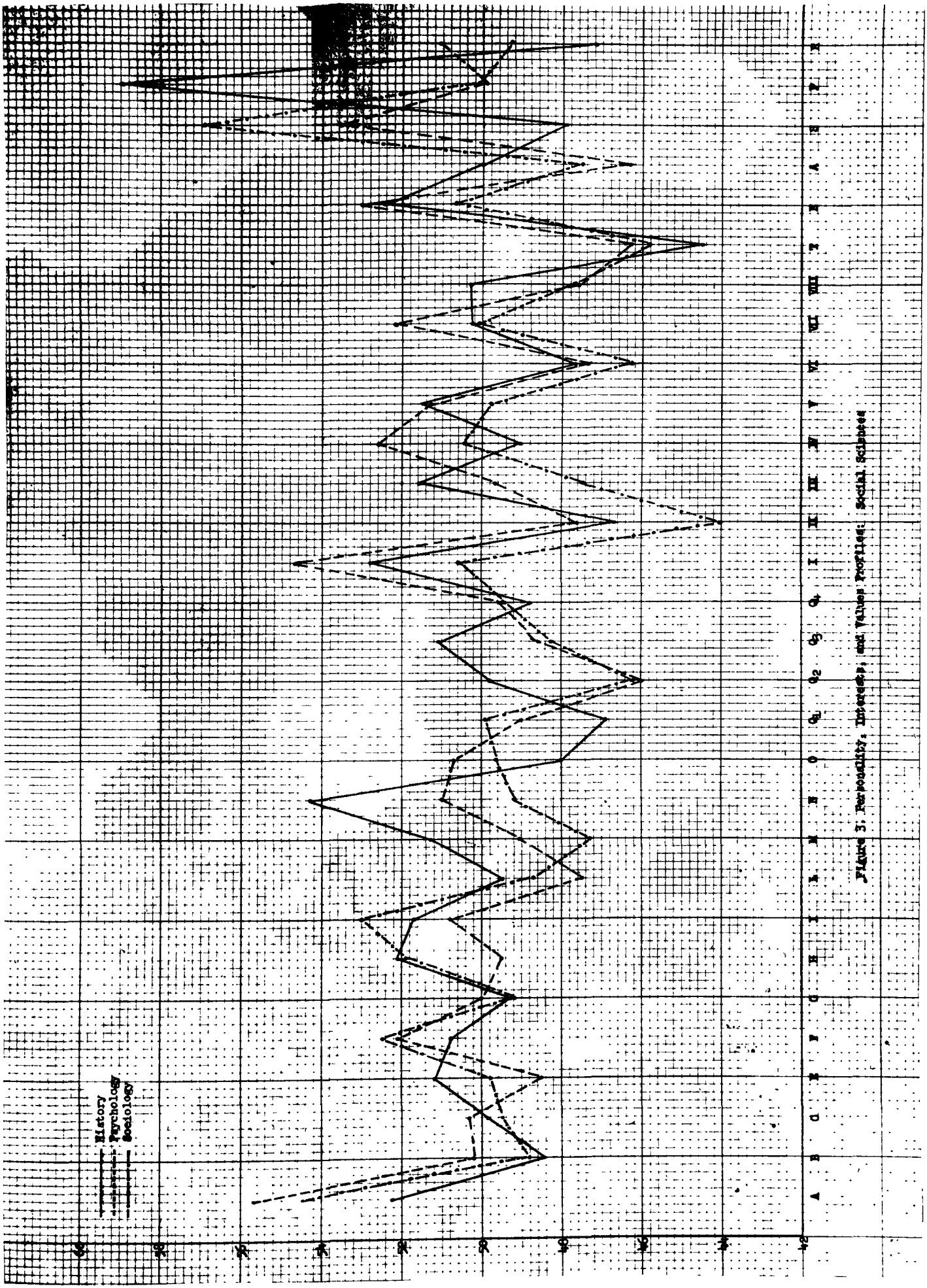


Figure 3: Personality, Interests, and Values Profiles: Social Sciences

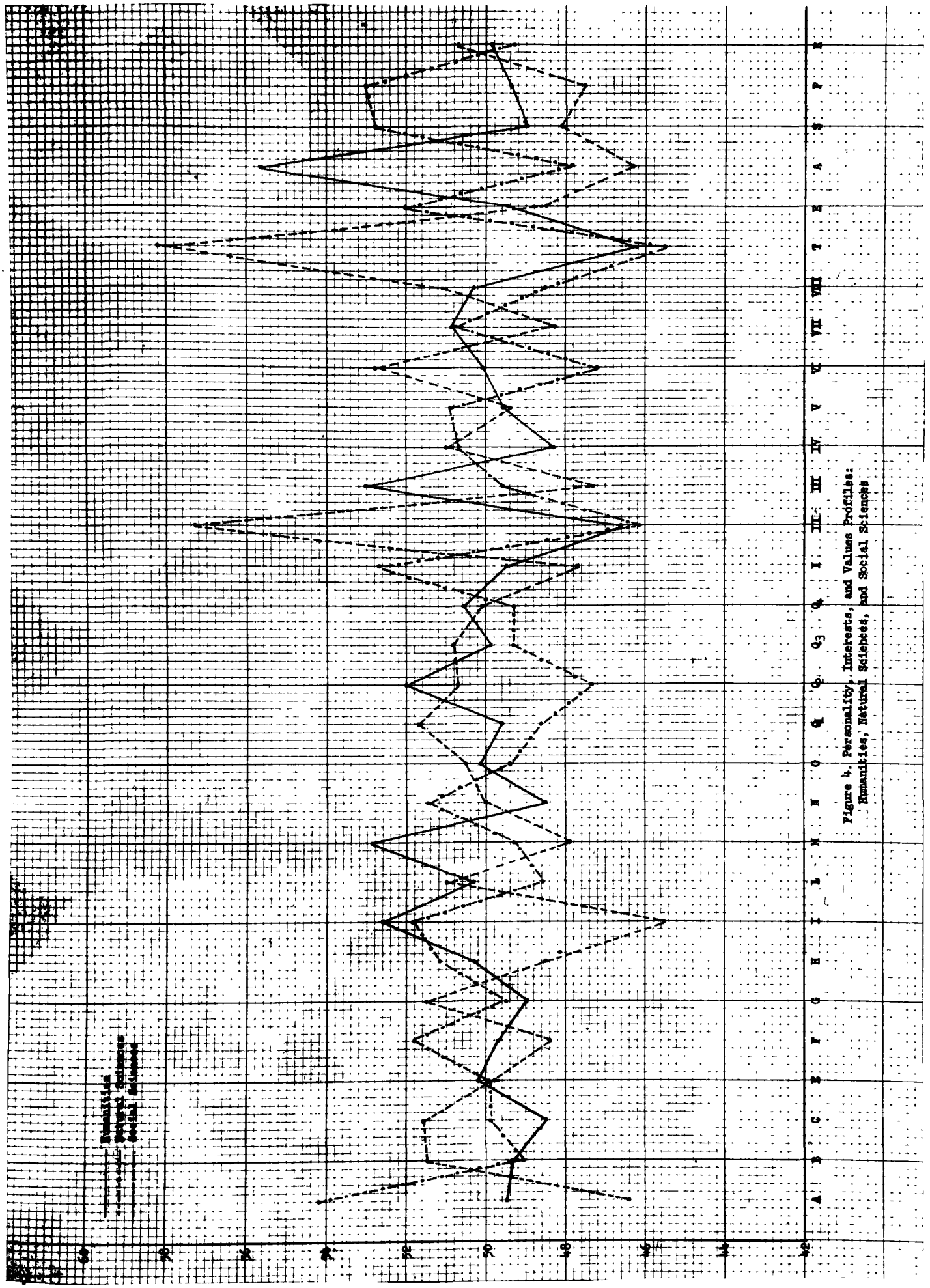


Figure 4. Personality, Interests, and Values Profiles: Humanities, Natural Sciences, and Social Sciences

APPENDIX I

ABSTRACT OF

The Relation of Personality, Interests, and Values to Fields of Concentration[1]

Research for this study aimed to alleviate problems encountered by students and educational counselors alike in liberal arts colleges for women. These difficulties revolve around the selection of the major field of study most appropriate for an individual student. The study represents an attempt to identify and relate patterns of personality traits, interests, and values to fields of concentration chosen by college women.

A broad historical review traces the recognition of the need to define and measure factors related to prevocational and vocational selection, from tentative observations of the role of personality to more complex approaches which involved interests and values as well.

The review of literature surveys the findings of previous studies and illustrates the hypothesis from which the present study was launched--that no significant differences exist in the psychological patterns of students concentrating in different fields of study.

---

1 Sister Mary Aloysius Sabacinska, CSFN, doctoral thesis presented to the Faculty of Psychology and Education of the University of Ottawa, Ontario, March 1967, xiv-162 p.

To test this hypothesis, the present study addressed itself to four questions: two of them concerned the existence of differences and their significance; a third, the characteristic patterns of groups; and the fourth, the implications of the findings.

A population sample, composed of 810 students, representing nine liberal arts colleges for women, was administered the Sixteen Personality Factor Questionnaire, the Hackman-Gaither Vocational Interest Inventory, and the Allport-Vernon Study of Values. Means and standard deviations were computed from the raw scores obtained for the thirty factors for the whole study population and for each of nine fields of concentration. Analyses of variance and t tests were used to identify similarities and differences within the study group. Intercorrelations of all thirty variables with each other were calculated.

The similarities and differences discovered were discussed at some length and the results indicated that statistically significant differences between sub-groups existed at .05, .01, and .001 levels for a majority of the factors in all three tests. The study included the preparation of profiles which traced characteristic patterns of the sub-groups and it was suggested that these patterns would be of value in educational counseling activities related to student selection of a field of concentration.

IPAT 16 P. F.

FORM A
1962 Edition

WHAT TO DO: Inside this booklet are some questions to see what attitudes and interests you have. There are no "right" and "wrong" answers because everyone has the right to his own views. To be able to get the best advice from your results, you will want to answer them exactly and truly.

If a separate "Answer Sheet" has not been given to you, turn this booklet over and tear off the Answer Sheet on the back page.

Write your name and other particulars at the top of the Answer Sheet.

First, you should answer the four sample questions below so that you can see whether you need to ask anything before starting. Although you are to read the questions in this booklet, you must record your answers on the answer sheet (alongside the same number as in the booklet).

There are three possible answers to each question. Read the following examples and mark your answers at the top of your answer sheet where it says "Examples." Put a mark, x, in the left-hand box if your answer choice is the "a" answer, in the middle box if your answer choice is the "b" answer, and in the right-hand box if you choose the "c" answer.

EXAMPLES:

1. I like to watch team games. **(a) yes, (b) occasionally, (c) no.**
2. I prefer people who:
   (a) are reserved, (b) (are) in between, (c) make friends quickly.
3. Money cannot bring happiness. **(a) yes (true), (b) in between, (c) no (false).**
4. Woman is to child as cat is to: **(a) kitten, (b) dog, (c) boy.**

In the last example there *is* a right answer—kitten. But there are very few such reasoning items among the questions.

Ask *now* if anything is not clear. The examiner will tell you in a moment to turn the page and start.

When you answer, keep these four points in mind:

1. You are asked not to spend time pondering. **Give the first, natural answer as it comes to you.** Of course, the questions are too short to give you all the particulars you would sometimes like to have. For instance, the above question asks you about "team games" and you might be fonder of football than basketball. But you are to reply "for the average game," or to strike an average in situations of the kind stated. Give the best answer you can at a rate not slower than five or six a minute. You should finish in a little more than half an hour.
2. Try **not** to fall back on the middle, "uncertain" answers except when the answer at either end is really **impossible** for you—perhaps once every two or three questions.
3. Be sure not to skip anything, **but answer every question, somehow.** Some may not apply to you very well, but give your best guess. Some may seem personal; but remember that the answer sheets are kept confidential and cannot be scored without a special stencil key. Answers to particular questions are not inspected.
4. Answer as honestly as possible what is true of **you.** Do not merely mark what seems "the right thing to say" to impress the examiner.

DO NOT TURN PAGE UNTIL TOLD TO DO SO

1. I have the instructions for this test clearly in mind. **(a) yes, (b) uncertain, (c) no.**

2. I am ready to answer each question as truthfully as possible. **(a) yes, (b) uncertain, (c) no.**

3. It would be good for everyone if vacations (holidays) were longer and everyone *had* to take them. **(a) agree, (b) uncertain, (c) disagree.**

4. I can find enough energy to face my difficulties. **(a) always, (b) generally, (c) seldom.**

5. I feel a bit nervous of wild animals even when they are in strong cages. **(a) yes (true), (b) uncertain, (c) no (false).**

6. I hold back from criticizing people and their ideas. **(a) yes, (b) sometimes, (c) no.**

7. I make smart, sarcastic remarks to people if I think they deserve it. **(a) generally, (b) sometimes, (c) never.**

8. I prefer semiclassical music to popular tunes. **(a) true, (b) uncertain, (c) false.**

9. If I saw two neighbors' children fighting, I would: **(a) leave them to settle it, (b) uncertain, (c) reason with them.**

10. On social occasions I: **(a) readily come forward, (b) respond in between, (c) prefer to stay quietly in the background.**

11. I would rather be: **(a) a construction engineer, (b) uncertain, (c) a teacher of social studies.**

12. I would rather spend a free evening: **(a) with a good book, (b) uncertain, (c) working on a hobby with friends.**

13. I can generally put up with conceited people, even though they brag or show they think too well of themselves. **(a) yes, (b) in between, (c) no.**

14. I'd rather that the person I marry be socially admired than gifted in art or literature. **(a) true, (b) uncertain, (c) false.**

15. I sometimes get an unreasonable dislike for a person: **(a) but it is so slight I can hide it easily, (b) in between, (c) which is so definite that I tend to express it.**

16. In a situation which may become dangerous I believe in making a fuss and speaking up even if calmness and politeness are lost. **(a) yes, (b) in between, (c) no.**

17. I am always keenly aware of attempts at propaganda in things I read. **(a) yes, (b) uncertain, (c) no.**

18. I wake up in the night and, through worry, have difficulty in sleeping again. **(a) often, (b) sometimes, (c) never.**

19. I don't feel guilty if scolded for something I did not do. **(a) true, (b) uncertain, (c) false.**

20. I am considered a liberal "dreamer" of new ways rather than a practical follower of well-tried ways. **(a) true, (b) uncertain, (c) false.**

21. I find that my interests in people and amusement tend to change fairly rapidly. **(a) yes, (b) in between, (c) no.**

22. In constructing something I would rather work: **(a) with a committee, (b) uncertain, (c) on my own.**

23. I find myself counting things, for no particular purpose. **(a) often, (b) occasionally, (c) never.**

24. When talking I like: **(a) to say things, just as they occur to me, (b) in between, (c) to get my thoughts well organized first.**

25. I never feel the urge to doodle and fidget when kept sitting still at a meeting. **(a) true, (b) uncertain, (c) false.**

(End of first column on answer sheet.)

26. With the same hours and pay, I would prefer the life of: **(a) a carpenter or cook, (b) uncertain, (c) a waiter in a good restaurant.**

27. With acquaintances I prefer: **(a) to keep to matter-of-fact impersonal things, (b) in between, (c) to chat about people and their feelings.**

28. "Spade" is to "dig" as "knife" is to: **(a) sharp, (b) cut, (c) shovel.**

29. I sometimes can't get to sleep because an idea keeps running through my mind. **(a) true, (b) uncertain, (c) false.**

30. In my personal life I reach the goals I set, almost all the time. **(a) true, (b) uncertain, (c) false.**

31. When telling a person a deliberate lie I have to look away, being ashamed to look him in the eye. **(a) true, (b) uncertain, (c) false.**

32. I am uncomfortable when I work on a project requiring quick action affecting others. **(a) true, (b) in between, (c) false.**

33. Most of the people I know would rate me as an amusing talker. **(a) yes, (b) uncertain, (c) no.**

34. Many ordinary people would be shocked if they knew my inner personal opinions. **(a) yes, (b) uncertain, (c) no.**

35. I get slightly embarrassed if I suddenly become the focus of attention in a social group. **(a) yes, (b) in between, (c) no.**

36. I am always glad to join a large gathering, for example, a party, dance, or public meeting. **(a) yes, (b) in between, (c) no.**

37. In school I preferred (or prefer): **(a) music, (b) uncertain, (c) handwork and crafts.**

38. I believe most people are a little "queer" mentally though they do not like to admit it. **(a) yes, (b) in between, (c) no.**

39. I like a friend (of my sex) who: **(a) seriously thinks out his attitudes to life, (b) in between, (c) is efficient and practical in his interests.**

40. "If at first you don't succeed, try, try, again," is a motto completely forgotten in the modern world. **(a) yes, (b) uncertain, (c) no.**

41. I feel a need every now and then to engage in a tough physical activity. **(a) yes, (b) in between, (c) no.**

42. I would rather mix with polite people than rough, rebellious individuals. **(a) yes, (b) in between, (c) no.**

43. In intellectual interests, my parents are (were): **(a) a bit below average, (b) average, (c) above average.**

44. When I am called in by my boss (or teacher), I: **(a) see a chance to put in a good word for things I am concerned about, (b) in between, (c) fear something has gone wrong.**

45. I feel a strong need for someone to lean on in times of sadness. **(a) yes, (b) in between, (c) no.**

46. I occasionally get puzzled when looking in a mirror, as to the meaning of right and left. **(a) true, (b) uncertain, (c) false.**

47. As a teenager, I joined in school sports: **(a) occasionally, (b) fairly often, (c) a great deal.**

48. I would rather stop in the street to watch an artist painting than listen to some people having a quarrel. **(a) true, (b) uncertain, (c) false.**

49. I sometimes get in a state of tension and turmoil as I think of the day's happenings. **(a) yes, (b) in between, (c) no.**

50. I sometimes doubt whether people I am talking to are really interested in what I am saying. **(a) yes, (b) in between, (c) no.**

(End of second column on answer sheet.)

51. I would like to be: (a) a forester, (b) uncertain, (c) a grammar or high school teacher.

52. For special holidays and birthdays, I: (a) like to give personal presents, (b) uncertain, (c) feel that buying presents is a bit of a nuisance.

53. "Tired" is to "work" as "proud" is to: (a) rest, (b) success, (c) exercise.

54. Which of the following items is different in kind from the others? (a) candle, (b) moon, (c) electric light.

55. I admire my parents in all important matters. (a) yes, (b) uncertain, (c) no.

56. I have some characteristics in which I feel definitely superior to most people. (a) yes, (b) uncertain, (c) no.

57. If it is useful to others, I don't mind taking a dirty job that others look down on. (a) true, (b) uncertain, (c) false.

58. I like to go out to a show or entertainment: (a) more than once a week (more than average), (b) about once a week (average), (c) less than once a week (less than average).

59. I think that plenty of freedom is more important than good manners and respect for the law. (a) true, (b) uncertain, (c) false.

60. I tend to keep quiet in the presence of senior persons (people of greater experience, age, or rank). (a) yes, (b) in between, (c) no.

61. I find it hard to address or recite to a large group. (a) yes, (b) in between, (c) no.

62. I would rather live in a town: (a) which is rough, prosperous, and booming, (b) uncertain, (c) artistically laid out, but relatively poor.

63. If I make an awkward social mistake, I can soon forget it. (a) yes, (b) in between, (c) no.

64. When I read an unfair magazine article, I am more inclined to forget it than to feel like "hitting back." (a) true, (b) uncertain, (c) false.

65. My memory tends to drop a lot of unimportant trivial things, for example, names of streets or stores in town. (a) yes, (b) in between, (c) no.

66. I am considered a person easily swayed by appeals to my feelings. (a) yes, (b) in between, (c) no.

67. I eat my food with gusto, not always so carefully and properly as some people. (a) true, (b) uncertain, (c) false.

68. I generally keep up hope in ordinary difficulties. (a) yes, (b) uncertain, (c) no.

69. People sometimes warn me that I show my excitement in voice and manner too obviously. (a) yes, (b) in between, (c) no.

70. As a teenager, if I differed in opinion from my parents, I usually: (a) kept my own opinion, (b) in between, (c) accepted their authority.

71. I prefer to marry someone who can: (a) keep the family interested in its own activities, (b) in between, (c) make the family a part of the social life of the neighborhood.

72. I would rather enjoy life quietly in my own way than be admired for my achievements. (a) true, (b) uncertain, (c) false.

73. I can work carefully on most things without being bothered by people making a lot of noise around me. (a) yes, (b) in between, (c) no.

74. I feel that on one or two occasions recently I have been blamed more than I really deserve. (a) yes, (b) in between, (c) no.

75. I am always able to keep the expressions of my feelings under exact control. (a) yes, (b) in between, (c) no.

(End of third column on answer sheet.)

76. In starting a useful invention, I would prefer: **(a) working on it in the laboratory, (b) uncertain, (c) selling it to people.**

77. "Surprise" is to "strange" as "fear" is to: **(a) brave, (b) anxious, (c) terrible.**

78. Which of the following fractions is not in the same class as the others? **(a) 3/7, (b) 3/9, (c) 3/11.**

79. Some people seem to ignore or avoid me, although I don't know why. **(a) true, (b) uncertain, (c) false.**

80. People treat me less reasonably than my good intentions deserve. **(a) often, (b) occasionally, (c) never.**

81. The use of foul language, even when it is not in a mixed group of men and women, still disgusts me. **(a) yes, (b) in between, (c) no.**

82. I have decidedly fewer friends than most people. **(a) yes, (b) in between, (c) no.**

83. I would hate to be where there wouldn't be a lot of people to talk to. **(a) true, (b) uncertain, (c) false.**

84. People sometimes call me careless, even though they think me an attractive person. **(a) yes, (b) in between, (c) no.**

85. My reserve always stands in the way when I want to speak to an attractive stranger of the opposite sex. **(a) yes, (b) in between, (c) no.**

86. I would rather have a job with: **(a) a fixed, certain salary, (b) in between, (c) a larger salary, but depending on my constantly persuading people I am worth it.**

87. I prefer reading: **(a) a realistic account of military or political battles, (b) uncertain, (c) a sensitive, imaginative novel.**

88. When bossy people try to "push me around," I do just the opposite of what they wish. **(a) yes, (b) in between, (c) no.**

89. Most people would be "better off" if given more praise instead of more criticism. **(a) true, (b) uncertain, (c) false.**

90. In discussing art, religion, or politics, I seldom get so involved or excited I forget politeness and human relations. **(a) true, (b) uncertain, (c) false.**

91. If someone got mad at me, I would: **(a) try to calm him down, (b) uncertain, (c) get irritated.**

92. I would like to see a move toward: **(a) eating more vegetable foods, to avoid killing so many animals, (b) uncertain, (c) getting better poisons to kill the animals which ruin farmers' crops (such as squirrels, rabbits, and some kinds of birds).**

93. If acquaintances treat me badly and show they dislike me: **(a) it does not upset me a bit, (b) in between, (c) I tend to get downhearted.**

94. Careless folks who say "the best things in life are free" usually haven't worked to get much. **(a) true, (b) in between, (c) false.**

95. Because it is not always possible to get things done by gradual, reasonable methods, it is sometimes necessary to use force. **(a) true, (b) in between, (c) false.**

96. At fifteen or sixteen I went about with the opposite sex: **(a) a lot, (b) as much as most people, (c) less than most people.**

97. I like to take an active part in social affairs, committee work, etc. **(a) yes, (b) in between, (c) no.**

98. The idea that sickness comes as much from mental as physical causes is much exaggerated. **(a) yes, (b) in between, (c) no.**

99. Quite small setbacks occasionally irritate me too much. **(a) yes, (b) in between, (c) no.**

100. I very rarely blurt out annoying remarks that hurt people's feelings. **(a) true, (b) uncertain, (c) false.**

(End of fourth column on answer sheet.)

101. I would prefer to work in a business: **(a) talking to customers, (b) in between, (c) keeping office accounts and records.**

102. "Size" is to "length" as "dishonest" is to: **(a) prison, (b) sin, (c) stealing.**

103. AB is to dc as SR is to: **(a) qp, (b) pq, (c) tu.**

104. When people are unreasonable, I just: **(a) keep quiet, (b) in between, (c) despise them.**

105. If people talk loudly while I am listening to music, I: **(a) can keep my mind on the music and not be bothered, (b) in between, (c) find it spoils my enjoyment and annoys me.**

106. I think I am better described as: **(a) polite and quiet, (b) in between, (c) forceful.**

107. I attend social functions only when I have to, and stay away any other time. **(a) yes, (b) uncertain, (c) no.**

108. To be cautious and expect little is better than to be happy at heart, always expecting success. **(a) true, (b) uncertain, (c) false.**

109. In thinking of difficulties in my work, I: **(a) try to plan ahead, before I meet them, (b) in between, (c) assume I can handle them when they come.**

110. I have at least as many friends of the opposite sex as of my own. **(a) yes, (b) in between, (c) no.**

111. Even in an important game I am more concerned to enjoy it than to win. **(a) always, (b) generally, (c) occasionally.**

112. I would rather be: **(a) a guidance worker with young people seeking careers, (b) uncertain, (c) a manager in a technical manufacturing concern.**

113. If I am quite sure that a person is unjust or behaving selfishly, I show him up, even if it takes some trouble. **(a) yes, (b) in between, (c) no.**

114. Some people criticize my sense of responsibility. **(a) yes, (b) uncertain, (c) no.**

115. I would enjoy being a newspaper writer on drama, concerts, opera, etc. **(a) yes, (b) uncertain, (c) no.**

116. I find it embarrassing to have praise or compliments bestowed on me. **(a) yes, (b) in between, (c) no.**

117. I think it is more important in the modern world to solve: **(a) the political difficulties, (b) uncertain, (c) the question of moral purpose.**

118. I occasionally have a sense of vague danger or sudden dread for no sufficient reason. **(a) yes, (b) in between, (c) no.**

119. As a child I feared the dark. **(a) often, (b) sometimes, (c) never.**

120. On a free evening I like to: **(a) see an historical film about past adventures, (b) uncertain, (c) read science fiction or an essay on "The Future of Science."**

121. It bothers me if people think I am being too unconventional or odd. **(a) a lot, (b) somewhat, (c) not at all.**

122. Most people would be happier if they lived more with their fellows and did the same things as others. **(a) yes, (b) in between, (c) no.**

123. I like to go my own way instead of acting on approved rules. **(a) true, (b) uncertain, (c) false.**

124. Often I get angry with people too quickly. **(a) yes, (b) in between, (c) no.**

125. When something really upsets me, I generally calm down again quite quickly. **(a) yes, (b) in between, (c) no.**

(End of fifth column on answer sheet.)

126. If the earnings were the same, I would rather be: **(a) a lawyer, (b) uncertain, (c) a navigator or pilot.**

127. "Better" is to "worst" as "slower" is to: **(a) fast, (b) best, (c) quickest.**

128. Which of the following should come next at the end of this row of letters: xooooxxoooxxx? **(a) xox, (b) oox, (c) oxx.**

129. When the time comes for something I have planned and looked forward to, I occasionally do not feel up to going. **(a) true, (b) in between, (c) false.**

130. I could enjoy the life of an animal doctor, handling disease and surgery of animals. **(a) yes, (b) in between, (c) no.**

131. I occasionally tell strangers things that seem to me important, regardless of whether they ask about them. **(a) yes, (b) in between, (c) no.**

132. I spend much of my spare time talking with friends over social events enjoyed in the past. **(a) yes, (b) in between, (c) no.**

133. I enjoy doing "daring," foolhardy things "just for fun." **(a) yes, (b) in between, (c) no.**

134. I think the police can be trusted not to ill-treat innocent people. **(a) yes, (b) in between, (c) no.**

135. I consider myself a very sociable, outgoing person. **(a) yes, (b) in between, (c) no.**

136. In social contacts I: **(a) show my emotions as I wish, (b) in between, (c) keep my emotions to myself.**

137. I enjoy music that is: **(a) light, dry, and brisk, (b) in between, (c) emotional and sentimental.**

138. I try to make my laughter at jokes quieter than most people's. **(a) yes, (b) in between, (c) no.**

139. I admire the beauty of a fairy tale more than that of a well-made gun. **(a) yes, (b) uncertain, (c) no.**

140. Hearing different beliefs about right and wrong is: **(a) always interesting, (b) something we cannot avoid, (c) bad for most people.**

141. I am always interested in mechanical matters, for example, in cars and airplanes. **(a) yes, (b) in between, (c) no.**

142. I like to tackle problems that other people have made a mess of. **(a) yes, (b) in between, (c) no.**

143. I am properly regarded as only a plodding, half-successful person. **(a) yes, (b) uncertain, (c) no.**

144. If people take advantage of my friendliness, I do not resent it and I soon forget. **(a) true, (b) uncertain, (c) false.**

145. I think the spread of birth control is essential to solving the world's economic and peace problems. **(a) yes, (b) uncertain, (c) no.**

146. I like to do my planning alone, without interruptions and suggestions from others. **(a) yes, (b) in between, (c) no.**

147. I sometimes let my actions get swayed by feelings of jealousy. **(a) yes, (b) in between, (c) no.**

148. I believe firmly "the boss may not always be right, but he always has the right to be boss." **(a) yes, (b) uncertain, (c) no.**

149. I tend to tremble or perspire when I think of a difficult task ahead. **(a) generally, (b) occasionally, (c) never.**

150. If people shout suggestions when I'm playing a game, it does not upset me. **(a) true, (b) uncertain, (c) false.**

(End of sixth column on answer sheet.)

151. I would prefer the life of: **(a) an artist, (b) uncertain, (c) a secretary running a social club.**

152. Which of the following words does not properly belong with the others? **(a) any, (b) some, (c) most.**

153. "Flame" is to "heat" as "rose" is to: **(a) thorn, (b) red petals, (c) scent.**

154. I have vivid dreams, disturbing my sleep. **(a) often, (b) occasionally, (c) practically never.**

155. If the odds are really against something's being a success, I still believe in taking the risk. **(a) yes, (b) in between, (c) no.**

156. I like it when I know so well what the group has to do that I naturally become the one in command. **(a) yes, (b) in between, (c) no.**

157. I would rather dress with quiet correctness than with eye-catching personal style. **(a) true, (b) uncertain, (c) false.**

158. An evening with a quiet hobby appeals to me more than a lively party. **(a) true, (b) uncertain, (c) false.**

159. I close my mind to well-meant suggestions of others, even though I know I shouldn't. **(a) occasionally, (b) hardly ever, (c) never.**

160. I always make a point, in deciding anything, to refer to basic rules of right and wrong. **(a) yes, (b) in between, (c) no.**

161. I somewhat dislike having a group watch me at work. **(a) yes, (b) in between, (c) no.**

162. I keep my room smartly organized, with things in known places almost all the time. **(a) yes, (b) in between, (c) no.**

163. In school I preferred: **(a) English, (b) uncertain, (c) mathematics or arithmetic.**

164. I have sometimes been troubled by people's saying bad things about me behind my back, with no grounds at all. **(a) yes, (b) uncertain, (c) no.**

165. Talk with ordinary, habit-bound, conventional people: **(a) is often quite interesting and has a lot to it, (b) in between, (c) annoys me because it deals with trifles and lacks depth.**

166. I like to: **(a) have a circle of warm friendships, even if they are demanding, (b) in between, (c) be free of personal entanglements.**

167. I think it is wiser to keep the nation's military forces strong than just to depend on international goodwill. **(a) yes, (b) in between, (c) no.**

168. People regard me as a solid, undisturbed person, unmoved by ups and downs in circumstances. **(a) yes, (b) in between, (c) no.**

169. I think society should let reason lead it to new customs and throw aside old habits or mere traditions. **(a) yes, (b) in between, (c) no.**

170. My viewpoints change in an uncertain way because I trust my feelings more than logical reasoning. **(a) true, (b) to some extent, (c) false.**

171. I learn better by: **(a) reading a well-written book, (b) in between, (c) joining a group discussion.**

172. I have periods when it's hard to stop a mood of self-pity. **(a) often, (b) occasionally, (c) never.**

173. I like to wait till I am sure that what I am saying is correct, before I put forth an argument. **(a) always, (b) generally, (c) only if it's practicable.**

174. Small things sometimes "get on my nerves" unbearably though I realize them to be trivial. **(a) yes, (b) in between, (c) no.**

175. I don't often say things on the spur of the moment that I greatly regret. **(a) true, (b) uncertain, (c) false.**

(End of seventh column on answer sheet.)

176. If asked to work with a charity drive, I would: **(a) accept, (b) uncertain, (c) politely say I'm too busy.**

177. Which of the following words does not belong with the others? **(a) wide, (b) zigzag, (c) regular.**

178. "Soon" is to "never" as "near" is to: **(a) nowhere, (b) far, (c) next.**

179. I have a good sense of direction (find it easy to tell which is North, South, East, or West) when in a strange place. **(a) yes, (b) in between, (c) no.**

180. I am known as an "idea man" who almost always puts forward some ideas on a problem. **(a) yes, (b) in between, (c) no.**

181. I think I am better at showing: **(a) nerve in meeting challenges, (b) uncertain, (c) tolerance of other people's wishes.**

182. I am considered a very enthusiastic person. **(a) yes, (b) in between, (c) no.**

183. I like a job that offers change, variety, and travel, even if it involves some danger. **(a) yes, (b) in between, (c) no.**

184. I am a fairly strict person, insisting on always doing things as correctly as possible. **(a) true, (b) in between, (c) false.**

185. I enjoy work that requires conscientious, exacting skills. **(a) yes, (b) in between, (c) no.**

186. I'm the energetic type who keeps busy. **(a) yes, (b) uncertain, (c) no.**

187. I am sure there are no questions that I have skipped or failed to answer properly. **(a) yes, (b) uncertain, (c) no.**

(Do not tear off this sheet unless told to do so.)

IPAT

ANSWER SHEET: THE 16 P. F. TEST, FORM A

NAME _____ SEX _____ AGE _____ DATE _____
First Middle Last (Write M or F) (Nearest Year)

EXAMPLES: 1 [a] [b] [c] 2 [a] [b] [c] 3 [a] [b] [c] 4 [a] [b] [c]

RAW SCORE

A B C E F G H I L M N O Q_1 Q_2 Q_3 Q_4

1 [a] [b] [c]	26 [a] [b] [c]	51 [a] [b] [c]	76 [a] [b] [c]	101 [a] [b] [c]	126 [a] [b] [c]	151 [a] [b] [c]	176 [a] [b] [c]
2 [a] [b] [c]	27 [a] [b] [c]	52 [a] [b] [c]	77 [a] [b] [c]	102 [a] [b] [c]	127 [a] [b] [c]	152 [a] [b] [c]	177 [a] [b] [c]
3 [a] [b] [c]	28 [a] [b] [c]	53 [a] [b] [c]	78 [a] [b] [c]	103 [a] [b] [c]	128 [a] [b] [c]	153 [a] [b] [c]	178 [a] [b] [c]
4 [a] [b] [c]	29 [a] [b] [c]	54 [a] [b] [c]	79 [a] [b] [c]	104 [a] [b] [c]	129 [a] [b] [c]	154 [a] [b] [c]	179 [a] [b] [c]
5 [a] [b] [c]	30 [a] [b] [c]	55 [a] [b] [c]	80 [a] [b] [c]	105 [a] [b] [c]	130 [a] [b] [c]	155 [a] [b] [c]	180 [a] [b] [c]
6 [a] [b] [c]	31 [a] [b] [c]	56 [a] [b] [c]	81 [a] [b] [c]	106 [a] [b] [c]	131 [a] [b] [c]	156 [a] [b] [c]	181 [a] [b] [c]
7 [a] [b] [c]	32 [a] [b] [c]	57 [a] [b] [c]	82 [a] [b] [c]	107 [a] [b] [c]	132 [a] [b] [c]	157 [a] [b] [c]	182 [a] [b] [c]
8 [a] [b] [c]	33 [a] [b] [c]	58 [a] [b] [c]	83 [a] [b] [c]	108 [a] [b] [c]	133 [a] [b] [c]	158 [a] [b] [c]	183 [a] [b] [c]
9 [a] [b] [c]	34 [a] [b] [c]	59 [a] [b] [c]	84 [a] [b] [c]	109 [a] [b] [c]	134 [a] [b] [c]	159 [a] [b] [c]	184 [a] [b] [c]
10 [a] [b] [c]	35 [a] [b] [c]	60 [a] [b] [c]	85 [a] [b] [c]	110 [a] [b] [c]	135 [a] [b] [c]	160 [a] [b] [c]	185 [a] [b] [c]

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

11 [a] [b] [c]	36 [a] [b] [c]	61 [a] [b] [c]	86 [a] [b] [c]	111 [a] [b] [c]	136 [a] [b] [c]	161 [a] [b] [c]	186 [a] [b] [c]
12 [a] [b] [c]	37 [a] [b] [c]	62 [a] [b] [c]	87 [a] [b] [c]	112 [a] [b] [c]	137 [a] [b] [c]	162 [a] [b] [c]	187 [a] [b] [c]
13 [a] [b] [c]	38 [a] [b] [c]	63 [a] [b] [c]	88 [a] [b] [c]	113 [a] [b] [c]	138 [a] [b] [c]	163 [a] [b] [c]	END OF TEST
14 [a] [b] [c]	39 [a] [b] [c]	64 [a] [b] [c]	89 [a] [b] [c]	114 [a] [b] [c]	139 [a] [b] [c]	164 [a] [b] [c]	
15 [a] [b] [c]	40 [a] [b] [c]	65 [a] [b] [c]	90 [a] [b] [c]	115 [a] [b] [c]	140 [a] [b] [c]	165 [a] [b] [c]	
16 [a] [b] [c]	41 [a] [b] [c]	66 [a] [b] [c]	91 [a] [b] [c]	116 [a] [b] [c]	141 [a] [b] [c]	166 [a] [b] [c]	
17 [a] [b] [c]	42 [a] [b] [c]	67 [a] [b] [c]	92 [a] [b] [c]	117 [a] [b] [c]	142 [a] [b] [c]	167 [a] [b] [c]	
18 [a] [b] [c]	43 [a] [b] [c]	68 [a] [b] [c]	93 [a] [b] [c]	118 [a] [b] [c]	143 [a] [b] [c]	168 [a] [b] [c]	
19 [a] [b] [c]	44 [a] [b] [c]	69 [a] [b] [c]	94 [a] [b] [c]	119 [a] [b] [c]	144 [a] [b] [c]	169 [a] [b] [c]	
20 [a] [b] [c]	45 [a] [b] [c]	70 [a] [b] [c]	95 [a] [b] [c]	120 [a] [b] [c]	145 [a] [b] [c]	170 [a] [b] [c]	
21 [a] [b] [c]	46 [a] [b] [c]	71 [a] [b] [c]	96 [a] [b] [c]	121 [a] [b] [c]	146 [a] [b] [c]	171 [a] [b] [c]	
22 [a] [b] [c]	47 [a] [b] [c]	72 [a] [b] [c]	97 [a] [b] [c]	122 [a] [b] [c]	147 [a] [b] [c]	172 [a] [b] [c]	
23 [a] [b] [c]	48 [a] [b] [c]	73 [a] [b] [c]	98 [a] [b] [c]	123 [a] [b] [c]	148 [a] [b] [c]	173 [a] [b] [c]	
24 [a] [b] [c]	49 [a] [b] [c]	74 [a] [b] [c]	99 [a] [b] [c]	124 [a] [b] [c]	149 [a] [b] [c]	174 [a] [b] [c]	
25 [a] [b] [c]	50 [a] [b] [c]	75 [a] [b] [c]	100 [a] [b] [c]	125 [a] [b] [c]	150 [a] [b] [c]	175 [a] [b] [c]	

HACKMAN - GAITHER VOCATIONAL INTEREST INVENTORY
RESEARCH EDITION

Form M

Roy B. Hackman, Professor of Psychology and Director, Counseling and Guidance Clinic, Department of Psychology, Temple University.

and

James W. Gaither, Asst. Professor of Psychological Studies, Director of Guidance, The Community College, Temple University.

INSTRUCTIONS

On the following pages you are asked to decide how you feel about different jobs and different kinds of work. There are no right or wrong answers as each is simply a statement of your personal feelings. This Inventory is designed to help you determine the pattern of your Vocational Interests. Read each job title or job description and decide quickly how you would feel about it as a career (assuming that you would have the necessary aptitude and could get the training needed.) Do not skip any questions. Note that the numbers of the questions run from left to right on the answer sheet instead of up and down. Mark your answers on the answer sheet in the following manner:

(1) If you are rather sure that you would like the work, fill in the space in the like column (L).

(2) If you are not sure, but feel you might like the work, fill in the space in the like-question column (L?).

(3) If you are not sure, but feel you might dislike the work, fill in the space in the dislike-question column (D?).

(4) If you are rather sure that you would dislike the work, fill in the space in the dislike column (D).

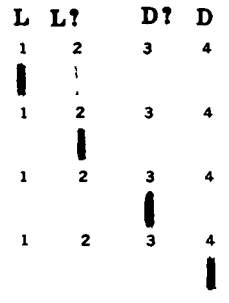
Examples:

(1) Fix Cars (Like-sure)

(2) Raise Fish (Like-not sure)

(3) Wash Floors (Dislike-not sure)

(4) Cook Food (Dislike-sure)



1. Immigration Agent
2. Purchasing Agent
3. Draftsman
4. Author
5. Dentist
6. Efficiency Expert
7. Demonstrator
8. Aviator
9. Portrait Painter
10. Psychologist
11. Army Officer
12. Salesman
13. Chemist
14. Designer
15. Teacher
16. Bill Collector
17. Auctioneer
18. Research Assistant
19. Interior Decorator
20. Physician
21. Income Tax Collector
22. Sales Engineer
23. Tool Designer
24. Musician
25. Lawyer
26. Critic
27. Real Estate Agent
28. Radio Operator
29. Artist
30. Trained Nurse
31. School Principal
32. Claim Adjuster
33. Engineer
34. Photographer
35. Clergyman
36. Policeman
37. Sales Manager
38. Ship Pilot
39. Master of Ceremonies
40. College Professor
41. Prison Warden
42. Insurance Agent
43. Surveyor
44. Entertainer
45. Social Worker
46. Judge
47. Appraisor
48. Laboratory Technician
49. Editor
50. Pharmacist

51. Select printed materials to make a favorable impression
52. Advertise vacancies and collect rents
53. Trace plans of machines or tools
54. Entertain with acts of skill
55. Investigate crimes and question witnesses
56. Interview workers to get information for an employer
57. Sell auto accessories and parts
58. Design aircraft, ships or bridges
59. Dance professionally before the public
60. Assist a physician in treating patients
61. Engage in competitive sport for pay
62. Collect installment payments
63. Design machinery and mechanical parts
64. Play in or conduct a band or orchestra
65. Investigate causes of human actions
66. Sell magazine subscriptions from door-to-door
67. Purchase equipment and supplies
68. Analyze the results of laboratory tests
69. Compose or arrange musical scores
70. Teach pupils in public or private schools
71. Investigate personal history of job applicants
72. Plan advertising programs and campaigns
73. Check repair and test electrical equipment
74. Write articles for publication
75. Advise clients of their legal rights
76. Determine methods to get greatest efficiency from workers
77. Sell stock or insurance to clients

78. Plan and carry out mathematical research
79. Arrange materials for decorative effect
80. Fill medical prescriptions in a drug store
81. Sentence defendants in keeping with the law
82. Hire employees and assign them to jobs
83. Operate testing and inspection equipment
84. Create or reproduce paintings or designs
85. Conduct research in housing needs
86. Assign duties to employees and enforce rules and regulations
87. Appraise property to determine its value
88. Draw maps and use surveying instruments
89. Write original prose or poetry
90. Lead religious services and visit parishioners
91. Run a prison and make disciplinary regulations
92. Audit the books of a business concern
93. Assist scientist in laboratory research
94. Carve or shape artistic objects
95. Do research to improve health conditions
96. Write criticisms of books and plays
97. Operate a retail store
98. Operate electrical or mechanical equipment
99. Sing with a band or choir
100. Teach in a college or university

-- TURN OVER ANSWER SHEET AND CONTINUE WITH QUESTION 101 --

101. Office Clerk
102. Mechanic
103. Beautician
104. Landscape Gardener
105. Radio Announcer
106. Stenographer
107. Carpenter
108. Dietician
109. Forest Ranger
110. Librarian
111. Shipping Clerk
112. Bricklayer
113. Chef
114. Dairyman
115. Advertising Agent
116. Statistical Clerk
117. Sheet-Metal Worker
118. Sales Clerk
119. Nurseryman
120. Printer
121. Timekeeper
122. Electrician
123. Waiter-Waitress
124. Fisherman
125. Salesperson
126. Cashier
127. Assembler
128. Steward-Stewardess
129. Gamekeeper
130. Detective
131. Bookkeeper
132. Machine Operator
133. Messenger
134. Florist
135. Store Manager
136. Typist
137. Plumber
138. Receptionist
139. Farmer
140. Translator
141. Stock Clerk
142. Repairman
143. Guide
144. Game Warden
145. Interviewer
146. File Clerk
147. Machinist
148. Driver
149. Rancher
150. Telephone Operator

151. Sort, count and store supplies

152. Cut, fit and lay stone, brick or tile

153. Supervise preparation and serving of meals

154. Plan and perform agricultural work

155. Speak over the radio or a public address system

156. Receive customers and give information

157. Supervise construction or repair work

158. Serve food or drinks

159. Breed or raise poultry or livestock for sale

160. Set type for printing

161. Take dictation and transcribe shorthand notes

162. Use tools to produce fine cabinet work

163. Watch, amuse or help children

164. Supervise gangs working in fields or forests

165. Advise and assist parents on child care

166. Type letters, bills or statements

167. Form molds for the casting of metal or glass

168. Aid the ill or disabled

169. Deliver bread, milk or laundry

170. Instruct workers in an industrial plant

171. Arrange and file records systematically

172. Form and assemble sheet metal parts

173. Care for elderly persons

174. Catch or breed fish commercially

175. Advise people on business or farming

176. Keep a complete set of business records

177. Carve, grind or polish optical glass or jewels

178. Advise customers on the proper use of articles

179. Plant and care for flowers and shrubbery

180. Give lectures and lead discussion groups

181. Operate office machines

182. Copy designs or letters on flat surfaces

183. Assist prospective customers

184. Treat animals for various diseases

185. Teach salesmen how to make sales talks

186. Sort and deliver letters and messages

187. Specialize in repairing gasoline or diesel engines

188. Plan or prepare meals for large groups

189. Operate small commercial boats

190. Write technical reports on scientific subjects

191. Take telephone orders for products or services

192. Operate heavy hoisting and moving machinery

193. Assist in caring for the property of others

194. Hunt or trap animals commercially

195. Report current events based on interviews

196. Keep charge account records

197. Replace worn parts on machinery

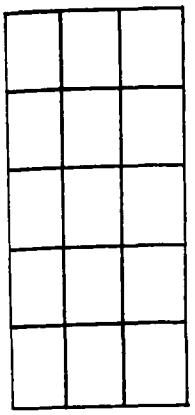
198. Prepare meals in a private home

199. Plant, cultivate and harvest crops

200. Translate foreign correspondence for a business firm

HACKMAN-GAITHER VOCATIONAL INTEREST INVENTORY

by Roy B. Hackman & James W. Gaither



DIRECTIONS:
Read each question, and think what your feelings or interests have usually been. Then mark your answer as you have been instructed.
BE SURE TO ANSWER EVERY QUESTION.

NAME _____ Last _____ First _____ Middle

AGE _____ Yrs _____ Mos SEX _____ M or F DATE _____

SCHOOL _____ CITY _____

L	L?	D?	D
1	2	3	4

1				2				3				4				5			
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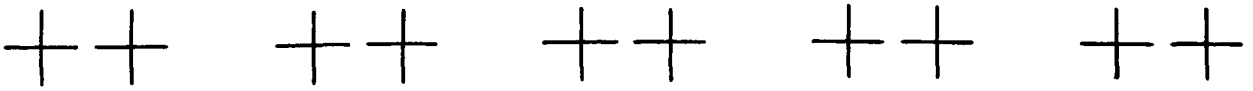

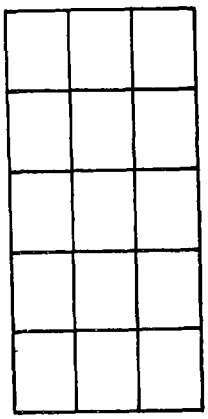

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106	1	2	3	4	107	1	2	3	4	108	1	2	3	4	109	1	2	3	4	110	1	2	3	4
111	1	2	3	4	112	1	2	3	4	113	1	2	3	4	114	1	2	3	4	115	1	2	3	4
116	1	2	3	4	117	1	2	3	4	118	1	2	3	4	119	1	2	3	4	120	1	2	3	4
121					122					123					124					125				

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131	1	2	3	4	132	1	2	3	4	133	1	2	3	4	134	1	2	3	4	135	1	2	3	4
136	1	2	3	4	137	1	2	3	4	138	1	2	3	4	139	1	2	3	4	140	1	2	3	4
141	1	2	3	4	142	1	2	3	4	143	1	2	3	4	144	1	2	3	4	145	1	2	3	4
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156	1	2	3	4	157	1	2	3	4	158	1	2	3	4	159	1	2	3	4	160	1	2	3	4
161	1	2	3	4	162	1	2	3	4	163	1	2	3	4	164	1	2	3	4	165	1	2	3	4
166	1	2	3	4	167	1	2	3	4	168	1	2	3	4	169	1	2	3	4	170	1	2	3	4
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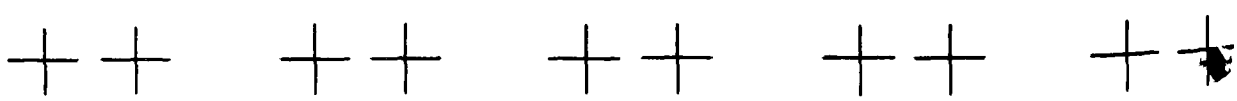
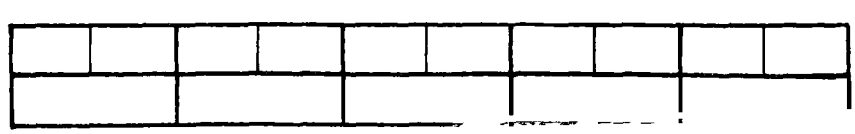
176	1	2	3	4	177	1	2	3	4	178	1	2	3	4	179	1	2	3	4	180	1	2	3	4
181	1	2	3	4	182	1	2	3	4	183	1	2	3	4	184	1	2	3	4	185	1	2	3	4
186	1	2	3	4	187	1	2	3	4	188	1	2	3	4	189	1	2	3	4	190	1	2	3	4
191	1	2	3	4	192	1	2	3	4	193	1	2	3	4	194	1	2	3	4	195	1	2	3	4
196					197					198					199					200				





TEST BOOKLET

ALLPORT · VERNON · LINDZEY

Study of Values

THIRD EDITION

HOUGHTON MIFFLIN COMPANY
Boston

The Riverside Press Cambridge
PRINTED IN THE U S A
HB 64

Part I

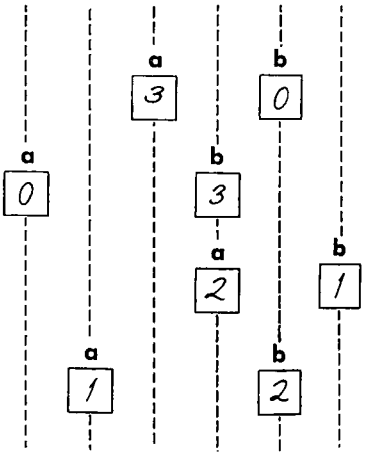
DIRECTIONS: A number of controversial statements or questions with two alternative answers are given below. Indicate your personal preferences by writing appropriate figures in the boxes to the right of each question. Some of the alternatives may appear equally attractive or unattractive to you. Nevertheless, please attempt to choose the alternative that is *relatively* more acceptable to you. For each question you have three points that you may distribute in any of the following combinations.

1. If you agree with alternative (a) and disagree with (b), write 3 in the first box and 0 in the second box, thus

2. If you agree with (b); disagree with (a), write

3. If you have a slight preference for (a) over (b), write

4. If you have a slight preference for (b) over (a), write



Do not write any combination of numbers except one of these four. There is no time limit, but do not linger over any one question or statement, and do not leave out any of the questions unless you find it really impossible to make a decision.

1. The main object of scientific research should be the discovery of truth rather than its practical applications. (a) Yes; (b) No.

2. Taking the Bible as a whole, one should regard it from the point of view of its beautiful mythology and literary style rather than as a spiritual revelation. (a) Yes; (b) No.

3. Which of the following men do you think should be judged as contributing more to the progress of mankind? (a) Aristotle; (b) Abraham Lincoln.

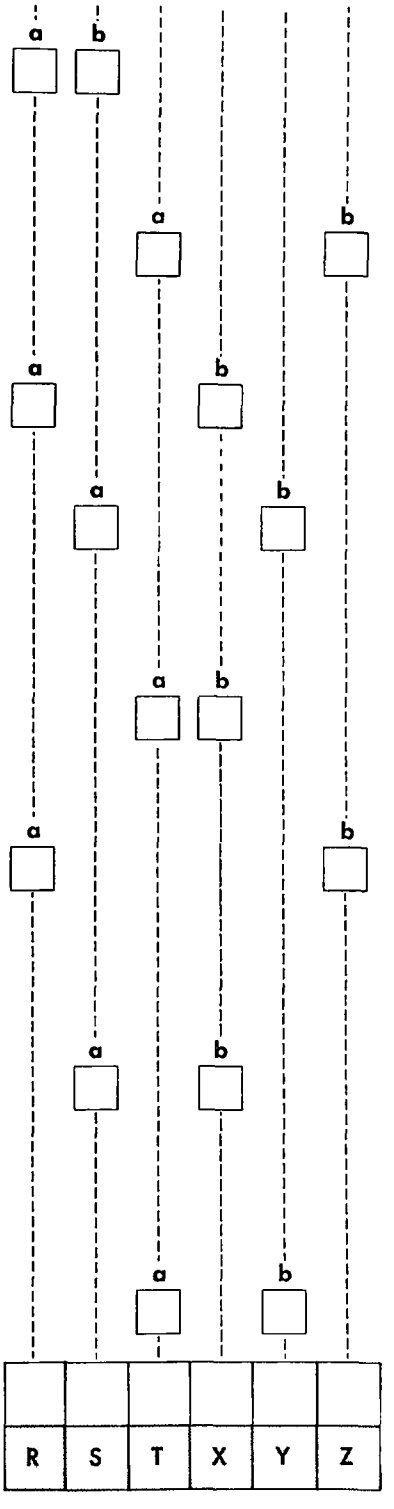
4. Assuming that you have sufficient ability, would you prefer to be: (a) a banker; (b) a politician?

5. Do you think it is justifiable for great artists, such as Beethoven, Wagner and Byron to be selfish and negligent of the feelings of others? (a) Yes; (b) No.

6. Which of the following branches of study do you expect ultimately will prove more important for mankind? (a) mathematics; (b) theology.

7. Which would you consider the more important function of modern leaders? (a) to bring about the accomplishment of practical goals; (b) to encourage followers to take a greater interest in the rights of others.

8. When witnessing a gorgeous ceremony (ecclesiastical or academic, induction into office, etc.), are you more impressed: (a) by the color and pageantry of the occasion itself; (b) by the influence and strength of the group?



9. Which of these character traits do you consider the more desirable? (a) high ideals and reverence; (b) unselfishness and sympathy.

10. If you were a university professor and had the necessary ability, would you prefer to teach: (a) poetry; (b) chemistry and physics?

11. If you should see the following news items with headlines of equal size in your morning paper, which would you read more attentively? (a) PROTESTANT LEADERS TO CONSULT ON RECONCILIATION; (b) GREAT IMPROVEMENTS IN MARKET CONDITIONS.

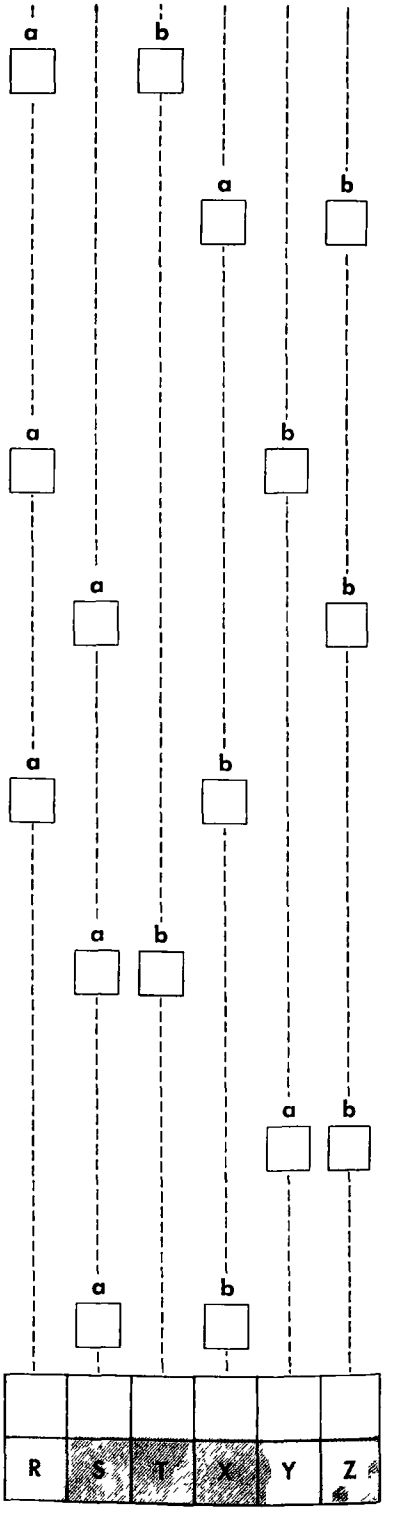
12. Under circumstances similar to those of Question 11? (a) SUPREME COURT RENDERS DECISION; (b) NEW SCIENTIFIC THEORY ANNOUNCED.

13. When you visit a cathedral are you more impressed by a pervading sense of reverence and worship than by the architectural features and stained glass? (a) Yes; (b) No.

14. Assuming that you have sufficient leisure time, would you prefer to use it: (a) developing your mastery of a favorite skill; (b) doing volunteer social or public service work?

15. At an exposition, do you chiefly like to go to the buildings where you can see: (a) new manufactured products; (b) scientific (e.g., chemical) apparatus?

16. If you had the opportunity, and if nothing of the kind existed in the community where you live, would you prefer to found: (a) a debating society or forum; (b) a classical orchestra?



17. The aim of the churches at the present time should be: (a) to bring out altruistic and charitable tendencies; (b) to encourage spiritual worship and a sense of communion with the highest.

18. If you had some time to spend in a waiting room and there were only two magazines to choose from, would you prefer: (a) SCIENTIFIC AGE; (b) ARTS AND DECORATIONS?

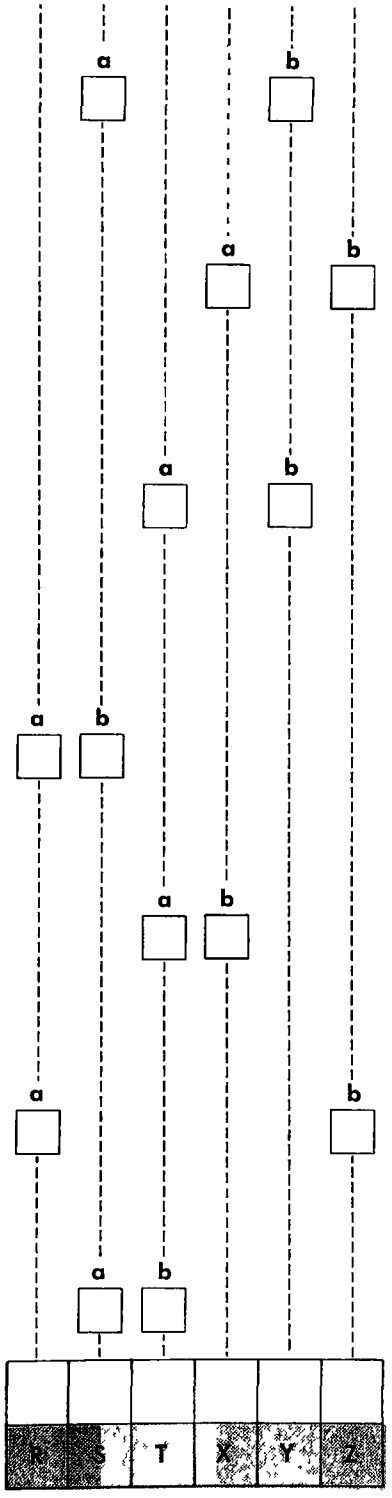
19. Would you prefer to hear a series of lectures on: (a) the comparative merits of the forms of government in Britain and in the United States; (b) the comparative development of the great religious faiths?

20. Which of the following would you consider the more important function of education? (a) its preparation for practical achievement and financial reward, (b) its preparation for participation in community activities and aiding less fortunate persons.

21. Are you more interested in reading accounts of the lives and works of men such as: (a) Alexander, Julius Caesar, and Charlemagne; (b) Aristotle, Socrates, and Kant?

22. Are our modern industrial and scientific developments signs of a greater degree of civilization than those attained by any previous society, the Greeks, for example? (a) Yes; (b) No.

23. If you were engaged in an industrial organization (and assuming salaries to be equal), would you prefer to work: (a) as a counselor for employees; (b) in an administrative position?



24. Given your choice between two books to read, are you more likely to select: (a) THE STORY OF RELIGION IN AMERICA; (b) THE STORY OF INDUSTRY IN AMERICA?

25. Would modern society benefit more from: (a) more concern for the rights and welfare of citizens; (b) greater knowledge of the fundamental laws of human behavior?

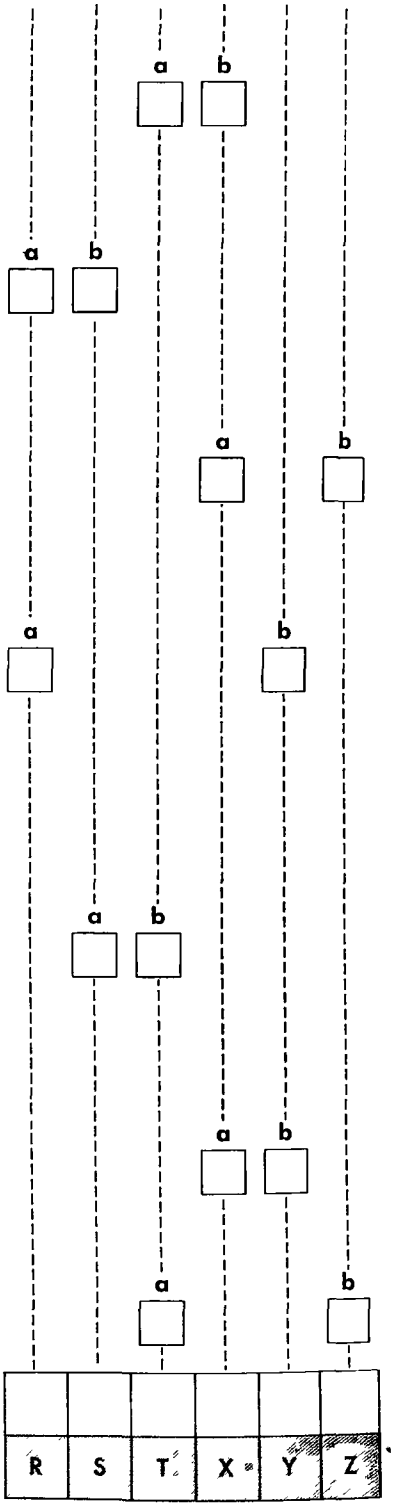
26. Suppose you were in a position to help raise standards of living, or to mould public opinion. Would you prefer to influence: (a) standards of living; (b) public opinion?

27. Would you prefer to hear a series of popular lectures on: (a) the progress of social service work in your part of the country; (b) contemporary painters?

28. All the evidence that has been impartially accumulated goes to show that the universe has evolved to its present state in accordance with natural principles, so that there is no necessity to assume a first cause, cosmic purpose, or God behind it. (a) I agree with this statement; (b) I disagree.

29. In a paper, such as the New York Sunday Times, are you more likely to read: (a) the real estate sections and the account of the stock market; (b) the section on picture galleries and exhibitions?

30. Would you consider it more important for your child to secure training in: (a) religion; (b) athletics?



Part II

DIRECTIONS: Each of the following situations or questions is followed by four possible attitudes or answers. Arrange these answers in the order of your personal preference by writing, in the appropriate box at the right, a score of 4, 3, 2, or 1. To the statement you prefer most give 4, to the statement that is second most attractive 3, and so on.

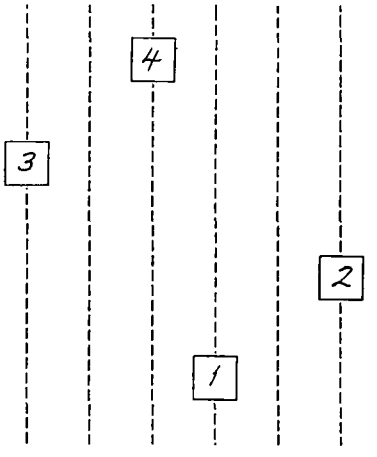
Example: If this were a question and the following statements were alternative choices you would place:

4 in the box if this statement appeals to you most.

3 in the box if this statement appeals to you second best.

2 in the box if this statement appeals to you third best.

1 in the box if this statement represents your interest or preference least of all.



You may think of answers which would be preferable from your point of view to any of those listed. It is necessary, however, that you make your selection from the alternatives presented, and arrange all four in order of their desirability, guessing when your preferences are not distinct. If you find it really impossible to state your preference, you may omit the question. Be sure not to assign more than *one* 4, *one* 3, etc., for each question.

1. Do you think that a good government should aim chiefly at—(*Remember to give your first choice 4, etc*)
   - *a* more aid for the poor, sick and old
   - *b* the development of manufacturing and trade
   - *c* introducing highest ethical principles into its policies and diplomacy
   - *d* establishing a position of prestige and respect among nations

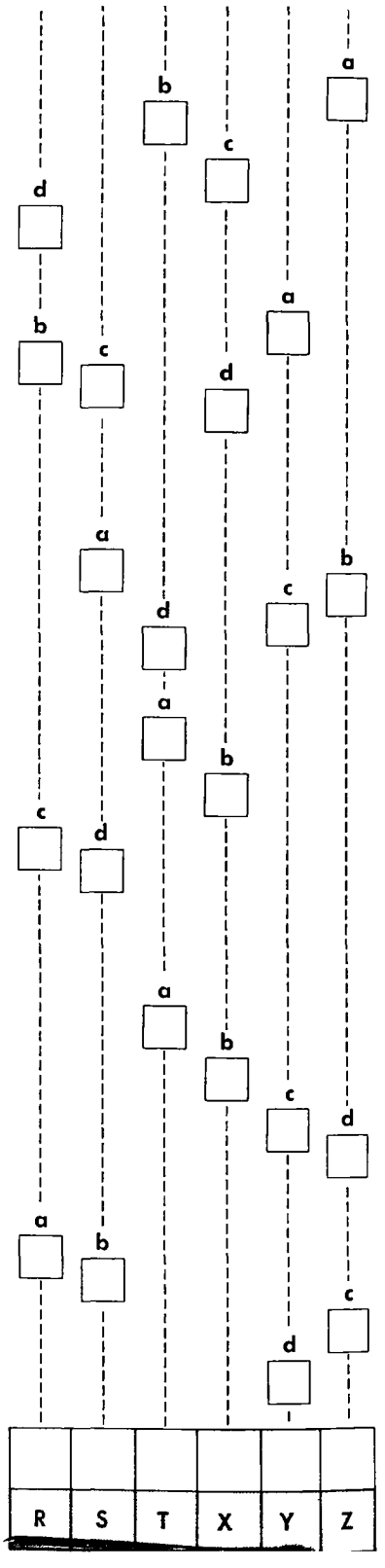
2. In your opinion, can a man who works in business all the week best spend Sunday in —
   - *a* trying to educate himself by reading serious books
   - *b* trying to win at golf, or racing
   - *c* going to an orchestral concert
   - *d* hearing a really good sermon

3. If you could influence the educational policies of the public schools of some city, would you undertake —
   - *a* to promote the study and participation in music and fine arts
   - *b* to stimulate the study of social problems
   - *c* to provide additional laboratory facilities
   - *d* to increase the practical value of courses

4. Do you prefer a friend (of your own sex) who —
   - *a* is efficient, industrious and of a practical turn of mind
   - *b* is seriously interested in thinking out his attitude toward life as a whole
   - *c* possesses qualities of leadership and organizing ability
   - *d* shows artistic and emotional sensitivity

5. If you lived in a small town and had more than enough income for your needs, would you prefer to —
   - *a* apply it productively to assist commercial and industrial development
   - *b* help to advance the activities of local religious groups
   - *c* give it for the development of scientific research in your locality
   - *d* give it to The Family Welfare Society

6. When you go to the theater, do you, as a rule, enjoy most —
   - *a* plays that treat the lives of great men
   - *b* ballet or similar imaginative performances
   - *c* plays that have a theme of human suffering and love
   - *d* problem plays that argue consistently for some point of view



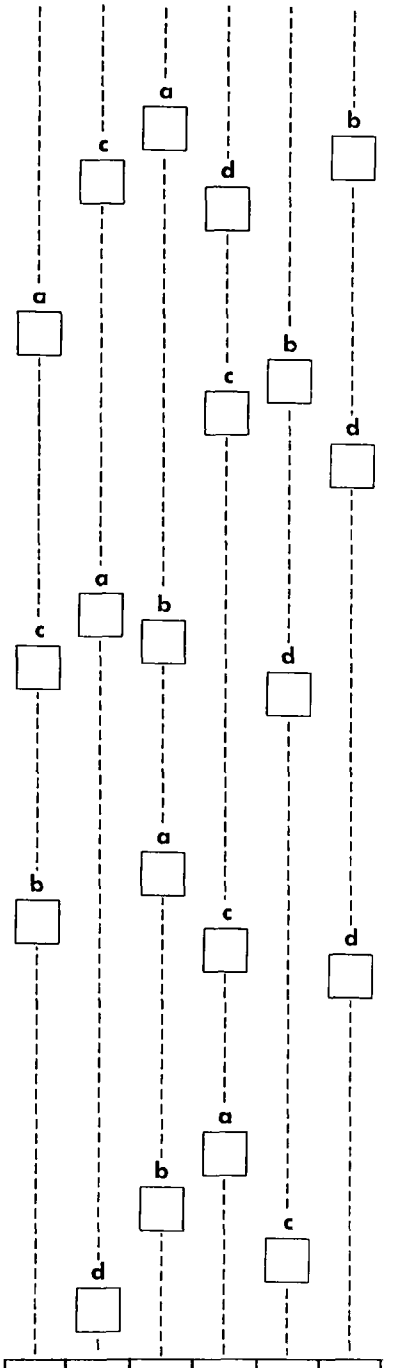
7. Assuming that you are a man with the necessary ability, and that the salary for each of the following occupations is the same, would you prefer to be a —
   a. mathematician
   b. sales manager
   c. clergyman
   d. politician

8. If you had sufficient leisure and money, would you prefer to —
   a. make a collection of fine sculptures or paintings
   b. establish a center for the care and training of the feeble-minded
   c. aim at a senatorship, or a seat in the Cabinet
   d. establish a business or financial enterprise of your own

9. At an evening discussion with intimate friends of your own sex, are you more interested when you talk about —
   a. the meaning of life
   b. developments in science
   c. literature
   d. socialism and social amelioration

10. Which of the following would you prefer to do during part of your next summer vacation (if your ability and other conditions would permit) —
    a. write and publish an original biological essay or article
    b. stay in some secluded part of the country where you can appreciate fine scenery
    c. enter a local tennis or other athletic tournament
    d. get experience in some new line of business

11. Do great exploits and adventures of discovery such as Columbus's, Magellan's, Byrd's and Amundsen's seem to you significant because —
    a. they represent conquests by man over the difficult forces of nature
    b. they add to our knowledge of geography, meteorology, oceanography, etc.
    c. they weld human interests and international feelings throughout the world
    d. they contribute each in a small way to an ultimate understanding of the universe



Total						
	R	S	T	X	Y	Z

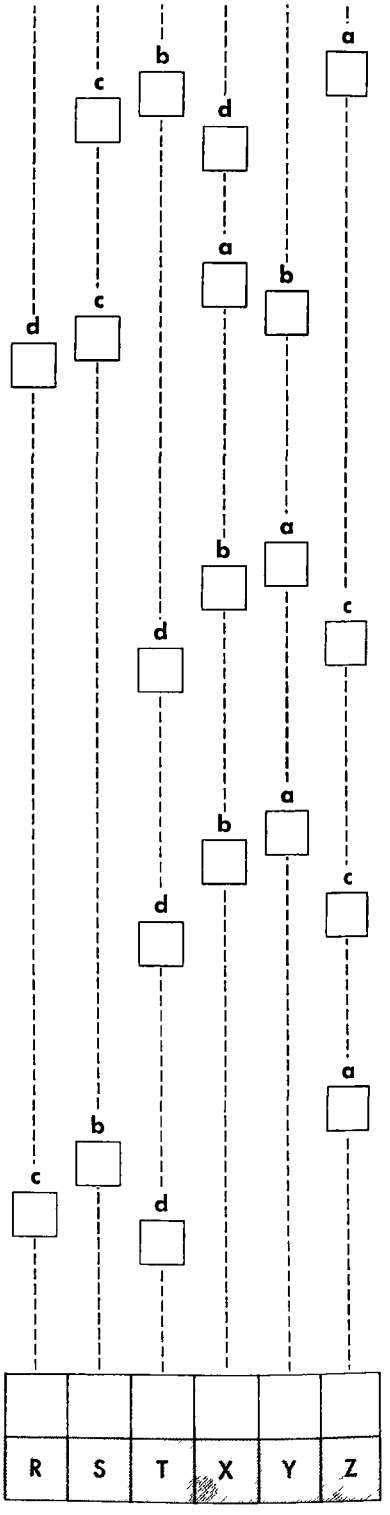
12. Should one guide one's conduct according to, or develop one's chief loyalties toward —
    a. one's religious faith
    b. ideals of beauty
    c. one's occupational organization and associates
    d. ideals of charity

13. To what extent do the following famous persons interest you —
    a. Florence Nightingale
    b. Napoleon
    c. Henry Ford
    d. Galileo

14. In choosing a wife would you prefer a woman who — (*Women answer the alternative form below*)
    a. can achieve social prestige, commanding admiration from others
    b. likes to help people
    c. is fundamentally spiritual in her attitudes toward life
    d. is gifted along artistic lines

    (*For women*) Would you prefer a husband who —
    a. is successful in his profession, commanding admiration from others
    b. likes to help people
    c. is fundamentally spiritual in his attitudes toward life
    d. is gifted along artistic lines

15. Viewing Leonardo da Vinci's picture, "The Last Supper," would you tend to think of it —
    a. as expressing the highest spiritual aspirations and emotions
    b. as one of the most priceless and irreplaceable pictures ever painted
    c. in relation to Leonardo's versatility and its place in history
    d. the quintessence of harmony and design



SCORE SHEET FOR THE STUDY OF VALUES

DIRECTIONS:

1. First make sure that every question has been answered.

   Note: If you have found it impossible to answer all the questions, you may give equal scores to the alternative answers under each question that has been omitted; thus,

   Part I. 1½ for each alternative. The sum of the scores for (a) and (b) must always equal 3.

   Part II. 2½ for each alternative. The sum of the scores for the four alternatives under each question must always equal 10.

2. Add the vertical columns of scores on each page and enter the total in the boxes at the bottom of the page.
3. Transcribe the totals from each of the foregoing pages to the columns below. For each page enter the total for each column (R, S, T, etc.) in the space that is labeled with the same letter. **Note that the order in which the letters are inserted in the columns below differs for the various pages.**

Page Totals	Theoretical	Economic	Aesthetic	Social	Political	Religious	The sum of the scores for each row must equal the figure given below.
Part I							
Page 3	(R)	(S)	(T)	(X)	(Y)	(Z)	24
Page 4	(Z)	(Y)	(X)	(T)	(S)	(R)	24
Page 5	(X)	(R)	(Z)	(S)	(T)	(Y)	21
Page 6	(S)	(X)	(Y)	(R)	(Z)	(T)	21
Part II							
Page 8	(Y)	(T)	(S)	(Z)	(R)	(X)	60
Page 9	(T)	(Z)	(R)	(Y)	(X)	(S)	50
Page 10	(R)	(S)	(T)	(X)	(Y)	(Z)	40
Total							240
Correction Figures	+ 2*	− 1	+ 4	− 2*	+ 2	− 5	
Final Total							240

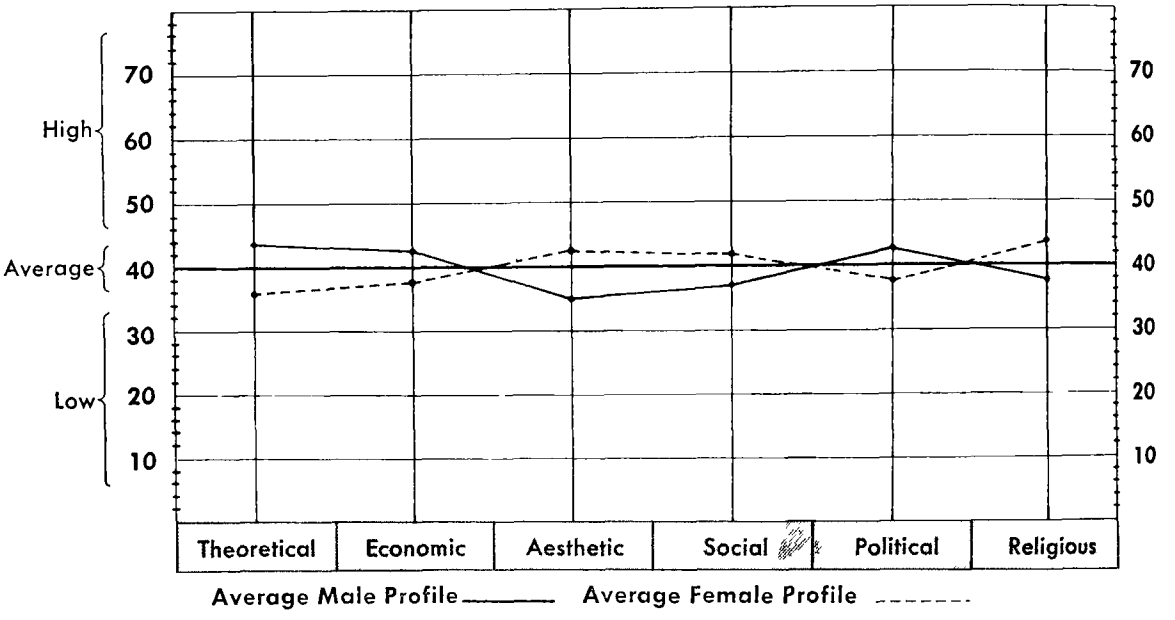
4. Add the totals for the six columns. Add or subtract the correction figures as indicated.
5. Check your work by making sure that the total score for all six columns equals 240. (Use the margins for your additions, if you wish.)
6. Plot the scores by marking points on the *vertical lines* in the graph on the next page. Draw lines to connect these six points.

*In the 1951 Edition these figures were: *Theoretical* +3, *Social* −3. These new correction figures have been employed in determining the norms in the 1960 manual.

NAME _____ DATE _____
Last First Middle Initial

SEX (M or F) _____

PROFILE OF VALUES



INTERPRETATION

The profile can be best interpreted if the scores obtained are compared with the following ranges. (Detailed norms for college students and for certain occupations will be found in the *Manual of Directions.*)

Men

High and low scores. A score on one of the values may be considered definitely high or low if it falls outside the following limits. Such scores exceed the range of 50% of all *male* scores on that value.

Theoretical	39-49	*Social*	32-42
Economic	37-48	*Political*	38-47
Aesthetic	29-41	*Religious*	32-44

Outstandingly high and low scores. A score on one of the values may be considered very distinctive if it is higher or lower than the following limits. Such scores fall outside the range of 82% of all *male* scores for that value.

Theoretical	34-54	*Social*	28-47
Economic	32-53	*Political*	34-52
Aesthetic	24-47	*Religious*	26-51

Women

High and low scores. A score on one of the values may be considered definitely high or low if it falls outside the following limits. Such scores exceed the range of 50% of all *female* scores on that value.

Theoretical	31-41	*Social*	37-47
Economic	33-43	*Political*	34-42
Aesthetic	37-48	*Religious*	37-50

Outstandingly high and low scores. A score on one of the values may be considered very distinctive if it is higher or lower than the following limits. Such scores fall outside the range of 82% of all *female* scores for that value.

Theoretical	26-45	*Social*	33-51
Economic	28-48	*Political*	29-46
Aesthetic	31-54	*Religious*	31-56